THE ACQUISITION OF ENGLISH PASSIVE CONSTRUCTIONS BY MANDARIN SPEAKERS: A DEVELOPMENTAL PERSPECTIVE

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To my son Jeremy 扬華，

who is growing up to be a speaker of the “Pure Language” (Zephaniah 3:9).
Acknowledgement

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Statement of Authentication

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in full or in part, for a degree at this or any other institution.

_____________________________
Kenny Wang
January, 2010
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<td>ACC</td>
<td>Accusative</td>
</tr>
<tr>
<td>ADJ</td>
<td>Adjunct</td>
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<tr>
<td>ADJAGENT</td>
<td>Adjunct agent</td>
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<tr>
<td>AUX</td>
<td>Auxiliary</td>
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<tr>
<td>CLASS</td>
<td>Classifier</td>
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<tr>
<td>DEF</td>
<td>Definiteness</td>
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<tr>
<td>GEN</td>
<td>Genitive</td>
</tr>
<tr>
<td>MW</td>
<td>Measure word</td>
</tr>
<tr>
<td>NUM</td>
<td>Number</td>
</tr>
<tr>
<td>Ø</td>
<td>Ellipsis</td>
</tr>
<tr>
<td>OBJ_θ</td>
<td>Secondary Objects or Restricted Objects</td>
</tr>
<tr>
<td>OBL_θ</td>
<td>Obliques (Abbreviation of multiple oblique functions)</td>
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<tr>
<td>PCASE</td>
<td>Prepositional “case”</td>
</tr>
<tr>
<td>PASS</td>
<td>Passive</td>
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<tr>
<td>PERF</td>
<td>Perfective aspect</td>
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<tr>
<td>PERS</td>
<td>Person</td>
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<tr>
<td>PRED</td>
<td>Predicate</td>
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Abstract

The acquisition and the felicitous use of discourse-pragmatic devices is an important milestone for L2 learners. This study utilises Processability Theory (Pienemann, 1998; Pienemann, Di Biase, & Kawaguchi, 2005) as the language development framework to investigate the acquisition of English passive constructions by Mandarin L1 learners of English L2.

The study aims to investigate the development of various English passive constructions in the interlanguage of Mandarin L1 learners of English L2. The hypotheses are that learners at lower stages of development will use only the active construction, and that passive constructions will be more effortful for learners to process due to the greater processing loads involved in the required argument-grammatical function mapping. Furthermore, it is hypothesised that learners’ development of various constructions under the passive voice category will proceed in a sequential fashion. To empirically test the hypotheses, this thesis employed a cross-sectional and a pretest/posttest design. For the cross-sectional study, data from Mandarin speakers in two different learning contexts were collected: Australia (English as a second language) and Taiwan (English as a foreign language). In the Australia study, advanced learners (N=26) and low level learners (N=20) were recruited. In the Taiwan study, university-educated EFL learners (N=33) participated in the study. In addition, nine native English speakers were recruited as control. Each participant watched and responded to two computer-based on-line speech production tasks designed to elicit passive constructions. Both tasks required participants to provide spontaneous narratives of different events in progress. The visual stimuli manipulated viewers’ visual attention to either orient them to the agent, patient or theme argument, thus encouraging them to narrate in the corresponding grammatical voices. In the pretest/posttest study, the advanced learners from the cross-sectional study were divided into interpreting and translation (I&T) degree and non-I&T degree students and did the tasks on three occasions over two semesters of study: pre-treatment, during-treatment and post-treatment. The treatment was two semesters of I&T/non-I&T classroom instruction conducted in English in an English-speaking country. The informants’ responses were recorded and analysed quantitatively and qualitatively.
Results show that in both on-line tasks, learners of all L2 proficiency levels in both learning contexts responded more quickly and more accurately to the active-construction eliciting trials in the tasks. For the passive-construction eliciting trials, the less proficient learners in both learning contexts resisted the contextual cues more strongly and displayed a strong preference for using the active voice. The use of passive constructions developed as proficiencies in L2 increased. A similar developmental trend also emerged in learners’ alternative strategies to coping with the passive-construction eliciting trials. Learners were more able to reliably map the prominent entity to the sentence subject in their narratives as their L2 proficiencies increased. Results of learners’ reaction time in the second task support the prediction that structures requiring noncanonical mapping of argument roles to grammatical functions are more effortful to process on-line. As L2 proficiencies increased, learners’ production of passives became more automated, their response latencies were reduced and became more native-like. In the pretest/posttest study, there was a significant improvement in the performance of the I&T group after one semester of training, whereas the improvement of the non-I&T group for the same period did not reach significance. Results from the pretest/posttest study showed that classroom instruction which provides a focus on the pragmatic functions of sentence structures accelerates the acquisition of the structures in learners who are developmentally ready for them. Taken together, the results point to learners’ processing of L2 discourse-pragmatic structures that develops partially independently and in parallel to their L2 morpho-syntax. Learners’ development in L2 discourse-pragmatic structures and morpho-syntax interact such that the more automated the L2 morpho-syntax, the more processing resources there are available for learners to process discourse-pragmatic information.
Chapter 1

Introduction

Discourse-pragmatics, also known as Information Structure, refers to the way speakers distribute information structurally or grammatically to allow their listeners to work out which piece of information is topical or given, and which piece of information is focal or new (Lambrecht, 1994). The relationship between discourse regularities and pragmatics is nicely encapsulated in Hopper and Thompson’s (1993, p. 358) comment:

Grammatical regularities arise because of certain strategies people habitually use in negotiating what they have to say with their hearers, in terms of what the hearer is likely to know or be able to identify, what needs to be highlighted or presented as newsworthy, what makes a good story, and so forth.

Therefore, when native speakers wish to attribute prominence to a particular event participant in their narratives, in addition to using gestural and prosodic stresses, they have also at their disposal optional syntactic constructions with which they can assign and package the pragmatic information of relative prominence along with the intended propositional contents (Levelt, 1989). In English, these include constructions other than actives (e.g. I fixed the car), such as topicalisations (The car, I fixed), passives (The car was fixed by me), left-dislocations (The car, I fixed it), wh-clefts or pseudo-clefts (What I fixed was the car; also The thing I fixed was the car), reverse wh-clefts (The car was what I fixed) and it-clefts (It was the car I fixed) (Lambrecht, 1994; Hedberg, 1990, 2000; Hedberg & Fadden, 2007).

To ensure successful communication, it is crucial that the operation of discourse-pragmatics in speech be a reciprocal task among interlocutors (Barr & Keysar, 2006). Speakers need to ensure that the messages they produce are coherent, easily processable and rapidly integratable by the listeners into the on-going discourse so as to be properly understood. Listeners on the other hand must be able to efficiently decode the discourse-pragmatic information embedded in sentence constructions in order to extract both the intended propositional and discourse-pragmatic information from the speech input (Givón, 1988, 1995; Cowles, 2003). In this regard, Givón
spoke of “degree of mental effort” (Givón, 1988, p. 278) in processing discourse-pragmatic information and the degree to which information in discourse is “mentally-accessible” (Givón, 1995, p. 64) to interlocutors. This means that although the aforementioned optional syntactic constructions with their pragmatic forces do not fundamentally alter the propositional meaning of utterances, discourse-pragmatics as a construct, whether implemented prosodically or syntactically, does play a critical role in speech processing and successful communication (Hruska & Alter, 2004; Mourao, 2006; Stolterfoht, Friederici, Alter, & Steube, 2007; Cowles, Kluender, Kutas, & Polinsky, 2007; Carlson, Dickey, Frazier, & Clifton Jr., 2009). Sentences whose information structures are congruent with the discourse context require less mental effort on the listeners’ part to process and comprehend. Sentences with anomalous information structures often create processing difficulties in listeners; they tend to be less accessible to listeners and can potentially lead to communication breakdown.

For example, when children listen to passive sentences whose discourse-pragmatics are incompatible with the preceding context (e.g. comparing the matched-context condition *Ernie skated down the sidewalk. Ernie was pushed by Bert* with the mismatched-context condition *#Bert skated down the sidewalk. Ernie was pushed by Bert*), they are more likely to misunderstand the propositional meaning of the sentences (Gourley & Catlin, 1978; Hargrove & Panagos, 1982). In fact, the children participants in these studies fared worse in the incompatible-context condition than in the no-context condition, i.e. listening to sentences in isolation was better than listening to sentences with a preceding preamble that introduced a non-target discourse-pragmatic orientation. For adult speakers, it has been found that narratives that do not comply with the discourse-pragmatic principles hinder listeners’ recall of information and their integration of simple propositional contents of interrelated sentences into complex ideas (Hupet & Le Bouedec, 1977); in other words, discourse-pragmatics affects the way messages are processed, remembered and comprehended. The critical role of discourse-pragmatics in language processing is further confirmed in a series of event-related brain potential (ERP) studies (Cowles, 2003; Cowles, et al., 2007). It was found that in comprehending *it*-cleft sentences that violated the discourse-pragmatic expectations, as in (1b), a greater N400-like negativity effect was elicited compared to the N400 by sentences that did not violate
the discourse-pragmatic expectations, as in (1a). The larger amplitude in N400 negativity indicates more effortful processing when sentences do not respect the appropriate discourse-pragmatic principles.

(1) Q: What ate the lettuce in your garden, the deer or the rabbits?
   A: (a) It was the rabbits that ate the lettuce.
       OR
   A: (b) #It was the lettuce that the rabbits ate.

Furthermore, recent electrophysiological evidence also shows that placing discourse-focus information in the structurally non-focus position will more likely result in semantic illusion, i.e. failure to accurately represent particular information from the input in listeners (Wang, Hagoort, & Yang, 2009; see also Hornby, 1974). An example of semantic illusion created by inappropriate discourse-pragmatics is the higher probability of failing to detect the inconsistency of the information underlined in the answer (2b) than to detect it in (2a):

(2) Q: Linda and Mary had a fight. What happened to Mary?
   A: (a) Mary was pushed to the floor by Lisa.
       OR
   A: (b) #Lisa pushed Mary to the floor.

In summary, speech processing studies have unequivocally established the crucial role discourse-pragmatics plays in communication. Moreover, not only do inappropriate discourse-pragmatic forces provide no facilitative value to communication, they in fact can potentially be disruptive to communication. Discourse-pragmatically inappropriate sentences presumably require listeners to undertake additional inferential processing to determine the speakers’ pragmatic motivation behind the anomalous distribution of topic and focus information (see Langford & Holmes, 1979). These additional processing efforts render the communication more laborious, making communication more susceptible to breakdown.
In Bates and Devescovi’s (1989) study, it was found that when asked about the patient of an event in interlocution, native English speakers replied in the passive voice starting with the patient 70% of the time. On the other hand, when asked about the agent, the rate dropped down to 0% (Bates & Devescovi, 1989). This demonstrates that native speakers in general make efficient use of structures of alternative discourse-pragmatics, such as passives, in communication. For second language (L2) learners, however, this is often not the case. L2 learners must first learn to encode and decode discourse-pragmatic information if they are to communicate effectively in the L2. Once learners acquire the necessary metalinguistic knowledge for producing alternative structures, their production of these structures to achieve the desired discourse-pragmatic objective is further constrained by their L2 processing capacities (Di Biase, 2005).

Discourse-pragmatics in recent years is receiving more attention in second language acquisition (see Dimroth & Starren, 2003; Iwasaki, 2003; Dehé & Comes, 2006; Hopp, 2009, in press). Learners’ acquisition of aspects of L2 pragmatics can provide important insight into their overall L2 development. Kasper and Rose (2002, pp. 187-188) explained:

In their development of L2 pragmatics and grammar, adult learners…make do with whatever L2 grammar they have…. As learners progress, their learning task increasingly changes to figuring out the various pragmatic, often secondary meanings that specific grammatical forms have beyond their primary meaning(s). This process will evolve differently for different grammatical forms and their pragmatic meanings.

In other words, learners begin with only the absolute essentials in terms of grammar, being equipped with only the bare minimum for communicating primary contents. As learners become more competent in the obligatory aspects of L2 grammar, their capacities to handle the relatively optional L2 pragmatics begin to develop. Optional discourse-pragmatic structures therefore can serve as an indicator to help gauge learners’ L2 development in a broader sense, particularly at the more advanced end of the spectrum (Kawaguchi & Di Biase, forthcoming).

Discourse-pragmatic structures play a key functional role in communication; learners’ effective communication in L2 hinges on their acquisition and competent
use of discourse-pragmatic structures. Discourse-pragmatic structures make up a critical component in second language acquisition (SLA), they are important milestones in L2 and they serve as an index to learners’ overall L2 development. For these reasons, I have chosen to investigate the L2 acquisition of the passive constructions as a subset of discourse-pragmatic constructions. The objective of this thesis is to provide a developmental perspective on the acquisition of English passives by Mandarin speakers. I will investigate the order of acquisition of various passive constructions, the processing factors that underlie the order of acquisition, the relationship between learners’ acquisition of passives and their L2 morphosyntax as assessed by PT, as well as investigate shifts in learners’ compensatory strategies in dealing with passive-eliciting contexts.

1.1 Practical Implications of the Study

Firstly, in light of the paramount importance of the passive voice as a discourse-pragmatic strategy (Ward & Birner, 2003, 2005; Birner, 2006), we need to better understand how discourse-pragmatic constructions such as passives develop in L2. More important, however, is the big picture of learners’ L2 development that one can ascertain as one gauges their performance of passives. The implicational nature of optional discourse-pragmatic structures as formally defined in PT (Pienemann, Di Biase, & Kawaguchi, 2005) and indirectly suggested by Kasper and Rose (2002) places them at the higher end of L2 development. Passive constructions as a subset of these optional structures are important pointers on the L2 developmental trajectories of late intermediate and advanced learners.

The objective of my study is to investigate the acquisition and processing of passive constructions by Mandarin\(^1\) L1 learners of English L2 from a language processing perspective. The study will also investigate whether classroom instruction, such as tertiary level interpreting and translation (I&T) training, which provides a focus on

\(^1\)Strictly speaking, “Mandarin” must be distinguished from “Chinese”, the latter being the umbrella term for the Sinitic language group under which Mandarin and other Sinitic varieties are classified (DeFrancis, 1984; Mair, 1991). I will use the term Mandarin instead of Chinese throughout the thesis. However, since references to the “Chinese” language in the SLA literature most often refer to the modern standard Mandarin as opposed to other Sinitic varieties, unless otherwise indicated, “Chinese” in this thesis will be interchangeable with “Mandarin” for the sake of consistency with the literature.
the pragmatic functions of sentence structures, accelerates learners’ acquisition of English passive constructions. The use of trainee interpreters is a novel attempt to investigate L2 development at a higher level. Treating trainee interpreters as advanced L2 learners allows results obtained in the study to potentially inform and improve I&T training.

1.2 Theoretical Implications of the Study

The study is carried out within the framework of Processability Theory (hereafter PT) (Pienemann, 1998) and the two hypotheses recently developed as an extension of PT – the Unmarked Alignment Hypothesis and the Lexical Mapping Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005). The original PT (Pienemann, 1998) offers a processing perspective on learners’ acquisition of L2 morpho-syntax. It also makes some preliminary assumptions on the relationship between the default mappings of argument roles onto surface structures. PT extension advances the theory in offering three new hypotheses, namely the Unmarked Alignment Hypothesis, Lexical Mapping Hypothesis and Topic Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005).

Lexical Mapping Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005) predicts that early L2 learners may not possess the necessary processing procedures to produce syntactic constructions such as passives because they involve learners having to process L2 syntax in a noncanonical fashion. Preliminary data from studies of Japanese L2 and English L2 support the Lexical Mapping Hypothesis (Kawaguchi, 2005; Kawaguchi, 2009; K. Wang, 2006; 2009a). However, further testings are necessary in order to affirm the validity of the hypotheses. The study aims to contribute to the current extension of PT by developing and testing the Lexical Mapping Hypothesis against an important language constellation, namely Mandarin L1-English L2.

The language constellation currently under investigation plays a significant part in a number of ways in further testing the PT extension. From a linguistic typology perspective, while Mandarin and English are both SVO languages, there is a relatively significant presence of SOV in Mandarin. Furthermore, Mandarin is an
isolating language with virtually no morphological inflection and no case marking, whereas morphological inflection for nouns, auxiliaries and verbs and case marking for pronouns exist in English. Mandarin is considered a topic-prominent language and English a subject-prominent one (Li & Thompson, 1976). As Peltomaa (2006, p. 83) pointed out, “Topic prominence is critically important in analysing the passive.” Therefore, the topic-prominent/subject-prominent typological features of the language pair of my study will have significant bearing on the role of Mandarin L1-English L2 in further validating PT’s typological generalisability. Many of the typological characteristics Mandarin exhibits are found in other Sinitic varieties, as well as other East and South East Asian languages (Peltomaa, 2006). Analyses of Mandarin may therefore hold wide implications potentially generalisable across many other languages of similar typological characteristics.

There has been very little research done on the oral L2 development of English passive constructions; fewer studies still on the Mandarin L1-English L2 language pair. Of the SLA studies that investigated English passive constructions by Mandarin speakers, a good number of them focused on the acquisition and overpassivisation of English unergative and unaccusative verbs (e.g. Balcom, 1997; Oshita, 2000, 2001; Yu, 2005, 2006; Cai, 2000; Mo, 2006; Yip, 1995; Zobl, 1989; Li, 2006) or the incorrect transfer of the Mandarin notional passive construction in English L2 (Yip, 1995). Characteristics common to many of these studies are the use of Error Analysis in addressing the issue, the use of written data and the use of college students (e.g. Ma, 2002; Kong & Kong, 2008; Li, 2009). While these studies shed important light on the status of learners’ interlanguage, they do not offer much insight into learners’ spontaneous production of passive constructions. My study aims to bridge this gap by investigating Mandarin L1 learners’ oral development of various English L2 passive constructions.

1.3 Socio-economic Implications of the Study

From a socio-economic impact standpoint, my study holds potentially global and local applications. Mandarin as a major East Asian language, and English as the global lingua franca are two of the most widely spoken languages of the world. As China emerges as the economic superpower on the world stage in the 21st century,
there is an enormous demand on a global scale for quality ESL (English as a second language) or EFL (English as a foreign language) education for native speakers of Mandarin, and increasingly for I&T training to Mandarin-English bilinguals.

On a more local scene, each year, a large number of immigrants and overseas secondary and tertiary students from China and Taiwan enter Australia and the Australian schooling system, thus creating a strong local demand for ESL education services. The Teachability Hypothesis (Pienemann, 1984, 1989, 1998) suggests that formal language instruction should work with and facilitate the natural acquisition sequence. L2 language educators should adopt a processability-oriented pedagogic approach in order to maximise the effectiveness of formal second language instruction. My study aims to provide a clearer understanding of the recently proposed PT extension and its proper place in L2 learners’ developmental trajectories.

Additionally, in terms of English L2 language testing and assessment, Australian tertiary institutions currently rely on testing schemes such as the International English Language Testing System (IELTS) to determine prospective international students’ English proficiency levels. The IELTS scores are often presented in the form of a figure which apart from its face value is uninterpretable should the admitting institution wish to gain further insight into the applicants’ language processing skills for the purpose of admission to specialised courses, such as the Master of Interpreting and Translation or Master of Conference Interpreting programs offered at the University of Western Sydney. My study aims to provide further theoretical and empirical motivations for the employment of advanced level structure-specific online speech elicitation tasks in language assessment or language profiling schemes such as the Rapid Profile (Keßler & Keatinge, 2008).

My thesis will also help to firstly identify the L2 developmental pattern of passives in Mandarin-English I&T students; and secondly to make suggestions on how the I&T training program can improve in regards to helping students to become more competent in the appropriate use of passive constructions.
1.4 Thesis Outline

The remaining part of the thesis is organised as follows: Chapter 2 provides a review of various formal and functional aspects of English and Chinese passive constructions. It presents a review of the literature on the syntax, semantics and pragmatics of passive constructions, followed by a review of the first language acquisition (FLA) and second language acquisition (SLA) literature relevant to the acquisition, processing and production of English and Chinese passive constructions.

Chapter 3 describes the theoretical framework adopted in the present study. The chapter begins with a presentation of Levelt’s (1989) speech production model and its revisions (Bock & Levelt, 1994; Levelt, Roelofs, & Meyer, 1999) as well as its adaptations to the production of English passives (Tomlin, 1997) and principles of structural priming (Pickering & Branigan, 1998). This is followed by an overview of Lexical-Functional Grammar and its Lexical Mapping Theory, the grammatical formalism adopted by PT. Following the presentation of Levelt’s model and LFG as PT’s two architectural cornerstones, Chapter 3 then elaborates on Processability Theory as the theoretical framework adopted for my study.

Chapter 4 details the research questions my study seeks to answer, as well as the research hypotheses, by means of which the research questions will be answered. The research hypotheses cover the interrelationship between passives as an optional discourse-pragmatic structure and learners’ L2 morpho-syntactic development, learners’ acquisition of various types of English passives in a general sequential order, and whether I&T training will have an acceleration effect on learners’ acquisition of English passives. The chapter then sets out the methodological design adopted to empirically test the research hypotheses, followed by the methods of data analysis adopted in my thesis.

Chapter 5 presents the results from the empirical studies of this thesis as outlined in Chapter 4. Both qualitative and quantitative results from the cross-sectional and pretest/posttest studies are discussed in relation to the research hypotheses proposed.
Finally, the thesis concludes with a summary of the major findings of my thesis and some potential implications of this study for L2 paedagogy and refinement of Processability Theory. The concluding chapter also discusses the study’s limitations and offers suggestions for further research.
Chapter 2

Literature Review

Chapter 2 begins with a brief overview of the linguistic typologies of the language constellation, thus offering some background information on the working languages of the learners in my study. Sections 2.2 and 2.3 outline the syntactic and semantic analyses of the English and Mandarin passive constructions respectively. Since PT utilises LFG as its reference point for implementing L2 processing procedures, Section 2.2 also presents an LFG representation of the English \textit{be}-passive and the Mandarin \textit{bèi}-passive constructions, with which the analyses of empirical data in this thesis are subsequently carried out.

Section 2.4 examines the pragmatic nature of passive constructions and the various perceptual, functional and discourse-pragmatic factors that trigger the English passive voice. This section points out the English and Mandarin use of the passive voice as a discourse-pragmatic strategy and that they overlap to a large extent in terms of what triggers the passive voice.

Section 2.5 firstly presents findings from English and Mandarin first language acquisition (FLA) studies in the area of comprehension and production of passives by both children and adults. The section provides an overview of L1 development and ultimate attainment of native performance of the target constructions. It then proceeds to discuss findings from studies with several atypical populations on the performance of passives, including children with SLI, children who stutter, individuals with Down’s syndrome, adult patients with Broca’s aphasia, patients with Parkinson’s disease and dementia of Alzheimer’s type. The purpose of examining the processing of passives among atypical populations is to provide insight into processing passive constructions from an additional L1 perspective, one where speakers’ performance is suboptimal either due to congenital impairments to language development or acquired brain trauma or adult-onset disease-induced neuropathological impairments. Next, I elaborate on the common theme of working memory as one of the explanatory constructs for speech processing difficulties and
its implications on L2 acquisition. Section 2.5 concludes with a review of the growing body of literature on structural priming as a cognitive booster for processing passives on-line, and structural priming as an effective methodology for investigating the mechanisms and the enhancement of speech processing. In sum, Section 2.5 draws on several research disciplines including FLA, SLA, and neurolinguistics and highlights the common and unifying thread of language processing along with its impairment and optimisation as the central dimension critical to the on-line production of passives.

Section 2.6 reviews previous studies on the acquisition of English passive constructions by Mandarin speakers. The review provides a contrast between the majority of SLA studies on the off-line, written mode of the English passive and a small number of SLA studies that approached the issue from an on-line speech production perspective.

Section 2.7 provides a brief discussion on passive constructions with ditransitive verbs, which is an area that has received virtually no attention in FLA and SLA. Section 2.8 compares and contrasts the pragmatics and syntax of structures involving noncanonical mapping (e.g. passives) from structures involving noncanonical word order (e.g. topicalisations). Finally, Section 2.9 summarises Chapter 2.

2.1 Linguistic Analyses of Passives

Baker (2005) suggested that SLA research could benefit greatly from an understanding of the linguistic typologies involved. This section aims to firstly provide a brief contrast of the typological characteristics of the languages under investigation. I will do so from three typological characterisations: syntax, morphology, information structure.

2.1.1 Typology – Syntax

Although both Mandarin and English are SVO languages, they differ in their degree of consistency. Mandarin is less rigid in its SVO word order. In Sun and Givón’s (1985) study, they found that the proportion of SOV in their written and spoken Mandarin corpus was around 10%. Some researchers (Li & Thompson, 1974b; Li, 1975; Tai, 1975) go further in suggesting that Mandarin is shifting from SVO to
SOV. A number of core constructions including the .bootstrap (把), the object-preposing construction, the lián…dōu (連…都) focus construction and the bèi (被) construction, all assume SOV-like word orders (Huang, 1978; Shyu, 2001).

(3)² Mǎlì yān bù chōu. Object-preposing construction
Mary tobacco not smoke.
“Mary doesn’t smoke.”

(4) Mǎkè lián dàmá dōu chōu. lián…dōu construction
Mark even marijuana also smoke.
“Mark even smokes marijuana (among other things).”

(5) Mǎkè bèi tā māma dā le. bèi construction
Mark BEI he mother smack PERF.
“Mark was smacked by his mother.”

The bèi construction is of particular interest to the present study, as it is the most commonly used marked passive construction in Mandarin.

English on the other hand is a highly consistent SVO language; it allows only on rare occasions a very small number of often formulaic expressions (e.g. With this ring I thee wed; Till death do us part) to exist in the SOV word order (O’Grady, Dobrovolsky, & Aronoff, 1996, p. 240).

2.1.2 Typology – Morphology
Both Mandarin and English fall somewhere in the “analytical language” end of the morphological typology continuum (Spencer, 1991). However, Mandarin as a typical isolating language stands in sharp contrast to English; Mandarin has virtually no inflectional or derivational morphology. In addition, Mandarin has no case marking, no marking for plurality and no subject-noun agreement (Li & Thompson, 1981); it relies predominantly on word order to signal grammatical functions, as shown in (6):

² The standard Hányǔ Pīnyīn Romanisation is used throughout this thesis.
By default, the linear order of arguments relative to each other determines their semantic roles.

2.1.3 Typology – Information Structure

According to Li and Thompson’s (1976) classification, English is a subject-prominent language, which means sentences typically emphasise the subject. On the other hand, Mandarin is a topic-prominent language (Li & Thompson, 1976; however, cf. Huang & Chui, 1997). This means that

in Mandarin, the basic structure of sentences can be more insightfully treated in a description in which the topic-comment relation rather than the subject-predicate relation plays a major role, although many sentences, of course, do have identifiable subjects. (Li & Thompson, 1978/2006)

The fact that Mandarin is topic-prominent has a direct and critical bearing on the nature of the Mandarin passive voice (Peltomaa, 2006). Li and Thompson (1976) pointed out that the low proportion of passive structures in Mandarin is mainly due to its topic-comment characteristic. For Mandarin speakers acquiring English L2, this means learners come from an L1 background whose passive constructions are less utilised, into an L2 that makes greater use of passives as a linguistic means of assigning prominence.

2.1.4 Passive Voice in English and Mandarin

Some languages have a clear preference for the passive voice over the active voice (Tucker, 1935; Nida & Taber, 1982). In some other languages (e.g. Dinka), both voices are equally well-developed (Tucker, 1935; see also Keenan, 1985). Other languages still have no passive voice at all (Turner, Mille, & Montgomery, 2002; Keenan, 1985). On this issue, the default voice for Mandarin and English is the active voice.
In English, speakers may express the same linguistic content in different constructions. Levelt (1989) contended that it is because speakers take a particular perspective on the conceptual structure to be expressed.

Take, for example, the following sentences:

(7) (a) President Obama dismissed the Secretary of Defense.
     (b) The Secretary of Defense was dismissed (by President Obama).

In sentence (7a), the speaker produces it from the perspective of the agent\(^3\) (Obama). In (7b), the speaker takes the perspective of the patient (the Secretary of Defense).

The subject of a sentence has the greatest grammatical prominence and the sentence initial position of the linear organisation of a sentence is the most prominent position (Levelt, 1989). Therefore, in (7a), the argument role of agent (Obama) is mapped to the syntactically prominent function/position, foregrounding Obama as the semantic agent responsible for the act. In (7b), a less prominent argument, the patient is mapped to the syntactically prominent function/position; the agent at the same time is backgrounded to become the adjunct of the sentence. That the agent is backgrounded in (7b) can be seen by the fact that the speaker may even make no mention of the agent if he or she so chooses. In other words, while the active and the passive voice can almost always be regarded as truth conditional synonyms, they evoke different cognitive representations in interlocutors (Evans & Green, 2006).

\(^3\) As Keenan (1985, p. 261) points out, expressions like “agent phrase” referring to by Mark in The dog was kicked by Mark can be misleading and confusing, as the NP in the by- clause assumes whatever thematic role is required by the verb (e.g. the by-NP is “Experiencer” in The dog was loved by Mark). On this note, Dowty (1991) contended that the difficulties traditional theories of thematic roles experience with regards to pinning down the exact role types is due to the fact that role types are simply not discrete categories in the traditional sense. Dowty (1991) proposed a two-cluster concept of thematic roles, namely the Proto-Agent and Proto-Patient as the best way of categorising thematic roles (see Kako, 2006, who tested the psychological reality of Dowty’s Proto-role Hypothesis). For the sake of simplicity, I follow Keenan (1985) and Wanner (2009) in calling the NP in the by- clause “agent” in a general sense notwithstanding the fact that it may assume other thematic roles.
In Mandarin, there are three types of passives (i) the unmarked or the notional passive, (ii) passive in the form of the \textit{shì...de} focus construction, and (iii) the marked passive.

Sentence (8) illustrates the unmarked or notional passive:

(8) \begin{align*}
Xìn & \quad ji & \quad le & \quad ma? \\
\text{Letter} & \quad \text{send} & \quad \text{PERF} & \quad \text{QUESTION}? \\
\text{Has the letter been sent?}
\end{align*}

The \textit{xìn} or letter in (8) obviously does not do the sending. So sentences like (8) appear in the active voice, its core passivity is not overtly marked, passivity however is implied and notionally interpreted by the listener. This type of passive sentence is called the unmarked passive, pseudo-passive\textsuperscript{4}, notional passive or the “patient-subject construction” (受事主语句) in Chinese linguistics. Notional passive is generally believed to be a form of topic-comment structure or topicalisation (Yip, 1995; Yip & Matthews, 2000; Han, 2000). As Chinese is a topic-prominent language, it is no surprise then that the notional passive is by far the most common type of passive in Chinese (Du, 1993; Y.-T. Wang & Li, 2007). Some have also suggested that the marked passive construction was diachronically a development out of the notional passive (He, 2005b). The notional passive construction is constrained by the animacy status of the patient. If an event involves an animate patient, placing the animate patient in the subject position will create ambiguity, as in (9):

(9) \begin{align*}
Yú & \quad chī & \quad le. \\
\text{Fish} & \quad \text{eat} & \quad \text{PERF}. \\
??\text{The fish has eaten}/\text{The fish has been eaten.}
\end{align*}

(Cheung, Liu, & Shih, 1994, p. 474)

\textsuperscript{4}There are unfortunately inconsistencies in the literature on the use of the term “pseudo-passive”. For example, pseudo-passives in traditional generative grammar refer to English prepositional passives that deem the verb and the preposition combination as one semantic unit (e.g. \textit{The doctor was sent for}) (Riddle & Sheintuch, 1983). Keating and Keßler (Keatinge & Keßler, 2009) use the term to refer to L2 learners’ non-target like passives. Chinese linguists use the term to refer to the notional passive in Chinese (e.g. Yip, 1995).
The English middle voice achieves a passive effect in a way similar to the notional passive construction in Chinese (Wilson, 1993). An example of an English sentence in the middle voice is *The book sells very well*.

The *shì...de* focus construction is more of a *it*-cleft like focus construction than a passive construction (Hedberg, 1999), although it can fulfil the function of passivity. *Shì* is the same as the English copula *be*, and *de* is a modification marker.

(10)  

```
Shū shì Mākè xiē de.
```

Book is Mark write MODIF.

The book was written by Mark.

With this construction, the modification marker *de* associates the post-*shì* modifying clause with “the book” in (10), indicating that the book is something Mark wrote.

Another construction worth pointing out here that may be seen as a variant of the notional passive is topicalisation, or what Givón terms “word-order inverse” or the “L(eft)-dislocation” construction (Givón, 1994):

(11)  

```
Dìngjīn wǒ yǐjīng jiāo le.
```

Bond I already pay PERF.

I have already paid the bond.

The pragmatic definition of the active, inverse and passive voice has been given by Cooreman (1982, 1985, 1987, as cited in Givón, 1994, pp. 8-9)

**Active**: the voice construction in which the agent is more topical than the patient, but the patient retains considerable topicality.

**Inverse**: the patient is more topical than the agent, but the agent retains considerable topicality.

**Passive**: the patient is more topical than the agent, and the agent is extremely non-topical.
According to Cooreman’s pragmatic definition, the inverse voice is a device that promotes the patient without significantly demoting the agent. The inverse voice in (11) promotes the theme/patient bond and retains the agent I while the notional passive such as (8) suppresses the agent altogether.

The marked passive\(^5\) involves the use of a passive marker, which is typically bèi (被). Using the same example above, the Mandarin version of (7a) and (7b) are as follows:

(12) (a) Áobāmā zòngtòng chèhuàn le guófáng bùzhǎng.
    Obama President dismissed PERF defense Secretary.
    President Obama dismissed the Secretary of Defense.

(b) Guófáng bùzhǎng bèi (Áobāmā zòngtòng) chèhuàn le.
    Defense Secretary BEI (Obama President) dismissed PERF.
    The Secretary of Defense was dismissed by President Obama.

The passive marker bèi marks the noun that precedes it as the patient of a passive sentence. In bèi passive sentences, the agent is the adjunct and is optional.

There has been much debate and great controversy surrounding the lexical category of bèi. There are roughly four competing approaches to analysing the categorical status of bèi; these are: bèi as a preposition/coverb (Chao, 1968; Li & Thompson, 1974a; Li, 1990; Kit, 1998; Cheng, 2000), a passive morpheme attached to the main verb (Shi, 1997; Hu & Shi, 2003), a verb (Hashimoto, 1971; Hashimoto, 1969b, 1987;)

\(^5\) Marked passives can be further divided into the direct and indirect passives. The indirect passive is found in many East Asian languages, it has no active counterpart. The indirect passive is also called the inflictive or the affective voice (Hashimoto, 1969b; Siewierska, 1984; Her, 1989). The direct passive is far more common than the indirect passive and it mirrors the English be- and get- passives. The scope of this thesis is the English be- and get- passives, therefore bèi in indirect passives, having no English counterpart, falls outside the scope of the present study, as does the bā-bèi cooccurring construction, which overlaps with the indirect passive to a large extend (Gao, 2007). Therefore any reference to the bèi construction or the marked passive construction refers to bèi or its variants used in the direct passive sense.
Her, 1989; Ting, 1998; Huang, 1999; Tang, 2001, 2002), a light verb (Sybesma, 1999), and an adverb (Cao, 2003).

LaPolla (1988) avoided tagging bèi with any categorical label, but rather advocated treating all verbs as having the active subcategorisation frame, the patient of a bèi sentence being the topicalised referent followed by bèi the “topic affectedness marker.”

In addition to bèi, passive markers also include jiào (叫/教), ràng (讓), and géi (给). The differences between bèi and the other passive markers are that bèi can be used in both formal and colloquial settings while the others tend to be more colloquial, and that only bèi allows for a null agent, as it is a more grammaticised marker (Ji, 2001; Yin, 2004; Yang, 2006). In colloquial use, the preference of one particular passive marker over the others is often influenced by the given regional variety of Mandarin. bèi is the most prototypical and frequently occurring passive marker (Cheung, et al., 1994; Wong & Hancox, 1999; Wu & Zhou, 2004). Lastly, bèi, jiào, ràng, and géi are considered as serial verbs when used as passive markers. All of the passive markers can in addition function as stand-alone verbs, except bèi, which has grammaticised into a passive marker only.

A unique property of the marked passive voice in Mandarin is that the use of a passive marker usually indicates that the event is to the detriment of the patient, i.e. the patient is negatively affected in some way (L. Wang, 1957; Li & Thompson, 1981; H. Wang, 1983; Cheung, et al., 1994; Hashimoto, 1988). This pejorative or adversative characteristic of marked passives is absent in notional passives and the shì…de passive construction.

2.2 Syntactic Analyses of Passives

Passive constructions have been central to formal linguistic theories. In this section, I discuss two different formal approaches to analysing the English passives, namely the transformational approach and the Lexical-Functional Grammar approach (LFG: Kaplan & Bresnan, 1982; Bresnan, 2001). LFG has been shown to be psychologically plausible as a grammatical formalism (Pickering & Barry, 1991;
Pickering, 2001; Bresnan, 2001). I therefore, following Pienemann for PT, choose LFG as the grammatical architecture on which the syntactic analysis of this thesis will be based.

### 2.2.1 Passives in Transformational Grammar

The classic transformational-generative (TG) approach (Chomsky, 1957, pp. 42-43) to analysing the English passive states that:

(13) If the following form is a grammatical sentence:
\[
NP1 - Aux - V - NP2
\]
then the corresponding string of the form is also grammatical:
\[
NP2 - Aux + be + en - V - by + NP1
\]

Under the TG approach, NP2 is moved to the subject position and NP1 becomes an oblique which may be optionally retained or deleted to arrive at a full or truncated passive respectively. TG posits that the psychological centrality is attributed to simple, active, declarative, affirmative sentences (Miller, 1962, pp. 42-43) known as “kernels”, which are the underlying sentences from which other sentence structures derive.

A number of studies (Miller, 1962; Savin & Perchonock, 1965; Morris, Rankine, & Reber, 1968) have shown the relative ease of processing kernel sentences as support for TG’s psychological reality in sentence processing. However, Goldman-Eisler and Cohen (1970) pointed out a caveat in looking to the difficulty in processing non-kernel sentences as justification for the alleged psychological reality of transformational operations. They noted that the relative difficulty in processing non-kernel sentences is not a valid measure of psychological reality of the transformation theory in view of the very high frequency of kernel sentences in speech.

On the other hand, there is a wide array of other cognitive and psycholinguistic evidence pointing to the psychological implausibility of the TG approach to analysing full and truncated passives of English (Slobin, 1966, 1968; Clark, 1965; Gough, 1965, 1966; Wright, 1969, 1972; Olson & Filby, 1972; Freidin, 1975; Salter, 1976a, 1976b; Bowey, 1982; Langacker, 1982; Tomasello, Brooks, & Stern, 1998). For example, TG posits that agentive passives are derived from active sentences,
truncated or agentless passives are in turn derived from agentive passives. Contrary to this claim, Gough (1965, 1966) found that when informants were asked to verify sentences, introducing a delay between the time the sentence presentations ended and when the participants were asked to verify the sentences did not close the gap in reaction time between verifying the active and the passive sentences. Gough’s results suggested that in some cases the semantic information of a sentence is actually accessible without the listener having to reverse-engineer, as it were, and retrieve the kernel sentence structure first. In Tomasello et al.’s (1998) study using novel verbs with young children, one group of children were exposed to a rich input of truncated passives and by-phrases, providing them with the discourse scaffolding for the agentive passive, but they never heard an agentive passive. The other group of children were exposed to agentive passives as they were. Tomasello et al. found that only those children exposed to agentive passives produced them; those who received input of truncated passives and by-phrases uttered individually only produced truncated passives. This finding demonstrates that truncated passives, which according to TG require more steps of transformation, can be acquired as single, non-transformational units before the supposedly more basic agentive passives.

Cross-linguistically, a TG analysis of passives also encounters problems when applied to other languages. M. J. Hashimoto (1969b, 1987) cited examples of the so-called inflictive or indirect passive in Japanese and Mandarin as supporting evidence and rejected the view that Japanese and Mandarin passives were derived syntactically from their underlying active sentences.

(14)  Boku-ga  chichi-ni  sin-are-ta.
    I-SUBJ   father-by  died-PASS-PAST.
    (My) father died on me.
    (Hashimoto, 1969a, p. 60)

(15)  Lisi  yòu  bèi  Wángwǔ  jīchū-le  yi-zhī  quānlěidā
    Lisi again BEI Wangwu hit-PERF one-MW homerun
    Lisi again had Wangwu hit a homerun [on him].
    (Huang, 1999, example (73))
The verbs in (14) and (15) are intransitive verbs, thus neither (14) nor (15) has a corresponding underlying active sentence from which the object was transformed into the grammatical subject of (14) or (15).

Post-verbal objects can appear in both Japanese and Mandarin passives:

(16) \textit{Boku-ga inu-ni te-o kam-are-ta.}  
I-SUBJ dog-by hand-ACC bite-PASS-PAST  
I was bitten by a dog on my hand.  
(Hashimoto, 1969a, p. 60)

(17) \textit{Wǒ bèi pèngyǒu tōu-le qián.}  
I BEI friend steel-PERF money.  
I was stolen of money by a friend.  
(Li & Thompson, 1981, p. 504)

TG would posit that the subjects of (16) and (17) are derived from the objects of the active sentences. This in reality would not be possible. The corresponding actives would have “I” in the genitive form and take “hand” or “watch” as the only possible candidate for the objects.

Similarly, Chappell’s (1986b) analysis of passives of bodily effects in Chinese provides further evidence, highlighting the difficulties a TG account would encounter in analysing Mandarin indirect passives:

(18) \textit{Tā bèi dírén dā-shāng-le tuǐ.}  
He BEI enemy hit-wound-PERF leg.  
He had his leg wounded in the enemy’s firing.  
(Chappell, 1986b, p. 274)

(19) \textit{Dírén dā-shāng-le tā-de tuǐ}  
Enemy hit-wound-PERF he-GEN leg.  
The enemy wounded his leg.  
(Chappell, 1986b, p. 274)
Sentence (18) is the passive version of (19). The object of (19) is leg, which fails to give a proper transformation-based explanation of the subject he in the passive sentence (18).

### 2.2.2 Passives in LFG

An alternative to a transformational based grammar to account for the passive is Lexical-Functional Grammar (Bresnan, 1982, 2001). LFG was chosen to provide PT with the grammatical formalism for the description of linguistic structures; therefore I also adopt LFG in this thesis for the description of both the Mandarin and English passive structures. LFG is discussed in detail in Section 3.2.

LFG is a variety of generative grammar. It rejects the assumptions of an underlying deep structure and the syntactic transformational rules of the transformational theory (Chomsky, 1965). While rejecting the assumptions of the transformational theory, LFG does not reject its goals. LFG is a processing oriented, lexicalist theory of grammar which has a powerful, flexible, and mathematically well-defined grammar formalism designed for typologically diverse languages. LFG draws on structuralist and functional/typological ideas and is compatible with different linguistic epistemologies (Bresnan, 2001). Commenting on LFG in contrast to other grammatical theories, Van Valin (2001, p. 193) stated:

> Research in LFG has had a number of different emphases, including the study of the lexicon and the development of a psychologically plausible, empirically testable theory of language production and comprehension, and...there has been a great deal of work on languages other than English and the familiar Indo-European languages.

Researchers in LFG are keenly aware of the challenge it takes to make cross-typological generalisations, and much has been done in LFG on many typologically diverse languages since its inception. Although LFG has revised its treatment of passives (Sells, 1991; Bresnan, 2001), the overall formalism of LFG has not changed significantly from when it was first introduced (Kaplan & Bresnan, 1982). It has therefore proven itself to be adaptable to a wide range of language typologies and can rightly claim this as one of its strong points (Falk, 2001). LFG was chosen to
provide the grammatical framework for PT (Pienemann, 1998) precisely because of LFG’s typological and psychological plausibility.

In LFG, sentences have several parallel representations, namely the f(functional)-structure, a(rgument)-structure, c(onstituent)-structure. The f-structures “deal with functional information (grammatical functions such as SUBJect and OBJect, but also discourse functions like TOPic) and have the form of matrices of attribute-value pairs”, the c-structures deal with constituency elements such as phrasal units and word order, while the a-structures “deal with predicate-argument information such as the number and type of arguments of a predicate and the semantic role borne by arguments.” (Austin, 2001, p. 8749) These parallel representations are linked by principles of correspondence rather than through derivation. The mapping of elements of the a-structure onto the f-structure and c-structure onto the f-structure is the driving force behind this grammatical formalism (Bresnan, 2001).

An LFG representation, including the a-structure, f-structure and c-structure, of the English sentence *Mark kicked the dog* is presented in (20):
In (20), the a-structure specifies that the verb *kick* subcategorises two arguments, bearing the roles “agent” and “patient”. The a- to f-structure mapping links the agent argument to SUBJ and the patient argument to OBJ. The c-structure manifestation of the f-structure is NP1 to SUBJ and NP2 to OBJ. The passive version of the same proposition is shown in (21):
In the passive version, *The dog was kicked by Mark* (21), in the original version of LFG (Bresnan, 1982), the auxiliary *was* was taken as the predicate (PRED) of the sentence, which took *kicked by Mark* as the verbal complement (VCOMP). However, this was amended in the later version in favour of taking the passive form of the verb together with the auxiliary *was* as the predicate (Bresnan, 2001; also compare with LOGON, 2009). Therefore (21) follows the current version of LFG (Bresnan, 2001), in representing the passive sentence *The dog was kicked by Mark*. In (21), the a-structure of the passive predicate *was kicked* specifies agent and patient, however the agent argument is suppressed. The patient is consequently mapped to SUBJ in f-structure in line with the Subject Condition in Lexical Mapping Theory (Lexical Mapping Theory is discussed in detail in Section 3.2.1). The suppressed agent can be optionally manifested as ADJ_{AGENT}.

The Mandarin equivalent of (20) *Mark kicked the dog* largely mirrors that of the English; it is shown in (22):
The Mandarin version of the active sentence roughly corresponds to the English version. The Mandarin version of the example sentence *The dog was kicked by Mark* is shown in (23):
Attempts at representing the Chinese bèi passives followed paths similar to that of the original version of LFG (Bresnan, 1982) in that they treated bèi either as a verb (Tan, 1987), a co-verb (Kit, 1998) or a matrix verb taking a VCOMP or XCOMP (Ma, 1985; Her, 1989; Wong & Hancox, 1999; Wong, 1999; Her, 2009). However, I follow the current version of LFG (Bresnan, 2001; Dalrymple, 2001) and analyse bèi tī as the passive predicate, the suppressed agent as the optionally realised ADJAGENT of the passive predicate bèi tī.

I will discuss the argument-function mapping relations of passive constructions as proposed by the Lexical Mapping Theory within the LFG framework later in Section 3.2.1.
2.3 Semantic Analyses of Passives

The passive has traditionally been regarded as the alternative voice to the active. The transformational grammar views passive constructions as merely the alternative voice derived from the active voice through movements, both originating from the same deep structure (Chomsky, 1965). Numerous semantic analyses of English passives however point out various limitations in the active-passive transformation, including the non-equivalence in meaning and the inability to passivise certain active forms (e.g. (24)-(27))(Weiner & Labov, 1983; Davison, 1980; McConnell-Ginet, 1982; Bach, 1980).

(24) Subject-oriented adverbs:
   (a) Reluctantly, Joan instructed Mary.
   (b) Reluctantly, Mary was instructed by Joan.
   (McConnell-Ginet, 1982, p. 145; see Jackendoff, 1972, p. 89)

Generic (a) vs. Specific (b) reading:
(25) (a) Beavers build dams.
    (b) Dams are built by beavers.
    (McConnell-Ginet, 1982, p. 145)

(26) (a) Every student read two books.
    (b) Two books were read by every student.
    (Sung, 1997, p. 293)

Inability to passivise reflexive and reciprocal pronouns:
(27) (a) John saw himself in the mirror.
    (b) *Himself was seen by John in the mirror.
    (c) Mary and Bill love each other.
    (d) *Each other are loved by Mary and Bill.
    (Bach, 1980, p. 305)
2.3.1 Adversity-Felicity in Get-passives

In English, the be auxiliary of a passive sentence may be substituted by get to form get-passives. Labov’s experiments (1975, as cited in Weiner & Labov, 1983) showed that people generally interpret basic get- and be- passive sentences as semantically equivalent.

(28) (a) The soldier was shot.
(b) The soldier got shot.

Despite the structural similarities shared by be- and get- passives, treating get-passives as simply a variant of be-passives is certainly inadequate. There are numerous fundamental differences between the two types of passives. Stylistically, get-passives are dispreferred in more formal registers, thus the choice of get-passives tends to be more available to speakers in less formal settings (Standwell, 1981). Studies of get-passives have revealed some characteristics that are very pertinent to the present study. Hatcher (1949) pointed out that it is very rare for get-passives to explicitly introduce a human agent via a by- clause. This point was also noted by other researchers of corpus-based studies on get-passives (Svartvik, 1966; Stein, 1979; Granger, 1983; Carter & McCarthy, 1999; Collins, 1996; Celce-Murcia, Larsen-Freeman, & Williams, 1999). For example, Collins (1996) reported 92% of what he termed the “core” or prototypical get-passives found in his corpus data had no agent explicitly stated; Carter and McCarthy (1999) also reported an echoing figure of 93% in their corpus data.

The passive voice places emphasis on the patient. In get-passives, agents are usually omitted. This goes one step further in downplaying the agent and foregrounding the patient as the more prominent entity. Matthews (1993) in pointing out the restrictions of get-passives noted that the further downgraded status of the agent makes including agentive instrument adverbials in get-passives such as (29a) ill-formed compared to (29b):

(29) (a) *He got killed with a gun.
(b) He was killed with a gun.
This point also finds support in Carter and McCarthy’s (1999) corpus-based data. They found that the only adverbials in connection to the get-passives in their corpus data were adverbials that referred directly to the verb phase instead of the agent, the general circumstances of the clause or the manner in which the event occurred.

Researchers have put forth various views on the semantic and pragmatic differences between be- and get-passives. Get-passives are used when the events are “felt as having either fortunate or unfortunate consequences for the subject” (Hatcher, 1949, p. 441). For instance, Chappell (1980) offered an in-depth analysis of the get-passive by considering two categories of get-passives, namely the non-reflexive get-passives (e.g. Jane got fired) and reflexive get-passives (e.g. Jane got herself fired). Chappell’s (1980) main argument was that both categories include the key element of a degree of causation on the part of the subject, i.e. Jane is somehow to blame both in the reflexive and non-reflexive examples above.

While get-passives have this duo characteristic, the distribution of positive and negative inference is an uneven one. Collins (1996) reported that of the get-passives found in his spoken-written corpus data, the adversative implicature dominated strongly over the beneficial, with 67.4% being adversative over 23.4% being beneficial, the remaining 9.3% being neutral. Carter and McCarthy (1999) reported a preponderant 89.2% of the get-passives found in their spoken corpus data as being of the adversative nature. The discrepancy between the two studies was most likely due to Collins’ corpus data being made up of spoken and written as opposed to the inclusion of spoken data only in Carter and McCarthy’s corpus.

Haegeman (1985) considered a number of get related constructions and their meanings arrived at two categories of meanings for get: a causative one (e.g. George got himself very wet) and an ergative one (e.g. George got very wet) (Haegeman, 1985, p. 61). She suggested treating get-passives as a type of middle voice construction and an example of the ergative get, where ergativity suppresses agents (see also similar findings from diachronic perspectives: Givón & Yang, 1994; Toyota, 2002, 2008a; Fleisher, 2006). Some linguists have challenged the auxiliary status of get in get-passive (Haegeman, 1985; Downing, 1996) and have advocated treating
get in get-passives as a full-fledged lexical verb instead of a passive auxiliary (Haegeman, 1985; see also Strang, 1968). Downing provided seven convincing syntactic criteria of auxiliary, all of which get fails to satisfy, to justify her opposition of the traditional “passive auxiliary” position of get (Downing, 1996, p. 183), summarised below:

(i) Negative contraction (e.g. He wasn’t caught and *He gotn’t caught).
(ii) Subject-auxiliary inversion (e.g. He was caught, wasn’t he? and *He got caught, gotn’t he? and *Got he caught?).
(iii) Stranded auxiliaries (e.g. Bill was caught and so was Jim and *Bill got caught and so got Jim).
(iv) Emphasis (e.g. Yes, he WAS caught and Yes, *he GOT caught).
(v) Position before a frequency adverb (e.g. He was never caught and *He got never caught).
(vi) Position of a quantifier (e.g. The boys were all caught and *The boys got all caught).
(vii) Existential “there” construction (e.g. There was a plane hijacked and *There got a plane hijacked).

Hübler (1991) also pointed out that when get is afforded the lexical verb status, meaning “to receive” something, it highlights the subject of get-passives as the receiver of an action. The lexical verb status endows get additional semantic features which are above and beyond merely tense and voice marking served by the be auxiliary (Banks, 1986; see also Alexiadou, 2005).

Get in English is in a sense autoantonymic, in that it can be used to denote causation/agency (e.g. George will get Linda to return your call or George got dressed) as well as passivity (e.g. George got fired from his job) and reception (e.g. George will get the money tomorrow) (Lakoff, 1971; Toyota, 2007). Interestingly, a similar parallel exists in Mandarin for the autoantonymic nature of the get-passive. Chappell (1980, 1986b) in asserting the dichotomy of the English get-passive cited the Mandarin ràng (讓) as a cross-linguistic example of a passive construction with an adversative-neutral dichotomy. In fact, there are ample examples of markers from a large number of Sinitic varieties which, similar to get in English, are in a sense autoantonymic in that they can mark both causation/agency (dispensation or disposal)
and passivity and reception. These markers include \textit{bei2 (畀)} in Cantonese and \textit{hou (互)} in Southern Min (Huang, 1999); \textit{gei (給)} in Mandarin (Yin, 2004) and similar variants of \textit{gei (給)} in the Beijing dialect (Li & Chen, 2005), in Yàntáí (Tang, 2002), Jiăochéng and Èdōng (Shi, 2004), in Xiăngfàn (D. Wang, 2005); \textit{nuo (搦)} in Ænyí (Xu, 2006a); \textit{na (拿)} in Liányuán (Wu & Deng, 2006); and \textit{tsao (招)} in Xīnjiāng (Shi, 2004). In the case of \textit{hou (互)} in Southern Min, Bao and Wee (1999) reported that it has even become a loan word for expressing passivity in Singaporean English, in the form of \textit{give}, as in \textit{The dog give the boy kick} (example (19b) in Bao & Wee, 1999), mirroring \textit{hou (互)} and its S(X)V word order, meaning \textit{the dog was kicked by the boy}.

2.3.2 Adversity-Felicity in \textit{Bēi}-Passives

As mentioned earlier, the traditional view held by Chinese linguists on the passive marker \textit{béi} is that it is used to denote adversity or detriment to the subject (L. Wang, 1957; Li & Thompson, 1981; H. Wang, 1983; Chappell, 1986a; Hashimoto, 1988), that is, “adversity” is identified as a primary function and a core semantic element of the \textit{béi} passive. The same traits are also typical of other East and South-East Asian languages such as Japanese, Thai, and Vietnamese (Li & Thompson, 1981).

However, many have also observed that \textit{béi} is now being used more and more for non-adversative events; it has even been suggested that the non-adversative use of \textit{béi} has outnumbered the adversative use in modern Chinese (Tiee, 1986). This shift has often been attributed to ‘translatese’ as a result of an influx of translated European works into China in the early part of the 20th century, notably after the May 4th movement in 1919 (Chao, 1968, p. 703; see also Chao, 1970; Chappell, 1986a). Kierman (1969) pointed out that in addition to translated works from many European languages, an inadvertent phenomenon motivated by political objectives was also particularly influential in this respect:

There has been a great deal of translation...including a perfect flood of Marxist material, which the Soviet translated and sold far below cost and which had a profound and continuing impact upon Chinese intelligentsia. The great majority of the translators were hacks, equipped with neither any real linguistic sophistication nor a very secure grasp of the language involved and their stylistic niceties...Such [unidiomatic] patterns become enshrined in ritually-admired literature and are thence imitated in other literature and are read aloud; and in no time the people are speaking that
way, with no idea that they are participating in radical linguistic change. (Kierman, 1969, pp. 74-75)

Moreover, the early part of the 20th century saw the Chinese language undergoing a radical linguistic reform as a result of the campaign to dispense with the classical literary Mandarin (wényán) and adopt colloquial Mandarin (báihuà) as the standard written form of Chinese. Therefore the chaos and unidiomaticity that had crept into Chinese in the 20th century was largely the by-product of the instability consequent to the language reform of the time (He, 2005a).

Others researchers presented diachronic accounts to show that the non-adversative use of the bèi passive in fact is not a recent trend brought about by translatese of the 20th century, but rather the non-adversative use of bèi could be traced all the way back to the Warring States era (403–222 B.C.) and has remained in the Chinese language and in literature ever since (Chu, 1973; Peyraube, 1989; Tien, 2000; Yang, 2006). Their contention is essentially that non-adversity has coexisted with adversity in the bèi passive for centuries.

Sugimura (1998, 2003, 2006) offered an innovative and refreshing synchronic explanation on the semantic motivation behind bèi and its variants. Sugimura’s explanation of the semantic expansion of bèi constructions accounted for both adversative and non-adversative passives in Chinese. Sugimura argued that

…the core semantic meaning of the passive voice in Chinese can be defined as “unexpected occurrence” (意外的遭遇). We believe that only by understanding the passivity of the Chinese passive voice as ‘the description of unexpected occurrence from the perspective of the patient’…could one offer a more reasonable explanation to the complex relationship between the forms and the meanings to the Chinese passive construction. When we say ‘unexpected’, it is unexpected in relation to the speaker’s knowledge; and when we say ‘from the perspective of the patient’, it may be rephrased as ‘when describing an unexpected occurrence, the patient is chosen by the speaker as the representer of that occurrence.’ (Sugimura, 2006, p. 285, my translation)

According to Sugimura (2006), it is human nature to desire for things to develop in accordance with one’s expectation. Hence when one entertains the notion of “unexpected occurrences”, a natural, unmarked expansion of this core notion is in the direction of accidents and undesirables, which one does not expect to take place. In
this sense, passives involving unexpected occurrences of an adverse nature are unmarked, and they make up the majority of the passives in Chinese. On the other hand, a semantic expansion in the other, marked, direction is in the sense of “a pleasant surprise”. If one tries to understand Chinese passives in this light, one can easily see why sentences such as (30) and (31) are highly acceptable even though they suggest no adversity:

(30) \text{Jìntiān wǒ jūrán bèi lǎobān biāoyáng le yìfān.}
Today I actually bèi boss praise PERF CLASS
I was actually praised by my boss today.

(31) \text{Xiǎonǚhái jìngrán bèi yīshēng jiù huó le.}
Little girl actually bèi doctor save alive PERF
The little girl was actually saved by the doctor.

Sentences (30) and (31) would also be acceptable without the modal “actually”. Nevertheless, according to Sugimura (2006), the use of the modal “actually”, which indicates something contrary to expectation, endows an even higher acceptability onto (30) and (31).

Results from large scale corpus-based analyses of spoken and written Mandarin Chinese offered support for this asymmetric duo-nature of bèi-passives from naturalistic data (Xiao, McEnery, & Qian, 2006; Xiao, 2006). The studies reported that 51.5% of the collocates of bèi in the corpus data were of a negative meaning while 10.7% of the collocates of bèi were of a positive meaning. Similarly, the percentage of positive meaning for gěi, jiào, ràng, were 7.5%, 25% and 26.7% respectively.

2.3.3 Adversity-Felicity in Be-Passives

The be-passives in English, unlike get-passives, are usually not seen in any adverse or fortuitous light. However, Davison (1980) contended that even with verbs whose semantic meanings were neutral, in the absence of any rebutting context, be-passives could quite easily be perceived as implying adversity or undesirability (see also
Generalisations 6 & 7 in Keenan, 1985, pp. 267-268). Davison gave the following example:

(32)  (a) This chair has been sat on by Fred.  
(b) This chair has had Fred sat on it.  
(c) Fred has sat on this chair.

She then went on to say that in the absence of any specific information one would very likely conclude that in (32a), Fred did the chair no good by sitting on it (Davison, 1980, p. 53).

Table 2.1  
Semantic properties of English and Chinese passives in the British English and Mandarin corpora as reported in Xiao et al. (2006).

<table>
<thead>
<tr>
<th>Language</th>
<th>Passive type</th>
<th>Negative (%)</th>
<th>Positive (%)</th>
<th>Neutral (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Be-passive</td>
<td>15.0</td>
<td>4.7</td>
<td>80.3</td>
</tr>
<tr>
<td></td>
<td>Get-passive</td>
<td>37.7</td>
<td>3.4</td>
<td>58.9</td>
</tr>
<tr>
<td>Chinese</td>
<td>Bèi-passive</td>
<td>51.5</td>
<td>10.7</td>
<td>37.8</td>
</tr>
<tr>
<td></td>
<td>Jiào-passive</td>
<td>50.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>Ràng-passive</td>
<td>66.7</td>
<td>26.7</td>
<td>6.6</td>
</tr>
<tr>
<td></td>
<td>Gěi-passive</td>
<td>67.5</td>
<td>7.5</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Additionally, as seen in Table 2.1, Xiao and colleagues’ (2006) corpus analysis of spoken and written British English provided further validation for this adversative construe of the English be-passive. This study found that 15% of the be-passives and 37.7% for the get-passives were of negative semantic properties. Hence, I have established that although unevenly distributed, the semantics of the Chinese bèi and the English be- and get-passives all have a dichotomous adversity-felicity nature.

2.3.4 Summary of Section 2.1 - 2.3

In summarising Sections 2.1 to 2.3, typologically speaking, English and Mandarin are distinctly different from each other with regards to morphology, syntax and information structure. Nevertheless, English and Mandarin share many commonalities when it comes to passive constructions. These include the passive voice being the non-default grammatical voice for both languages; the passive voice appearing more frequently in writing than in speech; and the adversative-felicitous nature of get-, be- and bèi (and its variants) passives where the adversative usage of
passives in both languages dominates to varying degrees (Davison, 1980; Xiao, et al., 2006).

2.4 Passive Voice as a Discourse-pragmatics Strategy

A speaker is always faced with different choices of syntactic forms when reporting an event, and they are free to make their choices in terms of how to express their intentions. Speakers have, among others, the option of employing either the active or the passive voice. The active voice construction is the canonical syntactic construction; it is the unmarked or the default grammatical voice (Anisfeld & Klenbort, 1973). Choi (1999) characterised canonicity as follows:

In sum, the unmarked or the canonical order is the order which is not contextually restricted or constrained. In other words, the unmarked order is context-neutral. This can be interpreted as meaning that the unmarked order, or the phrase structure which results in that order, is determined only by sentence-internal, i.e. the morphological or syntactic properties of the component elements of the sentence, and is not influenced by sentence-external factors such as discourse-contextual information. (Choi, 1999, p. 29)

Canonical structures have neutral or the lowest discourse presuppositionality; that is, in uttering such sentences, a speaker makes minimal assumptions about the listener’s background knowledge, and such sentences require the least amount of processing of implicit discourse presupposition on the listener’s part in addition to processing the propositional content (Anisfeld & Klenbort, 1973; Slobin & Bever, 1982). Therefore, in everyday speech, a speaker does not deviate from the active voice and the canonical word order unless there are contextual or discourse-pragmatic factors of contrastive prominence to motivate the speakers to do otherwise (Langacker, 2002).

By the same token, various factors steer speakers towards choosing to encode propositions in the passive voice. I shall now turn my attention to factors and situations that create a preference in speakers to narrate events in the passive voice.

In discussing the psychological constraints on the forms of grammar, Slobin (1979, p. 64) pointed out that since all languages are used by the same species (human) for the same communication functions and cognition, “language universals, must be based on psychological and socio-cultural universals.” He went on to say that
the conventions for the mapping of communicative intentions onto utterances...are constrained, for all languages, by: (1) human tendencies to think and imagine in certain ways; (2) processing demands imposed by a rapidly fading temporally ordered code (be it auditory speech or visual design); and (3) the nature and goals of human interaction. (Slobin, 1979, p. 64)

Hence, following Slobin’s contention on the principles that shape human languages, the passive as an optional structure is motivated by (i) the prioritisation of different elements of a proposition by structural means; (ii) the universal extra-linguistic perceptual patterns of human beings; and (iii) the amount of processing load generated by the syntactic structure one wishes to employ. Section 2.4 therefore presents a review of the literature on these three cognitive-psycholinguistic aspects in the order of the above iteration (i)-(iii).

2.4.1 Discourse Topicality

The notion of discourse topic is defined in general terms as “the proposition (or a set of propositions) about which the speaker is either providing or requesting new information” (Ochs Keenan & Schieffelin, 1983b, p. 68). The discourse topic may be established verbally, or nonverbally such as when one physically points something out with one’s finger. Once the discourse topic is established, it may be sustained linguistically by pronominalising it as the subject of the ensuing sentence (Ochs Keenan & Schieffelin, 1983b).

The discourse topic is often realised in the paradigm of give-new information (Birner, 1996; Birner & Ward, 1998; Ward & Birner, 2003, 2005). The notion of given vs. new information has figured prominently in the literature under various labels such as “old-new”, “known-new”, “presupposed-focus” and “theme-rheme” (Halliday & Matthiessen, 2004; see Prince, 1981; Prince, 1992 for a thorough review). Chafe (1976) maintained that the traditional way of interpreting given information as known information and new information as something yet unknown was somewhat dissatisfactory. Rather, Chafe (1976, p. 28) tried to clarify given information as “that knowledge which the speaker assumes to be in the consciousness of the addressee at the time of the utterance”, and new information as “what the speaker assumes he is introducing into the addressee’s consciousness by what he says.” Birner (2006)
proposed to redefine ‘discourse-old information’ as information that is inferentially linked in various senses to the prior context. In Birner’s (2006, p. 31) new definition, “the category of inferrable information is argued to be coextensive with the category of discourse-old information while varying in terms of hearer status.”

Empirically, Carroll (1958) found that high-school students could be induced to use passives, if the eliciting questions drew attention to the patient and made it the “interest-object”. Similarly, Turner and Rommetveit (1967b) asked their children informants “What is being done to (the patient)?” and “What is happening to (the patient)?” and were equally successful in eliciting passives from primary school aged children. Tannenbaum and Williams (1968) found that their junior high school aged informants could more readily produce passives when they were provided with six-sentence preambles that placed the conceptual focus on the patient. Bates and colleagues (Bates, McNew, MacWhinney, Devescovi, & Smith, 1982; see also Bock, 1977) likewise employed the preamble strategy to establish the patient as the given and the discourse topic in eliciting passives. An example of the preambles used in Bates et al.’s (1982) studies is This is a cow; now we’re going to talk about this cow. The cow.... In this way, both the preamble and the contrast between definite and indefinite articles marked the patient as given. Flores d’Arcais (1975) found that when the name of the patient was provided prior to showing the informant the picture, the informant was more likely to describe the picture in the passive voice when it was shown to them (see also Turner & Rommetveit, 1967b who achieved the same result by showing the picture of the patient first, followed by the agent).

Krauthamer (1981) tested different combinations of noun animacy and givenness in her experiment. The givenness of the nouns in the experiment was established by asking her informants to look at a set of four pictures as part of a sequence in a comic strip. Krauthamer (1981) found that consideration of both animacy and givenness strengthened the predictability of the occurrence of passives.

2.4.2 Lexical Priming

Bock (1986a) found that the syntactic form could be influenced by the variations in the semantic processing of words. In her experiment, Bock asked her participants to describe pictures. An example of a picture and two possible descriptions of it are
Lightning hit the church and The church was hit by lightning. Participants were presented with a priming word before the presentation of the picture. The prime word was semantically related to either the agent or the patient of the event depicted in the target picture, which was to follow the prime word. Bock (1986a) found that, for example, the prime words church (patient) and worship (semantically related to the patient) could both quite reliably succeed in disposing participants to describe the abovementioned picture in the passive voice, coding the patient entity as the sentence subject. In contrast, phonological priming was observed to be an unreliable priming device in influencing the informant’s syntactic coding, i.e. search as a phonological prime word for church in the same picture had a weak priming effect in the speaker’s structural choice. This can be explained by the fact that the phonological information is stored as lexeme in the lexical item; in a strictly modular spreading-activation model of speech generation, no feedback is permitted from the lexeme information at the grammatical encoding stage back to microplanning at the conceptualiser (See Section 3.1) (Levelt, 1989; Levelt, et al., 1999).

The lexical priming effect can be interpreted as the result of the priming word being a pre-emptive selective attention pointer. In other words, when the priming word worship was presented first, the semantic concept worship and those related to it, including most likely church, were activated in the participant’s conceptualiser, which in the subsequent presentation of the picture became more prominent, more conceptually accessible and more likely to attract the attention of the participants compared to other elements in the same picture.

2.4.3 Saliency – Size and Colour

Johnson-Laird (1968a) found that when his informants were asked to draw the two colours after listening to a statement in either the active or the passive voice, the colour that appeared as the logical object in the active voice was bigger in size than the colour of the logical subject when the statement was in the passive voice. For example, upon hearing the statement Red is followed by blue, the patch drawn in red was slightly larger, on average 0.4 inch longer in length, than the patch drawn in blue. The size of the colour was assumed to reflect predominance of importance attributed to that entity. Therefore, the passive voice was used to place emphasis on the element first mentioned in the sentence.
Likewise, in a different experiment, Johnson-Laird (1968b) found that the choice of the passive voice could be influenced by the size of the referent, that is, when a referent was larger in size, people were more inclined to encode it as the subject as a way of making it more emphatic, even if doing so meant that the sentence had to be in the passive voice. Flores d’Arcais (1975) also showed that preference for passives could be increased when the patient of the action was perceptually larger than the agent.

Lempert (1990) reported that in a pilot study involving 24 college students, the informants produced more sentences in the passive voice where the patient was salient by virtue of it being coloured compared to where the patient was non-salient, i.e. non-coloured (see also Lempert, 1989; Baldie, 1976; Horgan, 1976; Lempert, 1984). Therefore following Lempert (1990) and Horgan (1976), I also adopted colour manipulation as a critical empirical manipulation in designing the methodology of my experiments.

### 2.4.4 Perspective and Subject Assignment

MacWhinney’s (1977) Perspective Hypothesis maintained that perspective is the starting point of sentences. The Perspective Hypothesis posited that speakers are actively involved in a sentence by “getting inside it”, and that “Speakers tend to choose the perspective which is most compatible with the perspective which they assume in their own motoric, causal, social, and positional interactions with the world” (MacWhinney, 1977, p. 152; see also the “motivation-of-speaker” principle in Osgood & Bock, 1977; Suzuki, 2002). Lempert (1990, p. 677) concurred with the Perspective Hypothesis and claimed that perspective is “the cognitive counterpart to the formal category of subject.” Likewise, in a general sense, Levelt (1989) also pointed out that speakers take a particular perspective on a conceptual structure to be expressed, and this perspective influences how speakers organise propositions syntactically.

Following Clark, Carpenter and Just (1973) and Clark and Chase (1972, 1974), Sridhar (1988, 1989) hypothesised that a speaker would prefer to encode the upper object, the left object and the object closer to oneself as the sentence subject. Based
on these hypotheses, it may be deduced that should the patient be physically located above, to the left of the agent and closer to the speaker than the agent, the speaker would more likely encode the patient as the sentence subject, hence using the passive voice. There is partial support for this in Flores d’Arcais’s (1975) study, in which it was found that next to and in addition to size, the left-right position also influenced the active-passive voice alternation (see also Buswell, 1935; Chatterjee, Maher, & Heilman, 1995; Chatterjee, Southwood, & Basilico, 1999; Chatterjee, 2001). A preference for placing agents on the right and patients on the left upon being presented with passive verb stimuli was also found in English speakers (Altmann, Saleem, Kendall, Heilman, & Rothi, 2006).

2.4.5 Animacy

In their seminal study, Bock and Warren (1985) examined how the conceptual accessibility of noun phrases affects the syntactic position in which a speaker encodes it. The index of conceptual accessibility employed in this study was the imageability of the NP. The hypothesis being tested was that a conceptually more accessible NP would claim the grammatical role that is higher on the grammatical relational hierarchy, which is ordered from highest to lowest as Subject > Direct Object > Indirect Object > All lower relations (Keenan and Comrie, 1977 and Pullum, 1977, both as cited in Bock & Warren, 1985; see also Ransom, 1979, who approached animacy and passives from Role and Reference Grammar).

In this test, the informants were played an audio recording of pairs of sentences in the active and passive forms. Each sentence of a pair contained a NP that is more conceptually accessible than the other NP in the same sentence. For example, in the sentence *the doctor administered the shock*, “the doctor” is regarded as more conceptually accessible than “the shock”. The informants were then provided the verb of a sentence pair as cue, upon which they were to write down the sentence they recalled. Although this test was carried out in written form, the finding is still relevant to this study. It was found that the more conceptually accessible NP would likely assume the grammatical subject of the sentence, which would result in passives in the cases of the semantic patients being the more conceptually accessible one (Bock & Warren, 1985).
In a recent auditory ERP study (Philipp, Bornkessel-Schlesewsky, Bisang, & Schlesewsky, 2008) on the interplay between sentence comprehension and animacy, it was found that for Mandarin, a non-case marking language, there is a preference for processing animate agents in the active bà construction and the passive bèi construction; the additional processing load in processing inanimate agents engenders a N400 negativity. This preference mirrors the finding for German, a case marking language, suggesting that processing animate agents is a universal preference.

The animacy hierarchy has often been seen in the light of speakers’ perspective taking (MacWhinney, 1977; Lempert, 1984). MacWhinney’s (1977) Perspective Hypothesis predicted the speaker’s perspective as the pragmatic determinant of sentence topic. The animacy hierarchy, when seen in the light of the Perspective Hypothesis, reflects the “closest to ego” principle, namely humans being most animate, then those animate referents which resemble ego relatively more than other less animate referents (MacWhinney, 1977, p. 158).

Animacy has been found to affect preschool age (Lempert, 1984, 1989, 1990) and 5-to 10-year-old native English speaking children’s acquisition of syntax (Harris, 1978), as well as that of adults (Ferreira, 1994; but cf. Snider & Zaenen, 2006; Seoane, 2009). A shortcoming in the noun animacy or conceptual accessibility arena is that while animacy has been shown to be a crucial and pervasive factor in human languages (Foley & Van Valin, 1985), little work has been done in forming a comprehensive, elaborate and inclusive scheme than simply the three categories of human-animates > non-human-animates > inanimates (Zaenen, et al., 2004; however, see Yamamoto, 1999, for a notable exception).

**Animacy as a Cross-linguistic Concept**

The effects of noun animacy on word order and grammatical assignment reported in Bock and Warren (1985) have been tested cross-linguistically with quite consistent results. Tanaka and colleagues (Tanaka, Branigan, & Pickering, 2005; Tanaka, 2006; Branigan, Pickering, & Tanaka, 2008) have shown that noun animacy (or conceptual accessibility in Bock and Warren’s term) correlates with the level of difficulty in processing an entity. Thus in language production, which occurs incrementally,
information that is easily accessed is processed first. This means that noun animacy would affect word order and grammatical assignment. Additionally, Chang, Kondo and Yamashita (2000) looked at conceptual accessibility and scrambling in Japanese and also arrived at the same conclusion. Teufel and Feleki (1996) and van Nice and Dietrich (2003) both attested to Bock and Warren’s hypothesis as valid for German, also a free word order language. Prat-Sala (1997; also Prat-Sala & Branigan, 2000) reported that speakers of Brazilian Portuguese, Catalan and Spanish all prefer to encode animate nouns as sentential subjects even if so doing means using the passive voice. Moreover, Prata-Sala (1997; also Prat-Sala, Shillcock, & Sorace, 2000) found animacy to influence the selection of the sentential subject with Catalan speaking children.

2.4.6 Visual Attention and Subject Assignment

The intricate and elusive nature of “thematicity” or “topicality” as pragmatic motivations for the grammatical notion of subject assignment would be an issue for any attempt at empirically testing the link between the two. However, visual attention provides the much anticipated nexus between the two constructs. I shall now provide a detailed review of the notion of focal or visual attention, as it will be one of the bases of the empirical design of my thesis, in particular the use of Tomlin’s FishFilm task, as reviewed below.

Some studies in the 1960s started to suggest a relationship between visual attention and the sentence subject. For example, Turner and Rommetveit (1968, p. 544) hypothesised that “the focus of one’s attention during the storing and retrieving of sentences, or both, may influence the choice of subject in recall.” To test this hypothesis, 48 children were given a recall task. The informants were shown either a picture of the actor, of the acted-upon object or of the entire event at a time while the sentence corresponding to the picture shown was read out. When the experimenter had gone through a set of sentence storage pictures and sentences, the informants were shown a set of sentence retrieval pictures and were asked to recall the sentences that corresponded to the retrieval pictures in front of them. Turner and Rommetveit found that
when the picture on which the child focused his attention was congruent with the subject of the original stimulus sentence, correct recall was facilitated; on the other hand, when the picture on which the child focused was incongruent with the sentence subject (but congruent with the object), sentences tended to be transformed into the opposite voice in recall. (Turner & Rommetveit, 1968, p. 543)

Olson and Filby (1972) obtained the same results by showing first a picture of the patient on its own, followed by a picture with the patient in its original position plus the agent (see also Prentice, 1967).

Eye gazes have been found to closely mirror the time course of sentence formulation and the subsequent order of mention (Griffin & Bock, 2000). Tomlin (1995, 1997) conducted a cross-linguistic investigation on the relationship between visual attention and voice and word order. He began by making some criticisms against historical functionalist approaches in account for the selection of word order. He claimed that the typical postulations of pragmatic notions such as *theme*, *topic* and *focus* as the functional bases for the choice between active and passive voice were flawed partly due to:

- The theoretical weakness in the definitions of central pragmatic notions such as *theme* and *topic*.
- The empirical difficulties with identifying instances of *theme* or *topic* in actual discourse data.
- The failure to distinguish form-function *correlations* from causal functional interactions. (Tomlin, 1995, p. 517, italics in the original)

These criticisms were essentially a reiteration of his earlier concern (Tomlin, 1983). In that earlier attempt, Tomlin (1983) hypothesised that the syntactic subject in English encoded primarily thematic information over agent. Hence, he claimed that when a non-agent entity was more thematic (in a general sense) than the agent, it would occupy the sentence subject. Although Tomlin’s (1983) earlier definition of thematicity was rather generic and quite crude, he was aware of the need to substantiate his hypothesis regarding thematicity and voice alternation. The problem with defining and identifying the theme was the need to come up with a set of objective and independent criteria that was not linked to an introspective determination. For had the theme been subjectively determined by the experimenter or in the introspective stage, one could never be certain as to whether the
identification of the theme was tainted or influenced by the grammatical forms that emerged in the data collected, thus becoming a circular identification criteria. In light of the first two difficulties raised above, Tomlin (1995, 1997) proposed two measures to counteract these difficulties. Firstly, he worked around “the definition problem by replacing the pragmatic notion of theme with its cognitive counterpart attention detection” (Tomlin, 1997, p. 167, bold in the original). Tomlin (1995) argued that the hypothesis about theme/topic interaction should be recast more clearly in the cognitive processes of focal attention, a notion that is well-established and deeply rooted in the psychological literature and is amenable to experimental manipulation. Moreover, by “conducting experiments in which attention detection can be manipulated directly and the effects of those observations directly observed”, the problem with identifying the theme or topic in discourse can also be avoided (Tomlin, 1997, p. 167).

With regards to the third issue raised, Tomlin discussed how previous studies on global control of theme (Turner & Rommetveit, 1968), the saliency of characters (Bock & Warren, 1985), and the local control of theme (Tomlin, 1983) accounted for the selection of passives all attempted to answer the question of causal function interactions, and indeed were all able to conclude from their observations on the correlation between these features and subject assignment. Tomlin, however, maintained that all of these earlier efforts failed to “provide an adequate account of the phenomenon largely because the analytical residues left by each are too large to warrant claims of a general solution” (Tomlin, 1995, p. 526).

Tomlin then proceeded to propose a rule within the functional grammar of English which according to him provided a deterministic account of how actives and passives were selected. The hypothesis and its entailments are quoted here in full from Tomlin (1995, p. 527 emphasis in the original):

Hypothesis: At the time of utterance formulation, the speaker encodes the referent currently in FOCAL ATTENTION as the SYNTACTIC SUBJECT of the utterance.

The hypothesis entails the following:
I. If a referent falls within focal attention at the moment of utterance formulation, it shows up as syntactic subject. If it does not fall within
focal attention, it does not show up as subject.

II. Given an event reported by transitive verb, if the agent is in focal attention, one will observe a corresponding active clause. Likewise, if it is the patient that is focally attended, one will observe a corresponding passive clause.

III. This mechanism is localistically controlled, which means that neither global theme nor local saliency is adequate to determine the selection of linguistic form, though both may contribute to the assignment of focal attention during the discourse production process.

IV. This rule is invariant and automatic. It is invariant in that it governs the discourse production behaviour of all native [English] speakers in exactly the same way. It is automatic in that it applied to each and every instance of sentence production without easy or noticeable conscious access by the speaker.

The hypothesis entailment bullet points were changed to Roman numerals in the quote above for ease of reference in this paper. As can be seen from entailment IV, Tomlin made a bold claim of being able to make “individuated predictions”, virtually stipulating a 100% correlation with no residues.

Attention in the general sense can be likened to a bottleneck type of filter for information that is going to the brain. It filters and regulates what information feeds originating from the surrounding context are allowed to undergo further specialised processing at the expense of other feeds. An instance of such operation at work may be the classic Cocktail Party Phenomenon (Cherry, 1953), i.e. carrying on of a conversation in a noisy pub. A speaker’s attention is set to allow the linguistic input of the conversation through for the exclusive processing while effectively blocking out other visual or acoustic feeds such as the music and TV broadcasts in the pub from qualifying for the mental efforts of that specialised processing. Tomlin and Villa (1994) took the fine-grain view of the visual attentional system as comprising three independent processes – alertness, orientation and detection. Of the three processes, detection is the one relevant to this discussion. When something is attentionally detected in the attentional system, it is in the attentional focus or the visual attention (Neisser & Becklen, 1975). It takes approximately 150 ms. to complete the shift of attention and moves from one target referent to another (Tomlin, 1997). This 150 ms. temporal characteristic is a key factor in designing the appropriate experimental protocol to test the hypothesis.
Tomlin created a computer animation clip called *FishFilm* to test this hypothesis. The clip contained 32 trials. Each trial of the clip depicted a visually cued referent fish which made the referent fall within the focal attention of the informant at the instance of utterance formulation, thus fulfilling the hypothesis entailments I, II and III. The two fish swam towards each other from both sides of the screen. As the two fish of each trial appeared on screen, either of the two would be visually cued by a flashing arrow appearing above the selected fish. As the two fish reached each other at the centre of the screen, one would swallow the other. The fish that was cued with an arrow could be either the agent fish or the patient fish; informants only found out at the moment that one swallowed the other. The clip was designed so that an audible beep was timed to sound at the very moment the agent fish closed its mouth and swallowed the patient fish (hereafter referred to as the dynamic event). This design permitted analyses of informants’ reaction times. Although Tomlin included this feature in the clip, he did not collect any reaction time data in his study. I utilise this feature to measure reaction times, which are assumed to reflect the processing costs involved in generating the sentences (see Section 4.3.2). The film ran at 12 frames per second. The direction of the agent fish (entering from the left or the right) was counterbalanced; the colours of the two fish in each episode were randomly selected. In half the trials the agent was cued; in the other half the patient fish.

The informants were instructed to keep up with the unfolding of the episodes and were asked to keep their eyes on the cued fish, hence ensuring that their focal attention would be allocated to the target fish at the crucial moment (swallowing). The informants were to give an on-line narrative of the events as they unfolded.

The results of the test on 10 of the 12 English speakers\(^6\) showed no significant deviation from the prediction in their narratives. In these informants’ on-line discourse production, the cued referent appeared as the syntactic subject of the utterance in over 90% of the time. The results led Tomlin to make the claim that the syntactic subject in English may act as the functional reflex of focal attention.

\(^6\) One of the informants who used only the active voice revealed in the debriefing session that she had consciously suppressed the use of the passive voice as a result of her journalism training on preferable language use (Tomlin, 1995, p. 531).
Tomlin (1995) also did some cross-linguistic comparisons. The languages tested were Burmese, Indonesian, Mandarin, Polish, Russian, Bulgarian and Akan (Fante). Although the cross-linguistic data were small in scale, the results are nonetheless of great pertinence to the present study. For Burmese, Indonesian and Mandarin, preliminary data collected suggested that speakers of these three languages would essentially behave in the same pattern as English speakers. However, only 3 out of the 6 Mandarin speaking informants engaged by Tomlin performed on target as predicted, that is, with no residues. No clear pattern emerged for Polish and Russian speakers. For Bulgarian and Akan, there appeared to be no grammatical coding of a focally attended referent. The findings from cross-linguistic comparison indicate that while the hypothesis deals with the language-independent cognitive factor of focal attention, the operationalisation of it is nevertheless language-dependent, i.e. it seemed to work for English, but the cross-linguistic data in this study was less conclusive.
The *FishFilm* protocol was later applied to native speakers of two free word order languages, namely Russian (Myachykov, Tomlin, & Posner, 2005; Myachykov, 2005) and Serbian (Medojević, 2007, in preparation). The Russian speakers in Myachykov’s study and the native Serbian speaker in Medojević’s study persistently produced agent-verb-patient irrespective of the visual probes. This at first glance is contrary to the original hypothesis predicting patient-verb-agent word order in patient-probe trials (Tomlin, 1995). However, when looked at more closely, it was found that speakers’ preference for agent-verb-patient entailed some processing costs in that (a) agent-verb-patient syntax in patient-probed trials were marked by significantly longer latency times (ca. 202 ms.) than in agent-probed trials, and (b) agent-verb-patient syntax in patient-probe trials were characterised by a significantly higher speech error rates with regards to the proper case markings (Myachykov, et al., 2005). The *FishFilm* protocol clearly demonstrates the interface between language-independent cognitive processes and language-specific operations of attention, either as manifested syntactically in active/passive alternations or in scrambled word orders accompanied by longer reaction times (Myachykov, Tomlin, & Posner, 2007).

### 2.4.7 Visual Attention and Starting Point

Forrest (1992, 1996) extended Tomlin’s manipulation-of-attention approach to the narration of stative events. Forrest covertly oriented the participant’s attention to one quadrant of the screen using an exogenous cue of a small bright cross. The two figures that appeared next on the screen (one in white and the other coloured in yellow) were arranged in such a way that either one of the figures would occupy the same spot that the exogenous cue had previously just been in. This was to ensure that at the very instance that the figures were displayed, the participant’s visual attention would still be fixated on the location where the cue had been, making the figure that replaced the cue the entity that had entered into the participant’s visual attention. The figures stayed on the display for a very brief instance, and were then masked. The participants were then asked to describe the position of the yellow figure in relation to the white figure.
Forrest’s (1992, 1996) hypothesis was that when the participant’s visual attention was subtly oriented to the yellow figure, the perspective taken would be congruent with the predefined discourse objective of describing the yellow figure. Participants’ response time to such a task was predicted to be shorter than when their visual attention was oriented to the less important white figure by the exogenous cue. Under the latter scenario, incongruence occurred due to the conflict between the perspective taken by the participant following the cue and the ultimate discourse objective; the hypothesis predicted the incongruence to be realised in the form of longer response latency.

Forrest in her original study (Forrest, 1992) also addressed humans’ persistent natural bias of selecting the vertically above and the horizontally left as the perspective (Clark & Chase, 1972, 1974; Sridhar, 1988) She analysed the trials which were incongruent with the natural bias of top-left separately. Forrest found that when the participants’ visual attention was oriented to the top-left quadrant (congruent with natural bias), they encoded the figure as the sentence subject 80.8%
of the time; when the visual attention was cued to the bottom-right corner (incongruent with natural bias), participants still assigned the cued figure to the sentence subject position 61.9% of the time.

Nappa, January, Gleitman and Trueswell (2004, p. 2) pointed out that previous investigations all involved “overt attention-getting devices and...often...with rigid task demands allowing for minimal generalisation.” These researchers were therefore interested in knowing if similar results could be obtained if the exogenous cuing of the participants’ attention used in Tomlin’s (1997, 1995) earlier studies, i.e. the flashing arrow, was changed to a less imposing, more subtle cue.

![Figure 2.3 Examples of visual stimuli used in Gleitman et al. (2007)](image)

The experimental design of Nappa et al.’s (2004) was similar to that of Forrest’s (1992, 1996). The difference was Nappa et al.’s task required participants to describe a transitive event that was depicted in a picture using a simple sentence. A crosshair fixation point first appeared on the screen for 500 ms. Next, a second screen appeared for 60–75 ms. to orient the participant’s visual attention to one area of the screen. This was immediately followed by a picture of a transitive event involving two entities. Either one of the entities would appear at the same location as where the attention orienting stimulus appeared briefly, thus the participant’s visual attention would be oriented toward that entity. The hypothesis was that if the participant’s initial visual attention was subtly oriented to a particular entity under the covert condition as described, the participant’s choice of the sentence subject and the verb used would likely been influenced accordingly. Nappa et al. (2004) reported that the results confirmed the hypothesis. When the participant’s visual attention was cued to the preferred subject (e.g. *the dog*), the participant was more likely (77%) to utter *the dog is chasing the man*. On the other hand, when the cue was to the dispreferred
subject, the percentage of coding the dog as the sentence subject dropped to 61%, and the researchers observed more sentences like the man is running from the dog, in other words, the visual cuing manipulation led to a corresponding increase in coding the man as the sentence subject. In a more recent article, they reported a reliable effect of participants producing the passive voice when their visual attention was oriented to the patient (Gleitman, January, Nappa, & Trueswell, 2007).

2.4.8 Passives as Discourse Strategy in English and Mandarin

The pragmatic function of the passive voice is to foreground the patient and defocus the agent (Keenan, 1985). The discourse-pragmatic nature of the passive is pointed out as follows (Givón, 1979, p. 186):

Passivization is the process by which a non-agent is promoted into the role of a main topic of the sentence. And to the extent that the language possesses coding properties which identify main topics as subjects and distinguish them from topics, then this promotion may also involve subjectivization.

Shibatani (1985, pp. 830, 833) asserted more strongly the function of “agent defocusing” over “object promotion” in using passives. The backgrounding of the agent and foregrounding of the patient is found not only in many Indo-European languages (Sansò, 2006), but has also been noted for, among others, Mandarin (LaPolla, 1988; Peltomaa, 2006), Japanese (Sugimura, 2003; Liu, 2005), Korean (Song, 1988), Russian (Jiang, 2006; Peng, 2006), Tibeto-Burman languages (Dai & Li, 2006) and Indonesian (Chung, 1976).

English is a “pragmatic pivot” language in which a passive sentence tends to occur in the event that the pragmatics orient the promotion of a non-agent argument to the pivot of a transitive verb, i.e. the subject (Foley & Van Valin, 1985, p. 305). For Chinese, LaPolla (1988) advocated treating the Chinese bèi construction not as a lexical passive, but rather passive in a pragmatic sense only, one that takes the form of a simple topicalisation in the case of the truncated passive and topicalisation with a “topic affectedness marker” bèi in the case of the agentive passive. Similarly, Tang (2001, 2004; see also Cheng, 1987) contended treating the Chinese passive construction as a process of ergativisation where the sentence-initial noun is regarded as the topic in the Chinese passive construction.
Therefore, for both Mandarin and English, whether it is perspective taking, visual attention, newsworthiness, theme highlighting, empathy or noun saliency, these individual motivations can all be funnelled into the core pragmatic motivation of promoting the patient and defocusing the agent in using the passive voice (Shibatani, 1985; Foley & Van Valin, 1985; Keenan, 1985).

2.4.9 Summary

In summarising Section 2.4, the prototypical function of passive constructions as an optional construction for shifts in prominence assignment is common to both Mandarin and English, if not universal (Shibatani, 1985; Levelt, 1989; Huang, 1999; Peltomaa, 2006; see also Huang & Chui, 1997). Section 2.4 presented a review of a large body of psycholinguistic research that has established a multitude of competing factors which sway English speakers to produce passive constructions in spontaneous speech. There is a wealth of evidence demonstrating that in English, the privilege of sentential primacy and the pivotal sentence subject position may be reserved for the most prominent entity. No single factor dominates the process of structural choice to the extent of causation, but rather the factors all interact and compete for the sentence subject position in spontaneous speech production (Altmann & Kemper, 2006). The speaker may be variably motivated to attribute prominence syntactically in accordance with contrasts in factors such as perspective taking, topicality, thematicity, newsworthiness, empathy, presuppositionality, saliency, animacy, and visual attention.

2.5 Comprehension and Production of Passives

Section 2.5 presents a review of the comprehension and production of passive constructions by native English speakers, to furnish background information on how passive constructions in different English L1 contexts are acquired, missed, and attrited. The review also shows how the acquisition of passives is hindered and facilitated. The review covers how the comprehension and production of passive constructions develop in native English speakers throughout the lifespan; how competent native speakers process passive constructions; the difficulties that children with linguistic developmental disorders and adult speakers with acquired brain lesions encounter as they process passive constructions. In every category of speaker
populations reviewed, I place particular emphasis on the processing aspects of speakers’ performance of passives.

The present study is concerned with the acquisition or production rather than the comprehension of the English passive construction. Therefore one may arguably see little relevance in reviewing studies on the comprehension of passives. However, comprehension studies are still relevant to the issues at hand, for there is a growing body of experimental psycholinguistic evidence including structural priming, subcategorisation preferences and agreement errors, all pointing to at least a partial modality-neutral syntactic system or to the suggestion that the processing mechanisms underlying different modalities overlap to a large extent (Kempen, 2001; Zwitserlood, 2004; Cleland & Pickering, 2006; Awad, Warren, Scott, Turkheimer, & Wise, 2007; cf. Hagoort, Brown, & Osterhout, 1999; Setton, 1999). The syntactic comprehension and production processes share much cognitive resources and working memory (Kempen & Harbusch, 2002; Kempen, 2004; Kempen & Olsthoorn, 2005). The rationale to include language processing and FLA studies in this review is because first language acquisition can inform theories of second language acquisition (Cook, 1973; d’Anglejan & Tucker, 1975; Cook, Long, & McDonough, 1979; Bowerman, 1981; Hakuta, 1981; Foster-Cohen, 1993, 1999; Perani & Abutalebi, 2005). Hence Section 2.5 begins with a review of the comprehension followed by the production of passives by physiologically healthy speakers of different stages of the lifespan. Moreover, I also reviewed at length the performance of passives by atypical populations. The rationale for including reviews of atypical populations is that much of our knowledge of language processing and speech production comes from studies of pathological speech and speech breakdowns (Levelt, 1989; Obler & Gjerlow, 1999). Besides, several lines of research have led to suggestions of a strong parallelism between the linguistic performance of certain atypical L1 populations and L2 learners, as both categories of speakers share the common characteristic of suboptimal language processing capacity (e.g. Håkansson & Nettelbladt, 1996; Newmeyer, 1997; Paradis & Gopnik, 1997; Baddeley, Gathercole, & Papagno, 1998; Ullman, 2005; M. Paradis, 2004; J. Paradis, 2005; O’Grady, 2005; see also Rosenberg, 1982; Tager-Flusberg, 1994; Karmiloff-Smith, et al., 1997; De Bleser &
Kauschke, 2003). In view of this, Section 2.5 reviews the comprehension and production of passives by L1 speakers of a number of atypical populations whose language processing is disturbed. An examination of the language processing difficulties evident among these L1 populations may shed crucial light on the processing difficulties likewise observed in L2 learners (O’Grady, 2004, 2005).

In offering a panoramic view of the issue of processing passives, Section 2.5.4 shifts attention from the suboptimal language processing of passives (as observed in young children, atypical populations and L2 learners) to where the processing of passives is optimised (through structural priming). Section 2.5.4 reviews recent studies on structural priming as a facility to reduce processing loads and as a form of implicit or procedural learning, as well as its implications for a processing approach to L1 and L2 acquisition of passive constructions.

Throughout the review, I underscore the strong body of evidence in support of deficits in language processing capacities over deficits in speakers’ linguistic knowledge as central to the development and impairment of passives (Just & Carpenter, 1992; Miyake, Carpenter, & Just, 1994; Carpenter, Miyake, & Just, 1994; Kolk, 1998, 2006; contra Borer & Wexler, 1987; Beretta, 2006). Finally, Section 2.5.5 considers Working Memory as a recurring theme throughout Sections 2.5.1 to 2.5.4 that potentially underlies the acquisition, processing and impairment of passives.

2.5.1 Comprehension of English Passives

2.5.1.1 Children’s Comprehension of Passives

Bever (1970) conducted a series of experiments with children between the age of two and five and found that children near four years of age acquire and overuse the following “behavioral strategy”:

Any Noun-Verb-Noun (NVN) sequence within a potential internal unit in the surface structure corresponds to “actor-action-object.” (Bever, 1970, p. 298)

In Bever’s (1970) study, children were asked to act out reversible passives such as The cow is kissed by the horse. It was found that children’s comprehension of
passives suffers severely around four years of age. In other words, the results indicate that children who err in their comprehension of passives around four have most probably had some accurate knowledge of passives earlier, but then overgeneralise the canonical mapping of agent to subject and patient to object when they are near four. Children’s comprehension of passives improves again around age five. This finding of a U-shape developmental trajectory for passive constructions was later replicated by Maratsos (1974) with 82 nursery school children between the ages of three and four, and by de Villiers and de Villiers’ (1973) using children’s mean length of utterance (MLU) instead of the chronological age as the performance predictor.

In an earlier study, Turner and Rommetveit (1967b) found that in sentences where the “event probabilities” differed, six-year-olds could respond correctly to sentences such as (31a) only 50% of the time while four-year-olds could respond correctly to sentences such as (31b).

(33) (a) the horse was followed by the cow.
     (b) the cookie was eaten by the dog.

This was attributed to the fact that cookie and dogs in (31b) are perceived as being functionally related and semantically constrained, i.e. in this case non-reversible, while cow and horse in (31a) have no apparent relationship.

Strohner and Nelson’s (1974) study of children between two and five also confirmed Bever’s findings (1970). In their study, it was found that three-year-olds could correctly comprehend around 80% of reversible actives but less than 30% of reversible passives. The comprehension of reversible actives reached nearly 100% among four-year-olds while comprehension of reversible passives was still around 85% by age five. Strohner and Nelson also proposed other nonverbal context such as “event probability” as factors influencing sentence comprehension of children between two and five. By five years old, children knew more about event probabilities, but their comprehension was only occasionally influenced by them. In terms of event probability and the comprehension of the two voices, five-year-olds in
the study correctly comprehended 90% of improbable actives compared to 70% improbable passives.

A number of other studies have all reported the effects of reversibility on children’s comprehension of passives (Slobin, 1966; Turner & Rommetveit, 1967a, 1967b; Lempert, 1978; Lempert & Kinsbourne, 1978; Hill, 1998; see also Frankmann, Herman, MacKain, & Oyer, 1979). In particular, Slobin (1966) found that the non-reversibility in passive sentences virtually neutralised the effects of the relative syntactic complexity of the passive voice for all of his informant age groups, the youngest of which was age six. In addition, results from a recent neuroimaging study on sentence comprehension by children and adults suggested that children tend to employ an imagery strategy in sentence comprehension, i.e. attempting to imagine sentence participants, rather than a more strictly linguistic strategy, as is the case with adults (Booth, et al., 2000). The link between the likelihood of misinterpreting passive sentences and the implausibility of the propositions expressed found in children also extends into adulthood (Ferreira, 2003), which I will turn to in Section 2.5.1.2.

More corroborating evidence of the U-shape developmental pattern of syntax among young children came from Wetstone and Friedlander (1973)’s study. In their study, which involved regular and scrambled word order rather than grammatical voice alternation, the researchers tested two- and three-year-olds to evaluate the communicative effectiveness of word order in the children’s comprehension of simple questions and commands. They found that when questions or simple commands in scrambled word orders were presented to the children (fluency in this study was determined by the children’s MLU), the majority of the ones in the non-fluent group responded appropriately; however, those in the fluent group scored significantly lower in the scrambled condition than in the normal word order condition. This study provided corroborating evidence from a non-voice alternation perspective that younger children focused and relied more on familiar semantic elements, elements which children could readily translate into their own reality. The linguistically more advanced children in the study had significant difficulties with scrambled word order, suggesting that as their linguistic abilities developed, word order began to assume some communicative values which children took into account.
as an anchor point during sentence comprehension. The U-shape development of passives and overgeneralisation of syntax in four-year-olds suggest that as native children grew older, they moved from greater reliance on individual lexis to discernment and overgeneralisation of the canonical syntactic patterns of their language.

Maratsos and colleagues (Maratsos, Kuczaj II, Fox, & Chalkley, 1979; Maratsos, Fox, Becker, & Chalkley, 1985) presented a number of experimental studies of children’s comprehension of both kinetic verb passives (e.g. Batman is *held* by Superman) and mental verb passives (e.g. Batman is *liked* by Superman). The studies were conducted with 31 children between the age of four and five. Three different groups of verbs were used: kinetic verbs (e.g. *shake*, *hold*), mental verbs (e.g. *forget*, *miss*) and nonsense verbs (e.g. *mell*, *zick*). In addition, the verb *smell* was also used as a semantically intermediate verb. Maratsos et al. (1985, p. 189) concluded that:

many children who can readily comprehend passives like *X is held by Y* nevertheless cannot readily comprehend structurally similar but semantically mental verb passives in which the surface grammatical subject is somehow experienced (perceived, cognized or emotionally experienced) by the underlying grammatical subject.

It was found that the children comprehended kinetic verb passives more accurately than nonsense verb passives, and nonsense verb passives more accurately than mental verb passives. Interestingly, the children’s performance with the verb *smell*, which could sometimes have actional and sometimes mental state characteristics, was better than mental verbs but worse than action verbs (Maratsos, et al., 1985).

This finding echoed the well-acknowledged inseparable relationship between transitivity and the passives (Bach, 1979; Hopper & Thompson, 1980; Bach, 1980; Rice, 1987; Marchman, Bates, Burkardt, & Good, 1991; Meints, 1997, 1999, 2003; Y. Wang, 2002). In a similar vein, another type of verbs that are syntactically full-fledged but semantically less filling, like *go, get, make, give*, known in the linguistic literature as “light verbs” (Jespersen, 1965; Pinker, 1989a; Butt, 2003), has been found to be harder to retrieve by aphasic patients than the semantically more substantial “heavy” verbs like *kill, stab, bend, run*, etc. (Breedin, Saffran, & Schwartz, 1998; see also Gordon & Dell, 2002; Gordon & Dell, 2003; Barde,
Schwartz, & Boronat, 2006). More recently, evidence from a magnetencephalographic (MEG) study showed that in reading comprehension, ‘light verbs’ and function verbs that are contextually disambiguated towards their ‘light’ reading (e.g. The heavy reading “take a computer”, which involves physically manipulating an entity, contrasts with the light reading “take a shower”, in which shower is only ‘taken’ metaphorically) increased the complexity of processing compared to ‘heavy verbs’ and verbs that are contextually disambiguated towards their ‘heavy’ reading (Briem, et al., 2009). The authors of the study proposed that the complexity lies in the ambiguous and variable nature of the argument-role-assignment property of light verbs.

Sudhalter and Braine’s (1985) experiments of comprehending actional and experiential passives with preschoolers, first, third and sixth graders confirmed and elaborated on the findings from Maratsos et al. (1985). Sudhalter and Braine (1985) found that the passive is differentially comprehended depending on the type of verb used in the construction, that is, whether it is actional or experiential. The children’s response distributions showed a unimodel distribution whose mean increased with age. This suggests that comprehension of passives is not an either/or process, but rather a steady, gradual increase of about 5% per year for the age range sampled, with the actional leading the experiential verbs.

Gordon and Chafetz (1990) criticised Maratsos et al.’s (1985) comparison of the actional vs. non-actional classes of verb passives. They posited that “actionality” per se is not central to explaining the uneven performance on comprehending passives, but rather it should further be decomposed into the fine-grain definition of “affectedness”. Verbs which are grouped under “actional” by no means have a uniform degree of transitivity or affectedness. Both hold and eat are considered actional verbs, but eat certainly has a greater degree of affectedness on the patient than hold does (see also Sinclair, Sinclair, & de Marcellus, 1971; Suzman, 1987).

Without totally rejecting the possibility of Maratsos et al.’s (1985) class-based account, Gordon and Chafetz (1990) proposed a “verb-based” account to explaining young children’s poor comprehension of non-actional verbs, as has already been attested by previous studies (Maratsos, et al., 1979; Maratsos, et al., 1985; Sudhalter
& Braine, 1985; Pinker, Lebeaux, & Frost, 1987). Gordon and Chafetz’s “verb-based” account suggested that verbs are initially learned one by one; and since children are exposed to considerably fewer non-actional verbs in their language input, their comprehension of non-actional verbs does not develop at the same pace as actional verbs (but for evidence against the semantic constraint account from recent structural priming studies, see Thatcher, 2007; Thatcher, Branigan, McLean, & Sorace, 2007).

Lempert’s (1978) study involved 40 children aged between 3;4 and 5;3 years old. She set out to find out how the animacy of the nouns affects children’s comprehension of passives. It was expected that children would assign the animate entity to the agent role. The findings, however, were contrary to expectation. In mixed-animacy sentences, children consistently attributed the agent role to the inanimate entity. Lempert, following Horgan (1976) suggested that young children adopt an “instrumental-passive” strategy which subserves a semantic function different to those which have animate agents. When the two nouns differ in their level of animacy, young children assume that the inanimate entity is the instrument, which consequently leaves the animate noun with the patient role to fulfil.

Gourley and Catlin (1978) looked at the comprehension of passives and cleft-patients in context by children of three age groups: nursery school, kindergarten and first grade. The given-new discourse regularities (Haviland & Clark, 1974; Chafe, 1976; Clark & Haviland, 1977) of the context sentences prior to the target structures were systematically manipulated. It was found that comprehension of passive and cleft-patient constructions were facilitated when the preceding context sentence conformed with the given-new discourse regularity (see also Hargrove & Panagos, 1982). Gourley and Catlin’s (1978) results also showed that for the cleft-patient structure in particular, comprehension was greatly facilitated by the appropriate context as opposed to the stand-alone condition. Additional difficulties arise where sentences have to be comprehended in isolation (see also Olson & Nickerson, 1977). The critical role of the context was highlighted by Trosborg (1982), who concluded from her study that if relying solely on syntactic information, children could only comprehend complex syntactic structures such as passives and patient-clefts from
age five onwards (see also Otsu, 1994; Sano, 2005; Mizumoto, 2007 for Japanese children’s comprehension of scrambled sentences in isolation and in context).

The Competition Model, first proposed by Bates and MacWhinney (Bates & MacWhinney, 1982, 1987, 1989; MacWhinney, 1987), makes its commitments in four major theoretical issues: Lexical-Functionalism, Connectionism, Input-driven Learning and Capacity. According to this model, human languages employ various cues to convey meaning, cues such as word order, verbal agreement, morphology, etc. The basic claim of the Competition Model is that children acquire linguistic functions before their corresponding forms, and the mapping of form to function is the end result of a series of “competition” of different cues in their processing.

(34) He annoys the dog

In (34), cues that favour the identification of he as the agent include the nominative case (as opposed to him), the sentence-initial position, the preverbal position and the verb agreement -s in annoy. If he were ill-formed as him in this sentence, it would still most likely be interpreted as the agentive subject, since the cue of the sentence-initial position and preverbal position outweighs case-marking in English. In this instance, he eventually defeated the dog in a round of competition and assumed the role of the agent.

(35) The dog is annoyed by Peter

The Competition Model maintains that since, as Bever (1970) reported, English children tend to take the first noun phrase as the agent, when faced with a non-linear association of form and function as in (35), children may be confused at first as to which noun phrase has the agent status. Since Competition Model posits Input-driven Learning as the key to acquisition, the availability of cues directly correlates to the order of acquisition. Therefore, as children are exposed to more input of this kind of cue, they gradually learn to attribute more strength to the cues “passivisation morphology” and “by” as being in favour of agency-marking for the ensuing NP over the cues “preverbal” and “sentence-initial”. Thus in the competition in (35), Peter
comes out as the winner for the agent role as *Peter* is favoured by the stronger cues “passivisation morphology” and “by”.

Sentence (35) also illustrates the ongoing nature of competition. When a listener hears *the dog* as the noun phrase occupying the sentence-initial position, the cue strength of sentence-initial position marking the agency is a strong one in English. However, a cautious listener will continue to maintain the alternative option in memory until the entire clause is completed. As it turns out in (35), the ongoing competition concluded when the cue “by” emerged in the end, the sentence-final *Peter* defeating the sentence-initial *the dog* as the agent.

Studies of English children’s sentence comprehension within the Competition Model have reported a similar finding to that of Bever’s (1970) and Strohner and Nelson’s (1974). Bates et al. (1984) tested 40 English speaking children between 2 and 5 years of age on their sentence comprehension where word order, noun animacy configuration (A(nimate) or I(nanimate)) and contrastive prosodic stress on nouns were systematically manipulated. They observed that word order accounted for more variance than any other cue in English, at every age tested. Their conclusion was that while children from the very earliest stages have shown sensitivity to the informational values of the abstract semantic and pragmatic cues, word order was the clear winner and was the single most important cue that dominated their sentence interpretation. Thus children overwhelmingly interpret the first noun in NVN, NNV and VNN as the agent, regardless of whether the noun animacy configuration was AA, AI or IA (see also Von Berger, Wulfeck, Bates, & Fink, 1996).

More recently, results from an eye-tracking study of children aged between 3;1 and 7;4 by Stromswold (2006) suggested that children hang onto the “agent-action-patient” strategy until they are six years old. The results further suggested that even six-year-olds’ sentence processing is still not adultlike. Adults utilise subtle acoustic cues in disambiguating actives from passives on-line, whereas six-year-olds decide that a sentence is passive off-line, i.e. only after the sentence ends. The study indicated that either English children at age six have not fully acquire the subtle language-specific acoustic-syntactic correspondences, or that they at least are unable to draw on such knowledge in real-time sentence comprehension. This conclusion is
in line with two other independent studies, which found that children comprehended passives better when sentences were presented in a “highly intonated, lively form” (Wheldall, 1978, p. 147) and when presented aurally in a self-paced, less dynamic fashion (Marinis, 2007). Likewise, in an ERP study investigating six to thirteen year-old children’s comprehension of passives, it was found that the syntactic processes for passives “are not yet established at age seven, but gradually develop toward adult-like processing during late childhood” (Hahne, Eckstein, & Friederici, 2004, p. 1302).

2.5.1.2 Adults’ Comprehension of Passives

Ferreira and colleagues (Ferreira & Clifton, 1986; Ferreira, Bailey, & Ferraro, 2002; Ferreira, 2003; Ferreira & Patson, 2007) researched adults’ comprehension of passives and object-cleft (patient-cleft) sentences heard in isolation. They found that adult native English speakers regularly misinterpret passive sentences in isolation as actives, accepting the first noun of passive sentences as the agent (see also Kako, 2006, which reported that compared to OBJ, adults consistently rated SUBJ more agent like, even when rating sentence with nonsense words). In one study (Ferreira, 2003), adult native English speakers were tested on their comprehension of passive sentences and subject-cleft sentences (e.g. The dog was bitten by the man vs. It was the man who bit the dog). It was found in this study that the speakers performed better in comprehending subject-cleft sentences than passive sentences. Ferreira pointed out that speakers’ poor comprehension of passives could not be due to their ignorance of passive constructions in their native language, nor could it be due to the fact that passives are infrequent, since their comprehension of the even less frequent subject-cleft construction outperformed that of passives. Ferreira and colleagues argued for “good enough” processing to explain such phenomenon, i.e. English speakers are often quite content with settling for the interpretation of the default word order. In fact, word order remains an extremely strong cue for sentence comprehension and agent assignment such that when asked to identify the agent in sentences such as the eraser bites the turtle, English speakers relentlessly chose the first NP as the agent no matter how strange the result (MacWhinney, Bates, & Kliegl, 1984).
Dąbrowska and Street (2006) tested the accuracy level of comprehending passive sentences in isolation among native and non-native English speakers belonging to either the highly educated or the less-educated group. Contrary to the widely held assumption in linguistics that all healthy native speakers master basic linguistic constructions of their native language, it was found that less-educated native speakers performed very poorly on implausible passives (e.g. *The dog was bitten by the man*), scoring below chance at only 36%. In contrast, both highly educated non-native and less-educated non-native scored 98% and 94% on implausible passives respectively. This was surprising because the relatively poor performance of the less-educated native speakers could not have resulted from a lack of linguistic input compared to the non-native speakers. Dąbrowska and Street (2006, p. 609) concluded that “there appears to be a continuum of proficiency with passive sentences, with participants with more schooling performing better than less educated participants.” The superior performance of the less-educated non-native speakers was attributed to the effects of the L2 specific instruction they had received despite their lower level of general education. The authors claimed that the results strongly suggested considerable individual differences in native speakers’ ability to process basic linguistic constructions and a difference in the level of ultimate attainment for native speakers. A similar finding was reported in a study on the comprehension of double-object actives and causatives (Sasaki, 1998). In Sasaki’s study, some Japanese L2 learners outperformed native Japanese speakers on comprehending syntactic causative sentences in isolation. This surprising result was explained by the fact that the causative construction in Japanese involves noncanonical mappings of arguments to grammatical functions. Native speakers expected sentences to mostly follow canonical mappings, therefore they often mistakenly interpreted the noncanonical causatives as the canonical double-object actives.

2.5.1.3 Summary

In summarising Section 2.5.1, it has been shown that in terms of comprehending English passives, children experience a U-shape developmental trajectory, i.e. young children start by relying more on the semantics, and gradually discern and overgeneralise the canonical syntactic pattern to all sentence structures. Children and adults tend to take the first NP as the agent. They are greatly facilitated by semantic
non-reversibility. Additionally, English children are also swayed by the actionality or transitivity of verbs and the preference for mapping the animate NP to the sentence subject. English children do not competently comprehend passives before age six or seven.

2.5.2 Production of English Passives

2.5.2.1 Children’s Acquisition of Passives

Agentive passives are rare in children’s speech production. For example, Harwood (1959) found no agentive passives in his corpus of approximately 12,700 utterances consisting of approximately 99,000 running words by children between the ages of 4;11 to 5;8. Furthermore, not only are agentive passives rare in children’s spontaneous speech, the scarcity continues into adulthood. In the spontaneous speech data examined by Weiner and Labov (1983), passives with agentive clauses made up only 1% to 2% of the total passivisable transitive verbs. Written English is in a similar situation. Agentless passives likely represent the dominant use of passives in English with between 70% and 94% of passive sentences found in a survey of various English writings containing agent clauses. Jesperson (1924, p. 168, as cited in Slobin, 1968, p. 877) confirmed a similar situation for written English, claiming that truncated passives probably represent the dominant use of the passive in English. Jespersen reported, for example, that between 70% and 94% of passive sentences found in a survey of various English writings contained no mention of the active subject. Most recently, Xiao et al.’s (2006) corpus-based analysis of both spoken and written British English revealed that truncated be-passives make up 89.2% of the total written be-passives and 94.9% of the total spoken be-passives, while truncated get-passives make up 91.5% of the total written get-passives and 97.4% of the total spoken get-passives. The scarcity of agentive passives in adult speech consequently means that children are exposed to a very limited and infrequent linguistic input for this construction (Brown & Hanlon, 1970; Brown, 1973).

When children produce passives, they often do not include the agentive by-clause (Beilin & Sack, 1975; Horgan, 1976), producing mostly the truncated form of passives. The English past participle appearing without an agentive by-clause can be
ambiguous. Sentences with the past participle such as (37) may have a stative (adjectival) reading or a passive (verbal) reading (Cook, 1990).

(37) The lock was broken.
   Passive = The lock was broken by someone.
   Stative = The lock was in a broken state.

In fact, some have even suggested that all passives were in fact adjectives (Freidin, 1975; see also Townsend & Bever, 2001). English lacks an elaborate morphology to distinguish between the adjectival and the passive reading. Other languages such as German, however, employ discriminative measures to differentiate adjectival from verbal passives. For example the German auxiliary sein is used for adjectival passives and warden for verbal passives (Kratzer, 2000).

Baldie (1976) claimed that comprehension precedes production, that children do not begin producing passives until the mean age of 3;9. Baldie also reported that children begin to produce agentless passives and perform better in agentless passives, which allow both verbal and adjectival readings, than agentive passives, which allow only verbal readings. It was also found that children’s ability to produce passives improves rapidly from 6;9 onwards. This led to further studies and the claim that children do not have control over agentive passives until age seven (Baldie, 1976; Horgan, 1976).

Pinker, Lebeaux and Frost (1987) conducted a study where four children were recorded at regular intervals between the age of 2;3 and 5;1. Both informants started producing passives at 3;1. Pinker et al. (1987) adopted a very liberal definition of “passive” which saw the inclusion of adjectival passives (e.g. He was named Luke), possible simple past tense forms and irregular passives (e.g. hurt, left). It was later reported in a separate publication that none of the informants in Pinker et al. (1987) produced any agentive passive, nor passives of actional verbs such as slap, touch, kiss, and that all of the spontaneous passives produced by two of the informants were ambiguous stative adjectives and truncated verbal passives (Pinker, 1989a, p. 315). Nevertheless, even with this liberal definition adopted, the emergence of passives was still relatively late in contrast to the mastery of actives.
Borer and Wexler (1987, 1992) proposed the Linguistic Maturation of Grammatical Principles theory, or the Maturation Hypothesis, to explain the absence or late acquisition of passive constructions by children. The theory proposes that since children’s ability to acquire language is derived from an innate and biologically determined property of the human brain, the maturation of the brain and the linguistic property of it are as natural a phenomenon as any other physiological maturation (see also Felix, 1992). According to the Maturation Hypothesis, certain linguistic principles will not be accessible to young children until later in age. Besides, there is an innate, maturation schedule that is universal to all children, which determines the time a particular linguistic feature is accessible to a child. The Maturation Hypothesis therefore claimed that the linguistic maturation of grammar does not depend on explicit instruction or frequency of exposure to certain grammatical input, but rather on the time it takes for a given grammatical feature to mature in a biological sense.

Borer and Wexler (1987, 1992), following the passive formation through NP movement proposition under the Government-Binding framework (Chomsky, 1981), argued that young children lack the ability to make A(argument)-chain representations that link the thematic subject and object positions. However, such a claim goes against clear findings such as Pinker et al. (1987), Maratsos (1974) and Maratsos et al. (1985). Empirical evidence shows that while children’s comprehension and production of passives is shaky, they nevertheless do possess some sort of command of the passive. Based on Maratsos et al.’s (1985) observation that young children have significantly more difficulties comprehending passives involving stative and mental verbs than those involving actional verbs, Borer and Wexler (1987, 1992) argued that young children only have access to adjectival passives, which are assumed to involve no representation of A-chain, that is, no representation of the coindexation of moved NPs and their traces. They argued that young children would have a maturational difficulty in forming A-chain representations until a comparatively later stage of development. The delay in acquiring verbal passives as observed in many languages such as English and Hebrew (Borer & Wexler, 1987), Spanish (Pierce, 1992), Japanese (Sugisaki, 1999; Machida, Miyagawa, & Wexler,
2004) and Russian (Babylonyshev, Ganger, Pesetsky, & Wexler, 2001) lends support to the Maturation Hypothesis.

However, the Maturation Hypothesis did not go unchallenged. Fox and Grodzinsky (1998) argued against Borer and Wexler’s (1987, 1992) maturation of A-chain hypothesis. They claimed that children’s difficulties with the agentive passives have nothing to do with whether they are adjectival or verbal in nature, but rather are owing to their lack of “ability to transmit the external θ-role of the predicate to the by phrase” (Fox & Grodzinsky, 1998, p. 311) They suggested that θ-role transmission requires more processing resources, which is beyond children’s limited processing capacities.

Empirical evidence from studies of the acquisition of the Sesotho (Demuth, 1989, 1990, 1992), Zulu (Suzman, 1985), Quiche Mayan (Pye & Poz, 1988) and Inuktitut (Allen & Crago, 1996) challenge the Maturation Hypothesis. For example, Demuth (1989, 1990, 1992) commented that since Sesotho does not have adjectival passives, any verbal passive produced by Sesotho children would involve A-chain representations in Borer and Wexler’s terms. Demuth (1989, 1990, 1992) found that Sesotho children could already produce verbal passives at age 2;8. Similarly, Allen and Crago’s (1996, p. 147) study of young Inuktitut children showed that “examples of passives occurred as early as 2;0; they appeared in both agentless and agentive forms, and with both actional and experiential verb roots.” According to the universality of linguistic maturation claim, these results would mean that children of the same age of other L1 languages should also be able to produce verbal passives. Hence it was argued that the fact that young children of many languages could produce verbal passives at an early age was evidence against the Maturation Hypothesis. Two studies (Teng, 1991; Terada, 1991) were done with three to five year-old English children’s comprehension of agentless passives of resultatives (e.g. The room was made clean), agentless lexicalised passives of small clause constructions (e.g. The cat is dressed black), and agentless passives with instrumental prepositional phrases (e.g. The fish was eaten with a fork); all of these sentence types imply implicit agents and can only be understood as verbal. The two studies found that young children could indeed comprehend these implicit verbal
passive sentences with high accuracy, thus providing evidence against the Maturational Hypothesis.

Marchman et al. (1991) conducted two experiments on children between 3 to 11 years of age. The study looked at the children’s responses when the patient in an event or action was probed by the experimenter (e.g. “Tell me about the UNDERGOER”). One of the questions the researchers focused on was this: When children do not use a passive in response to probes to the patient or the undergoer, what do they do instead?

The results were that when children did not produce passives in these circumstances, they employed the following two response types (excerpts taken from Marchman, et al., 1991, pp. 80-81)

1. Actor Actives: Actives where the actor of the action is in subject position.  
   e.g., ‘the bear is licking the tiger.’

2. Non-Passives: Event or Non-event descriptions in which the probed character is topicalised. This category is comprised of four types of responses:
   (a) Non-Event Descriptions with the undergoer/location in subject position:  
       e.g., ‘the tiger is just sitting there.’
   (b) Event Descriptions with the undergoer/location in subject position:  
       e.g., ‘the tiger let the bear lick him.’
   (c) Two Clause constructions:  
       e.g., ‘the tiger is just sitting there and the bear licks him.’
   (d) Cleft constructions:  
       e.g., ‘it was the tiger that the bear licked.’

In other words, Marchman et al. (1991) found that in those instances where children did not choose to use passives, they would often utilise alternative constructions that fulfil the same general discourse function as the passive. In other words, “these alternatives provide children with a ‘legal’ way to use easier and previously mastered constructions (i.e. the active voice) and still solve the discourse problem to [underscore] the undergoer in the scene.” (Marchman, et al., 1991, pp. 88-89). The Non-Passive type of responses was well utilised among the younger children. It peaked to 69% for the five/six-year-old group, and then diminished significantly after that. This declining trend of Non-Passive responses mirrored the increase in the
production of passives; the cross-over of the two trends was around 7;6 years old at roughly 45% for both passives and Non-Passives.

Three- and four-year-olds have been found to produce significantly more disfluencies (interjections, part- and whole-word repetitions, phrase repetitions, revisions, disrythmic phonations and extended pauses) on passive sentences than active sentences (Pearl & Bernthal, 1980). It was also observed that five- and seven-year-olds were more disfluent with producing passives than actives in a modelling task (Gordon, Luper, & Peterson, 1986; Gordon & Luper, 1989). Haynes and Hood (1978) attributed the disfluencies to the increased “linguistic stress” that the children’s language processing system was under when producing complex structures such as passives. According to Haynes and Hood (1978, p. 89), “linguistic stress” included children’s familiarity with the construction being encoded.

2.5.2.2 Elderly Adults’ Production of Passives

In general, elderly adults’ syntactic production varies from that of younger adults. Elderly adults produce fewer complex constructions, such as centre-embedded relative clauses (e.g. The man that the lady saw ran away), compared to younger adults (Kemper & Mitzner, 2001; Kemper, Herman, & Lian, 2003). In terms of morphology, older adults are less accurate than younger adults when using irregularly inflected verbs (Altmann & Kemper, 2006). Working memory limitations associated with normal aging also contribute to sentence comprehension difficulties in elderly adults (Davis & Ball, 1989; Zurif, Swinney, Prather, Wingfield, & Brownell, 1995; Grossman, Cooke, et al., 2002).

In Bates et al.’s (1995) study, 92% of the participants in the elderly group (age range 50-100) produced passives in the probe task compared to 100% from the college control group. Furthermore, the elderly group was divided into two groups: Young-Old (age range 50-66) and Old-Old (age range 67-100); statistical analyses revealed that while the difference between the Young-Old group and the college control group in terms of the probability of producing passives in the probe task did not reach significance, there was a significant difference between Young-Old and Old-Old adults. Normal aging therefore does decrease the probability of producing passives; this effect becomes evident after the age of 67.
2.5.2.3 Summary

In summarising Section 2.5.2, it has been shown that English children have been found to start producing passives at 3;9 (Baldie, 1976). They produce short, agentless passives before agentive passives (Baldie, 1976; Horgan, 1976; Pinker, et al., 1987; Israel, Johnson, & Brooks, 2000). Children’s ease of producing agentless passives is strongly connected to the less complex, ambiguous adjectival-verbal nature of agentless passives (Baldie, 1976; Horgan, 1976; Israel, et al., 2000). English children become competent users of passives around age seven (Baldie, 1976; Marchman, et al., 1991).

Children’s difficulties in acquiring passive constructions cannot be adequately accounted for by a purely linguistic account such as the Maturation Hypothesis (Borer & Wexler, 1987, 1992), as the delay in acquiring passive constructions is greatly diminished in children of languages in which passive constructions play a prominent role (Suzman, 1985; Pye & Poz, 1988; Demuth, 1989, 1990, 1992; Allen & Crago, 1996), thus arguing against the biological maturation of the brain as the cause of the difficulties. On the other hand, a processing account can more adequately explain children’s difficulties with passive constructions, since the non-default grammatical voice by virtue of its low frequency is less familiar to children, thus generating more “linguistic stress” (Haynes & Hood, 1978, p. 89) and greater processing loads, leading to poor performance and increased disfluencies. Besides, a processing approach can better explain the effects of aging on the decreased probability of producing passives in contextually appropriate conditions than a linguistic account (Bates, et al., 1995).

2.5.3 Passives in Atypical English Populations

Comparative studies in child language acquisition and aphasia have revealed many similarities across the two groups (Jakobson, 1971; Avrutin, 2000; Avrutin, Haverkort, & van Hout, 2001). Recent studies comparing children with Specific Language Impairment (SLI) and L2 learners have also found striking similarities between the two categories of speaker populations in terms of their performance in morphology and syntax (Håkansson & Nettelbladt, 1993, 1996; M. Paradis & Gopnik, 1997; Newmeyer, 1997; J. Paradis & Crago, 2000; J. Paradis, 2005; Håkansson, 2005). Moreover, evidence from several lines of research indicates that
there are highly suggestive parallels among early stages of L1 language acquisition, adult L2 acquisition and agrammatic aphasia (O’Grady, 2001, 2004, 2005; O’Grady & Lee, 2005; De Bleser & Kauschke, 2003; see also Ullman, 2001; Ullman, 2005; Bettoni, Favilla, & Ferroni, 2008). Therefore it is appropriate to examine the situation among atypical L1 populations with the view of drawing an additional L1 perspective for the purpose of investigating L2 acquisition.

2.5.3.1 Children Who Stutter

Bernstein (1981) suggested that the pattern of fluency breakdown observed in young children at verbs in particular might indicate a heightened level of strains associated with the syntactic planning of verb phrases, as well as a fluency interval resulting from their inadequate level of language development. Thus, fluency is often disrupted at the verb phrase boundary while the speaker attempts to syntactically plan and then produce the rest of the sentence (Bernstein Ratner & Benitez, 1985). The logic thus follows that morphologically more complex VPs would more likely lead to stuttering in children.

Indeed, in a study investigating the production of sentences of varying degrees of grammatical complexity by five-year-old stuttering and non-stuttering children, it was found that passive constructions significantly differentiated the stuttering from the non-stuttering children in terms of the number of disfluencies occurring in the stuttering group (Lees, Anderson, & Martin, 1999). Moreover, stuttering children are more prone to stuttering when narrating events in the passive than in the active voice (Pearl & Bernthal, 1980; Palen & Peterson, 1982; Gordon, et al., 1986; Gordon & Luper, 1989).

2.5.3.2 Children with Specific Language Impairment

Children with specific language impairment have normal nonverbal intelligence, exhibit no obvious neurological dysfunctions but show significant limitation in language ability, particularly with grammatical morphemes (Leonard & Deevy, 2006).

account to explain the difficulties children with SLI experience with English passives. According to this account, children with SLI have particular difficulties with processing what Leonard called “low phonetic-substance morphemes” (Leonard, 1989, p. 186), or grammatical morphemes which are acoustically impoverished with respect to both duration and amplitude. The surface account posits that the need to perceive these impoverished morphemes, retain them long enough to hypothesise their grammatical functions and then form the appropriate paradigm in which to place these morphemes can often be too intense for children with SLI. Because SLI children’s processing speed is limited, they often have to shift their focus to the next incoming utterance before they can finish processing the passive morphemes. It was therefore claimed that children with SLI need to have more than the usual number of encounters with the morphemes for them to be acquired (Leonard, et al., 2006).

According to the surface account (Leonard, 1989; Montgomery & Leonard, 1998; Leonard, et al., 2003; Leonard, et al., 2006), the most vulnerable surface feature in English passives is the consonantal -ed (/t/ or /d/) inflection, which is brief in duration and of low amplitude. Indirect evidence of this comes from Losiewicz (1992, 1995), who investigated the difference in the acoustic durations of the English past tense morpheme -ed in spontaneous, read-aloud context and found that the average acoustic duration of the -ed morpheme was 98 ms. for high-frequency verbs and 106 ms. for low-frequency verbs (e.g. needed vs. kneaded) This means that even with verbs whose -ed morpheme is slightly elongated, as is the case with low-frequency verbs, the consonantal morpheme which children would have to capture aurally and process the grammatical functions it represents is still very brief. Leonard et al. (2006) also suggested that this impeding effect may be exacerbated by the brief duration of the contracted form of the auxiliary such as she’s, as well as by, in She’s chased by the dog, causing children to misinterpret it as She chase the dog. Since these brief yet crucial phonomorphemic cues to passives could quite easily escape the fluctuating attention of typically developing children (Sudhalter & Braine, 1985), the surface account thus suggests that it is even more so with children with SLI.

Leonard et al. (2006) also studied English and Cantonese children with SLI to understand further the comprehension of passives of children with SLI in light of the surface account. Leonard et al. (2006) claimed that Cantonese passives hold
advantages to English passives in that the verbs do not inflect to reflect the voice, the acoustic duration of the passive morpheme bei2 (畀) is not subject to reduction or neutralisation and is longer in acoustic duration. Leonard et al. (2006) did not give a specific value, but indicated that it ranges between 100 and 400 ms., which is significantly longer than that of the typical English passive morphemes of 98–106 ms. (Losiewicz, 1992, 1995). The last point is readily generalisable to Mandarin, as the average acoustic duration of the Mandarin 4th tone (the tone of the passive markers bèi, jiào and ràng) is reportedly 251 ms. (Howie, 1976) when spoken in edited speech, or 334.4 ms. (Fu & Zeng, 2000) and 236.12 ms. (Tseng, 2006) when spoken in isolation.

Leonard et al. (2006) found that the English children with SLI were less proficient than the age-matched and younger typically developing children in comprehending passives, while the Cantonese children with SLI were less proficient than their age-matched peers but were at least equally competent to younger typically developing children. In line with the surface account, this outcome suggests that the stronger surface phonetic substance of the Chinese passive marker somewhat alleviates Chinese SLI children’s difficulties with processing passive constructions compared to English SLI children.

Clinical interventions provide more support for the surface account. Speech pathologists have found that by acoustically modifying the speech algorithms of some brief acoustic stimuli with the aid of computer software (Nagarajan, et al., 1998; Tallal, et al., 1998; Miller, Linn, Tallal, Merzenich, & Jenkins, 1999; Tallal & Miller, 2006; Montgomery & Leonard, 2006) or by lowering the rate of speech input (Montgomery, 2004, 2005), children with SLI are able to make remarkable improvements in their language comprehension. Simulations of phonological perceptual deficits in a connectionist network have yielded a pattern of past-tense impairments consistent with that of children with SLI (Joanisse & Seidenberg, 1998; Joanisse, 2004).

The surface account further claims that children with SLI have limitations in their processing abilities, in terms of both processing speed and processing capacity, i.e. their working memory capacity (Montgomery & Leonard, 1998, 2006). On this point,
numerous studies have consistently found a link between SLI and working memory (Weismer, Evans, & Hesketh, 1999; Baddeley, 2000b; Marton & Schwartz, 2003; Hoffman & Gillam, 2004; Mainela-Arnold & Evans, 2005). These studies all reported greater limitations in verbal working memory capacities or executive functions in connection with SLI. The implication of this association is that as SLI children’s limited working memory resources are allocated to processing such elements as message contents, there would be little cognitive resources left to allow these children to attend to and maintain the low phonetic-substance morphemes in working memory.

McGuckian and Henry (2007) pointed out that the order of grammatical morpheme acquisition observed in children with hearing impairment is characteristic of that reported for L2 learners (Dulay & Burt, 1974, 1973). One study found that a significantly higher level of hospital attendance for otitis media was reported in the developmental language disordered children compared to the typically developing group, thus lending support to the auditory perceptual deficit account of SLI (Bishop & Edmundson, 1986; see also Holm & Kunze, 1969).

On the other hand, some studies presented evidence showing that auditory perception deficits are not totally to blame for at least some children with SLI (van der Lely, 1994, 1998, 2005; van der Lely, Rosen, & McClelland, 1998; van der Lely & Christian, 2000; Hansson, Sahlén, & Maki-Torkko, 2007). Van de Lely maintained that while perceptual and general cognitive processing deficits may co-occur in some cases of SLI, evidence points to at least a subtype of SLI as an impairment to a grammar-specific subsystem in the brain with other cognitive processing abilities intact (van der Lely, et al., 1998).

Finally, the Procedural Deficit Hypothesis (Ullman & Pierpont, 2005) proposed that deficits in phonological and morphological processing in SLI can largely be explained by the abnormal development of the brain structures that subserve the procedural memory system. Ullman and Pierpont (2005) reviewed the literature and argued that the procedural memory system, which is critical for the computation of grammatical information as well as carrying out other non-linguistic processing functions such as typing and riding a bicycle, is impaired in a large number of cases.
of children with SLI. The relative strength with irregular verbs in SLI children is explained under the Procedural Deficit Hypothesis as their relying more on declarative memory and metalinguistics knowledge to compensate for their weaker procedural system (Ullman & Pierpont, 2005; Thomas, 2005; see also Paradis & Gopnik, 1997).

2.5.3.3 Speakers with Down’s Syndrome

Ring and Clahsen (2005) investigated the comprehension of passives in adolescents with Williams syndrome (WS) and Down’s syndrome (DS), both of which are genetic disorders characterised by learning disabilities. The authors had previously claimed, based on a set of studies on WS patients, that lexical representations or procedures for lexical access are impaired in WS patients but not their linguistic system. In this study, it was found that overall, the WS group performed comparably to the mental-age matched unimpaired controls. Patients with DS in the study, on the other hand, had significant difficulties with agentless and agentive passives. Since the WS and DS groups in the study did not differ significantly in their mean mental ages and full IQs, the Down’s syndrome participants’ difficulties with passives could not be attributed to low levels of intellectual development (see also Kernan & Sabsay, 1996 for similar findings in adults with Down’s syndrome and with mental retardation of unknown etiology).

Individuals with DS are known to suffer from relatively poor verbal working memory whereas individuals with WS have poor visual-spatial working memory (P. Wang & Bellugi, 1994; Jarrold & Baddeley, 1997; Jarrold, Baddeley, & Hewes, 2000; Jarrold & Baddeley, 2001; Jarrold, Baddeley, & Phillips, 2002). This dissociation of the two working memory components may have implications for the different patterns of performance with passive constructions observed in these two populations (see Section 2.5.5).

2.5.3.4 Speakers with Broca’s Aphasia

Broca’s aphasia (also known as non-fluent aphasia and agrammatic aphasia) is a common aphasia caused by damage, lesions or trauma to the third frontal convolution of the left hemisphere, including but not limited to the region of the brain known as Broca’s area. Patients with Broca’s aphasia are characterised by an
agrammatic disorder where they rely heavily on content words and hardly at all on word order or grammatical morphemes; articles and copulas appear infrequently and verbs are often uninflected (Caramazza & Zurif, 1976).

**Linguistic Accounts**

Grodzinsky (1986; 1990; 1995) proposed, based on the Government-Binding theory (Chomsky, 1981), the Trace-Deletion Hypothesis to account for patients’ at-chance performance with comprehending passives. This hypothesis postulates that the representational element called trace, which is claimed to arise from movement transformations involved in passive sentences, is deleted or absent in the linguistic representations of patients with Broca’s aphasia, making it impossible for these patients to correctly assign theta roles to moved arguments. The Tree Pruning Hypothesis (Friedmann & Grodzinsky, 1997; Friedmann, 2001, 2006), also based on the generative tradition (Chomsky, 1995), states that Broca’s aphasia disrupts patients’ access to the full set of hierarchically ordered functional nodes of the syntactic tree. This means that a deficit in a lower node renders all nodes above it inaccessible to the patient; Broca’s aphasia effectively “prunes” the syntactic tree at a specific node for each individual aphasic patient.

Linguistic approaches such as the Trace-Deletion Hypothesis for comprehension and the Tree Pruning Hypothesis for production (Grodzinsky, 2000; see also Beretta, 2006 for a review of various linguistic approaches to agrammatism) offer a binary account, i.e. traces are either intact or deleted in patients’ linguistic representations; the syntactic tree nodes are either intact or pruned. The challenge of such binary accounts is their inadequacies in explaining the varying degrees in the performance, severity and improvements of individual aphasic patients.

**Processing Accounts**

On the other hand, the existence of varying degrees of severity in patients favours non-binary, processing approaches as more encompassing and reflective of individual circumstances. Patients’ conditions vary, each patient fares differently in understanding and producing passives (Schwartz, Saffran, & Marin, 1980; Saffran, Schwartz, & Marin, 1980; Linebarger, Schwartz, & Saffran, 1983; Schwartz, Linebarger, Saffran, & Pate, 1987; Saffran & Schwartz, 1988, 1994; Saffran,
Schwartz, & Linebarger, 1998; Kolk, 1998, 2006; Caplan, 2006). Furthermore, it is hard to reconcile the Tree Deletion Hypothesis with cases where aphasic patients perform well on grammaticality judgement of some structures involving traces and quite poorly on other structures that do not involve any trace (Wilson & Saygin, 2004). Finally, cases of aphasic patients’ performance with passives ameliorating after therapeutic interventions are also difficult to reconcile with purely linguistic representational accounts (e.g. Linebarger, Schwartz, Romania, Kohn, & Stephens, 2000; Weinrich, Boser, McCall, & Bishop, 2001), since the linguistic approaches do not theorise the notion of restorable, non-permanently deleted or non-permanently pruned representations.

Dick and colleagues (Dick, et al., 2001; see also Dick, Gernsbacher, & Robertson, 2002) administered a comprehension task of active, subject-cleft (e.g. *It's the girl that is hitting the boy*), passive and object-cleft (e.g. *It was the boy who the girl hit*) sentences to 56 aphasic patients under normal listening conditions and 216 college students under listening conditions of various types of perceptual and attentional stressors. The researchers found that receptive agrammatism was found in aphasic groups and was also successfully induced in neurologically intact individuals processing under adverse conditions of stress. An earlier study in which normal individuals’ working memory demands were increased in simulations yielded similar results (Miyake, et al., 1994), which were interpreted as support for the theory that reduced working memory capacities for language, whether they be in neurologically intact individuals or in aphasic patients, hamper the storage and processing of sentence representational elements (see Kilborn, 1991; Caplan, 2006). A similar conclusion was reached by Gahl (2002) in her study of lexical bias in aphasic sentence comprehension. Gahl noted that the relatively higher error rate in patients’ comprehension of certain sentence types compared to comprehension by neurologically intact adults is compatible with the view that aphasic speech differs quantitatively, not qualitatively, from normal speech, and the difference may be attributed to changes in processing capacity. Moreover, the use of computer-based communication systems have markedly improved the syntactic structure of aphasic patients’ speech production by manipulating the temporal demands of on-line speech processing (Linebarger, et al., 2000; Weinrich, et al., 2001; Haarmann & Kolk, 1991;
Haarmann, Just, & Carpenter, 1997) and provide script training through massed practice and drilling (Cherney, Halper, Holland, & Cole, 2008).

Two grammaticality judgment tests using a cross-modal structural priming methodology were administered to Dutch speaking aphasic patients (Friederici & Kilborn, 1989; Kilborn & Friederici, 1994). It was found that when patients were given more time to process the syntactic context on-line, in contrast to age-matched controls, patients’ reaction times became faster. The authors thus proposed that the source of difficulties with syntactic structures experienced by patients with Broca’s aphasia lies in the loss of fast and automatic on-line syntactic processing rather than deficits in linguistic structures (see also Wassenaar & Hagoort, 2007 for a similar conclusion based on ERP evidence).

Upon comparing patients with Broca’s and Wernicke’s aphasia, Swinney, Zurif, Prather and Love’s (1996) conclusion also favours a processing view of deficits in Broca’s aphasia. They maintained that:

In the view we have developed, the brain region implicated in Broca’s aphasia is not the locus of syntactic representations per se, but rather, appears to provide the resources that sustain the normal timing characteristics of the lexical processing system – characteristics that are in turn necessary for building syntactic representations in real time. (Swinney, et al., 1996, p. 179)

It is also interesting to note that in a recent electrophysiological study of aphasic patients’ on-line processing of subject-verb agreement violations (Wassenaar, Brown, & Hagoort, 2004), the less severely impaired patients showed a reduced sensitivity to subject-verb agreement violations compared to the neurologically intact controls, while the more severely impaired patients showed a greatly diminished to an absent ERP effect. Wassenaar et. al. (2004) concluded that the reduction in the verbal working memory of aphasic patients was the root cause of their reduced sensitivity to subject-verbal agreement in processing sentences on-line.

Noncanonical Mapping and Procedural Memory
In terms of procedural processing of language, in comparing patients with Broca’s and Wernicke’s aphasia, the non-fluent patients were consistently more impaired in
the production, reading and judgement of regular past tense verbs, than irregular past
tense verbs or novel verbs; the former being subserved by procedural memory and
the latter stored in declarative memory. By contrast, the fluent, anomic aphasic
patients showed the opposite pattern. Ullman and colleagues (Ullman, et al., 1997;
Ullman, et al., 2005; Ullman, 2008) maintained, under the procedural-declarative
dual system view of neurocognition and language processing, that the word-finding
difficulties evident in anomic aphasic patients result in their impairment of retrieving
irregular verbs from declarative memory, whereas Broca’s aphasic patients’ limited
capacities to process verbs with regular past tense inflections in real-time indicate
deficits in their procedural memory.

Menn and colleagues (Menn, et al., 1998; Menn, 2000; Gahl, et al., 2003) proposed a
canonical sentence processing approach, which states:

We suggest that aphasic problems with producing noncanonical structures
such as passives derive principally from two sources: difficulty in retrieving
the less frequent frames for a given verb, and difficulty in controlling the
placement of retrieved noun lemmas in the correct slot at the functional
level....If a verb is most commonly used in the passive, passive should be
easy for that verb. (Menn, 2000, pp. 158-159)

In essence, Menn and colleagues suggested input driven or frequency as the crucial
factor. They explained the simplicity of the canonical word form in terms of the
active form of a verb lemma being most likely the more frequent form compared to
its passive form and consequently would have the lower activation threshold. Some
exceptions are “thrill”, “anger”, “disgust”, for which frequency favours the passive
form. With regards to the effects of frequency, simulations of the relative frequency
patterns of actives/passives in a connectionist network have yielded a pattern of late
acquisition and greater vulnerability to simulated brain damage for passives
compared to actives (St. John & Gernsbacher, 1998).

English has a class of double-purpose lexical causative verbs which alternate
between transitive lexical causatives and unaccusatives (Miller & Johnson-Laird,
1976; Levin, 1993; Levin & Rappaport Hovav, 1994). For these lexical causative
verbs, the patient/theme argument in the transitive version is mapped to the subject
function in the unaccusative version of the same verb. (e.g. The man melted the ice
alternates with *The ice melted, not #The man melted*; cf. the two versions of the simple transitive/intransitive verb *sing* in *The boy sang the chorus* and *The boy sang*). Another line of evidence suggesting noncanonical argument-function mappings as the source of difficulties for Broca’s aphasic patients is their performance with object-topicalisations and unaccusatives. Studies have found that aphasic patients have greater difficulties in both comprehending and producing sentences containing object-topicalisations and lexical causative verbs of alternating transitivity, (Heeschen, 1980; Bastiaanse, 2003; Bastiaanse & van Zonneveld, 2004, 2005; Bastiaanse & Thompson, 2003; Bastiaanse, Koekkoek, & van Zonneveld, 2003; Bastiaanse & Edwards, 2004; Burchert, Meißner, & De Bleser, 2008). In addition, patients with Broca’s aphasia perform better with unergatives (e.g. *The baby cried*), which map the agent to the subject, than with unaccusatives (e.g. *The baby drowned*), which map the patient/theme to the subject (Kim & Thompson, 2000; Finocchiaro, 2002; Thompson, 2003; Lee & Thompson, 2004; see also Huang, 2009 for similar findings with Mandarin aphasic patients); and they perform better with unaccusatives than with passives (Menn, et al., 1998; Menn, 2000; Gahl, et al., 2003).

The Slow Syntax Hypothesis (Piñango, 2000) postulates that lexical activation in aphasic patients is slower than in neurologically intact individuals. This delay in retrieving the thematic grid, which triggers the assignment of argument roles to NPs, leads to breakdowns in sentence comprehension. It is also hypothesised that the time course is delayed further when processing psychological verbs (psych-verbs) of the noncanonical Theme-Experiencer mapping (e.g. *Peter frightens Mary*) than of the canonical Experiencer-Theme mapping (e.g. *Mary fears Peter*). Results of Broca’s aphasic patients’ at-chance performance with canonical psych-verbs and above-chance performance with noncanonical psych-verbs were interpreted as support for the Slow Syntax Hypothesis (Piñango, 2000). A computer model has since been created based on the Slow Syntax Hypothesis, which succeeded in simulating aphasic patients’ impairments in understanding psych-verbs (Stocco & Crescentini, 2005).

Carlson and Tanenhaus (1988) pointed out that regularities in the mapping of argument roles to grammatical functions create weak biases of NP1-to-Agent mapping, the effects of which could be greatly compounded when one’s syntactic
control is diminished, as is the case with aphasic patients (Caplan, 1983, 1985; Caplan & Futter, 1986; Saffran, et al., 1998; see also Law & Leung, 1998; 2000 for similar findings with Mandarin and Cantonese aphasic patients) and young children (Bever, 1970).

Finally, in a recent PT-based exploratory study of six Italian speaking patients of various types of aphasia, Bettoni, Favilla & Ferroni (2008) tested the participants’ production of passives, object-topicalisations and what Pinker (1984, p. 300) called “exceptional verbs” (e.g. receive) and found that overall, the patients produced more target-like passives than object-topicalisations and exceptional verbs. When encountering passive-friendly contexts, the authors observed that instead of using passive verbs, all of the patients preferred producing sentences using canonical mapping, which either resulted in reporting in the active voice from the agent’s perspective, or in semantically reversed sentences. Bettoni et al. claimed that although the patients knew the full paradigms of verbs and clitic pronouns and their morphological agreements were accurate, when confronted with noncanonical mapping requirements (e.g. for passives), the extra processing loads required to handle these mappings swayed them to reverting back to the more easily processed default mapping and morphology. While this study was not conducted with English speakers, the study is nevertheless highly relevant as it was done within the extended PT framework.

Compensatory Strategies
Broca’s aphasic patients have been found to adopt a number of strategies to compensate for their syntactic deficits, namely semantic heuristics such as animacy contrasts, semantic reversibility and other semantic properties (Caramazza & Zurif, 1976; Ansell & Flowers, 1982; Saffran, et al., 1998; Luzzatti, et al., 2001), temporal-spatial heuristics (Caplan & Futter, 1986; Chatterjee, Maher, Rothi, & Heilman, 1995; Maher, Chatterjee, Rothi, & Heilman, 1995), off-line processing (Friederici & Kilborn, 1989; Haarmann & Kolk, 1991; Kilborn & Friederici, 1994; Haarmann, et al., 1997; Inglis, 1999; Linebarger, et al., 2000; Weinrich, et al., 2001; Wassenaar & Hagoort, 2007) and a greater reliance on declarative memory (Ullman, 2000; Drury & Ullman, 2002; Ullman, et al., 2005).
One study found that Broca’s aphasic patients correctly comprehended 90% of the non-reversible, semantically constrained sentences, but their performance dropped to chance where the semantic constraints were absent and they had to rely solely on syntactic information (Caramazza & Zurif, 1976). Studies have also found that aphasic patients improve markedly when the stress of fast, automatic on-line language processing was alleviated by either allowing patients ample time to process speech or doing so in a self-paced manner (Friederici & Kilborn, 1989; Kilborn & Friederici, 1994; Inglis, 1999; Linebarger, et al., 2000; Wassenaar & Hagoort, 2007). Melodic intonation therapy, in which patients are exposed to speech input in exaggerated and dramatised intonations and prosodic patterns, has been shown to be effective in improving patients’ overall language comprehension (Marshal & Holtzapple, 1976; Belin, et al., 1996). More generally, Broca’s aphasia is associated with disturbance to the procedural system. Patients with Broca’s aphasia, but not Wernicke’s aphasia, were found to more likely memorise and retrieve English regular past tense verbs from memory, suggesting a shift of reliance on the declarative system in Broca’s aphasic patients in assuming some of the functions that would typically be handled by the procedural system had it remained intact (Ullman, 2000; Drury & Ullman, 2002; Ullman, et al., 2005; cf. Paradis, 1994; Paradis, 2004).

2.5.3.5 Speakers with Parkinson’s Disease

Parkinson’s disease (PD) is a neuropathological disorder characterised by hypokinesia, or conspicuous suppression of motor activities, including akinesia, bradykinesia, muscular rigidity, postural instability and tremor at rest (Cohen, 1998). PD is associated with general impairments to the procedural memory while the declarative memory is usually intact in non-demented PD patients (Ullman, 2004, 2006). The degree of severity in syntactic deficits is less in PD than in Broca’s aphasia. However, many similarities do exist between the two, particularly in more advanced PD patients (Natsopoulos, et al., 1991; Lieberman, et al., 1992; Grossman, Carvell, Stern, Gollomp, & Hurtig, 1992; Natsopoulos, et al., 1993; Arnott, Chenery, Murdoch, & Silburn, 2005).

One of the manifestations of impairments to the procedural memory in PD patients is the higher error rates in producing regular past tense -ed inflections and higher
incidence of overgeneralising irregular verbs with -ed inflections, which are generated compositionally by the procedural system, than in producing irregular past tense verbs, which are listed in the lexicon and are retrieved from the declarative memory (Ullman, 2004). The difficulties with composing regular past tense -ed inflections are also characteristic of Broca’s aphasic patients (Ullman, et al., 1997; Ullman, et al., 2005; Ullman, 2008). Moreover, the level of right-side hypokinesia correlates with the error rate of producing regular past tense -ed inflections but not irregular forms (Ullman, 2004; see also McNamara, Krueger, O’quin, Clark, & Durso, 1996). Right-side hypokinesia implicates left-hemisphere brain functions, to which hemisphere language functions such as grammar are often lateralised (Obler & Gjerlow, 1999).

PD patients’ spontaneous speech is characterised by simpler syntactic structures (Illes, 1989), a higher frequency of hesitations and abnormally long silent hesitations (Illes, Metter, Hanson, & Iritani, 1988). Impairments in syntactic processing in PD patients seem to be mild and their consequences more discrete in nature. Previous studies have reported relatively good comprehension of reversible passives for around half of the non-demented PD patients tested (Lieberman, Friedman, & Feldman, 1990; Lieberman, et al., 1992; see also Terzi, Papapetropoulos, & Kouvelas, 2005). However, self-paced reading and auditory comprehension of more complex constructions, including those involving noncanonical mappings of argument roles such as object-raising (e.g. Susan is easy for Bill to catch), centre-embedded object-relative clauses (e.g. The boy that the girl chased was friendly) and transitive sentences containing verbs that alternate between lexical causative verbs and unaccusatives (e.g. The woman drowned the swimmer entails The swimmer drowned, not #The woman drowned), are generally poor among PD patients (Grossman, et al., 1992; Geyer & Grossman, 1994; Angwin, Chenery, Copland, Murdoch, & Silburn, 2006; Kemmerer, 1999; Grossman, 1999; Grossman, Zurif, et al., 2002; Grossman, Lee, Morris, Stern, & Hurtig, 2002; Grossman, et al., 2003; Lee, Grossman, Morris, Stern, & Hurtig, 2003; see also Natsopoulos, et al., 1991; Natsopoulos, et al., 1993; and Katsarou, et al., 2003). When lexical causative/unaccusative verbs are presented in the periphrastic voice (e.g. The woman made the swimmer drown), thus explicitly marking the agent, PD patients’ comprehension of these unaccusative verbs improved, as casting them in the
periphrastic voice neutralises the difference between the subtle uncanonical mapping in unaccusativity and the canonical mapping in unergativity (Geyer & Grossman, 1994).

**Deficits in Working Memory**


**Compensatory Strategies**

PD patients adopt a number of strategies to compensate for their syntactic deficits. A fMRI study found that PD patients contrasted with neurologically intact age-matched participants during sentence comprehension. PD patients had a significantly increased level of activation of the right inferior frontal and left posterolateral temporal-parietal areas, indicating patients’ up-regulation of working memory related brain regions in order to achieve reasonably accurate sentence comprehension (Grossman, et al., 2003; see also Grossman, Cooke, et al., 2002 for evidence of similar compensatory up-regulations of certain neural substrates in elderly compared to younger adult participants). PD patients also rely more heavily on heuristic over algorithmic strategies by making greater use of semantic and pragmatic cues such as semantic reversibility when comprehending complex syntactic structures (Natsopoulos, et al., 1991; Natsopoulos, et al., 1993).
2.5.3.6 Speakers with Alzheimer’s Disease

Disturbances of language, in particular deficits of word-finding and word-fluency are among the first symptoms of dementia of Alzheimer’s type, or Alzheimer’s disease (AD) (Jellinger, 2007). AD patients’ working memory and declarative memory are impaired while their procedural memory is generally relatively intact (Baddeley, Bressi, Della Sala, Logie, & Spinnler, 1991; Ullman, et al., 1997; Bayles, 2003; Paradis, 2004). Some studies (Bates, et al., 1995; Bickel, Pantel, Eysenbach, & Schröder, 2000) found however that AD patients’ syntactic production and comprehension, specifically the pragmatic and felicitous use of complex structures including passives and object-topicalisations, are also impaired. AD patients’ syntactic impairments were discussed from the perspectives of patients’ gradual breakdown of access to the semantic knowledge and argument role structures of verbs within a unified lexicon (Bates, et al., 1995; see also Grossman, Mickanin, Onishi, Robinson, & D’Esposito, 1997; Grossman & Rhee, 2001; Price & Grossman, 2005; Grossman, et al., 2007; Grossman, 2008), and deficits in working memory (Kempler, Almor, Tyler, Andersen, & MacDonald, 1998; Bickel, et al., 2000; see also MacDonald, Almor, Henderson, Kempler, & Andersen, 2001; Altmann, 2004; Altmann & McClung, 2008), its central executive component and subprocesses of selectively attention to the most relevant entity and inhibition of canonical mappings in noncanonical sentences (Grossman & White-Devine, 1998; Grossman & Rhee, 2001; see also Collette, Van der Linden, Bechet, & Salmon, 1999; Vosse & Kempen, 2000; Bayles, 2003; Amieva, Phillips, Sala, & Henry, 2004; Baudic, et al., 2006; Peters, et al., 2007).

In Bates et al. (1995), AD patients, aged-matched adults and college age adults were tested in a controlled task where the participants were required to provide verbal descriptions of a film in a agent/patient probe task. It was found that the AD patients produced fewer passives overall. Moreover, despite producing fewer passives in the task, the AD patients nevertheless fairly consistently began their sentences with the probed character, indicating that they were able to pragmatically assume the probed character’s perspective in narrating the scenes. The results were interpreted as suggesting the increased difficulties in retrieving the less frequent passive lemmas and the subsequent passive-sentence formulation in pragmatically felicitous contexts.
Grossman and colleagues (Grossman, et al., 1997; Grossman & Rhee, 2001; Price & Grossman, 2005; Grossman, et al., 2007) tested AD patients’ acquisition of the semantic meaning and argument structure of a novel verb and a very low-frequency verb and AD patients’ sensitivity to agreement violations involving verb transitivity / subcategorisation (e.g. *The boy puts on the table) and thematic role components (e.g. #The chair pushed the lady). While AD patients were comparable to controls in terms of their acquisition of the grammatical subcategorisation knowledge of the verbs, they showed minimal acquisition of the verbs’ semantic knowledge and argument structure and demonstrated selective insensitivity and delayed marginal sensitivity to argument structure violations, but not transitivity violations, during on-line sentence processing. AD patients’ selective difficulties with the semantic meaning and the argument structures of verbs and their demonstrated normal processing of the transitivity agreement of verbs suggest that AD patients’ processing of argument structures in a precise and timely manner is compromised, possibly in connection with impairments to the verbs’ semantic meaning (Grossman, et al., 1997; Grossman & Rhee, 2001; Grossman, et al., 2007; see also Altmann, Kempler, & Andersen, 2001).

Two lines of evidence further indicate that the unstable semantic knowledge of noncanonical argument structures of verbs in AD patients is a crucial contributing factor to their fewer instances of felicitous use of passive constructions. In an off-line sentence completion task, AD patients managed well on verbs of the canonical mapping. However, patients performed worse than the controls on psych-verbs, with greater difficulty demonstrated in psych-verbs that involve the noncanonical Theme-Experiencer mapping than those of the canonical Experiencer-Theme mapping (Manouilidou, de Almeida, Schwartz, & Nair, 2009). Moreover, although no difference in AD patients’ comprehension of active and passive voice was observed, like PD patients, AD patient were found to perform worse on the unaccusative than on the simple transitive version of verbs with alternating transitivity (Grossman & White-Devine, 1998; compare Geyer & Grossman, 1994), Additionally, similar to that observed in PD patients, presenting unaccusatives in the periphrasic voice (e.g. The woman made the swimmer drown) also neutralised the difference between unaccusatives and transitives for AD patients and had a facilitative effect on correct sentence comprehension (Grossman & White-Devine, 1998). Hence Gross and
colleagues claimed that noncanonical argument structures were indeed a source of difficulty for AD patients. However, such difficulties may be mitigated by explicitly stating the noncanonical nature of the verbs in question by means of passive morphology or periphrastic sentence frames (Grossman & White-Devine, 1998).

2.5.3.7 Summary

In summarising Section 2.5.3, firstly, the added stress associated with the passive voice tends to induce more disfluencies and stuttering in both stuttering and non-stuttering children. Results from studies on patients with Williams syndrome and Down syndrome rule out the suggestion that difficulties with passives, observed in the DS group but not in the WS group, are due to low levels of intellectual development. Instead, different impairments to the working memory in DS and WS may contribute to explaining the difference in performance on passives.

The brief acoustic duration of the passive morphology is difficult for children with SLI to process. Manipulations in making crucial morphemes more salient aurally facilitate the comprehension of these morphemes. The procedural memory system, which plays a crucial role in syntactic processing, is implicated in SLI (Ullman & Pierpont, 2005). SLI children compensate for their weak procedural system by relying more heavily on declarative knowledge in language processing (Paradis & Gopnik, 1997).

Research in Broca’s aphasia shows that there is a strong body of evidence in favour of difficulties in processing noncanonical mapping of argument roles to grammatical functions as being at the heart of Broca’s aphasic patients’ difficulties with passive constructions, not some type of deficits in linguistic knowledge (e.g. Swinney, et al., 1996; Menn, et al., 1998; Inglis, 1999; Menn, 2000; Gahl, et al., 2003; Bettoni, et al., 2008). Aphasic-like performance with passives can be induced in neurologically intact participants by placing them under increased cognitive processing demands. By contrast, manipulations in easing the on-line processing demands can markedly improve aphasic patients’ performance with passives. Similar to that found in SLI children, manipulations of the saliency of auditory signals can also improve aphasic patients’ processing of function words. Aphasic patients comprehend and produce unaccusatives better than passives; they also produce more unaccusatives than non-
aphasic speakers.

Although not as severe as in Broca’s aphasia, patients with Parkinson’s disease are impaired in their comprehension of structures involving noncanonical mappings such as object-raisings, object-topicalisations, passives, unaccusatives and Theme-Experiencer psych-verbs.

Finally, Alzheimer’s disease patients have selective difficulties and delayed marginal sensitivity in processing the argument structure information of verbs. AD patients have greater difficulties with Theme-Experiencer psych-verbs and unaccusative verbs, both of which involve non-transparent atypical mapping of argument roles onto grammatical functions. AD patients were found to produce fewer passives than age-matched and younger adults. Lexicalist analyses suggest a gradual decay in AD patients’ accessing of the less frequent passive lemmas from the lexicon as the AD condition worsens.

The notion of limited processing capacity as the source of syntactic deficits in Broca’s aphasia, Parkinson’s disease and Alzheimer’s disease figures prominently in the literature. The limited processing capacity effect is exacerbated when cognitive stress is added. This characteristic holds interesting implications for SLA, for L2 related increases in stress, anxiety and processing demands are well-attested, particularly among adolescent and adult learners (Strozer, 1994), and even more so among L2 learners of a Chinese/Confucian heritage (Woodrow, 2006).

2.5.4 Structural Priming Facilitates Processing of Passives

Having reviewed how processing of passives is suboptimal in populations of attenuated processing resources, I will now consider processing passives from a different perspective: optimisation of the processing of passives. The specific means of optimisation this section discusses is Structural Priming, also known as Syntactic Priming or Syntactic Persistence.

Structural priming is a pervasive phenomenon in spontaneous speech; it is “the phenomenon by which processing one utterance facilitates processing of another utterance on the basis of repeated syntactic structure” (Branigan, 2007, p. 1). In other
words, speakers tend to reuse or recycle a recently encountered or recently produced syntactic structure. There has been an explosion of extensive studies on the effects of structural priming in the past two decades (Pickering & Ferreira, 2008).

Pickering and Branigan (1999) suggested that an attractive explanation for the structural priming phenomenon was that it plays a functional role. They pointed out that:

> Speakers are faced with the highly complex problem of communicating an idea in a well-formed and fluent utterance, and therefore have to integrate a number of very different kinds of information. Thus, any means of reducing the computational load would be beneficial. Syntactic priming could be a means of reducing the load associated with syntactic processing, by facilitating production of particular syntactic structures. (Pickering & Branigan, 1999, pp. 136-137)

In one of the very first priming studies, Whitehurst, Ironsmith & Goldfein (1974) tested whether children (mean age 4;8) could better comprehend and produce more passives after hearing the experimenter model a passive sentence in picture description. They found that both production and comprehension of passives increased after hearing the modelled primes and children who were primed scored above the baseline group.

Bock (1986b) used a memory test as a disguise and asked her participants to repeat prime sentences, which were in either active or passive voice, and then describe some pictures depicting events that were unrelated to the prime sentences. Bock (1986b) found that when the prime sentences were in the passive voice, participants more readily described the pictures using the passive voice.

In Bock and Loebell (1990), it was found that in the sentence priming paradigm, a sentence with a syntactically similar structure such as one with a prepositional locative by- phrase could elicit passive sentence structures almost as effectively as could a passive sentence. For example, the prime sentences (38a) and (38b) could both quite easily elicit the passive sentence (39).

(38)  (a)   The 747 was landing by the airport’s control tower.
(b) The 747 was alerted by the airport’s control tower.

(39) The tree was struck by lightning.

Furthermore, it was found that the priming effect may persist over 10 intervening sentences of other kinds (Bock & Griffin, 2000). Bock and Griffin reasoned that the findings point to viewing structural priming in terms of learning, one of an implicit or procedural kind, rather than some kind of a transient memory-activation mechanism. This thus led to the hypothesis that structural priming was a form of implicit learning, one that facilitates the proceduralisation of generating a linguistic structure (Chang, Dell, Bock, & Griffin, 2000).

Thatcher and colleagues (Thatcher, 2007; Thatcher, et al., 2007) tested 20 preschool age children (mean age 4;6) with picture description tasks involving actional and non-actional verbs. The structural priming experimental paradigm was used to elicit passives. Contrary to previous studies suggesting that children’s acquisition of the passive structure is semantically constrained (Maratsos, et al., 1985; Sudhalter & Braine, 1985), Thatcher and colleagues found that there was a strong and reliable structural priming effect in children for both actional and non-actional verb types, suggesting that “children acquire an abstract syntactic representation for the passive early on which is not necessarily semantically constrained.” (Thatcher, et al., 2007). The results showed that the facilitative effects gained from structural priming are able to neutralise much of the semantic constraint encountered in processing non-actional verbs.

Structural priming has been shown to be effective with adults (for a thorough review, see Pickering & Branigan, 1999; also Branigan, 2007), young children (Brooks & Tomasello, 1999; Savage, Lieven, Theakston, & Tomasello, 2003; Huttenlocher, Vasilyeva, & Shimpi, 2004; Savage, Lieven, Theakston, & Tomasello, 2006; Thatcher, et al., 2007; Bencini & Valian, 2008), children who stutter (Anderson & Conture, 2004; see also Savage & Howell, 2008, for content word priming in children who stutter), children with SLI (Miller & Deevy, 2006), older adults (Altmann, Kemper, Mullin, & Mathews, 2004; Alvarez, Yimoyines, Key-DeLyria, & Altmann, 2006), people with anterograde amnesia (Ferreira, Bock, Wilson, & Cohen,
aphasic patients (Friederici & Kilborn, 1989; Saffran & Martin, 1997; Hartsuiker & Kolk, 1998) and most crucially with English L2 learners (Kim & McDonough, 2008). Moreover, priming effects have been found to persist across modalities, e.g. where participants only listened to audibly presented sentence primes without verbally repeating the primes, priming effects persisted into subsequent sentence productions (Cleland & Pickering, 2006; Bock, Dell, Chang, & Onishi, 2007).

Two recent studies (Anderson & Conture, 2004; Savage & Howell, 2008) found robust priming effects in children who stutter. In fact, in both studies, priming effects were found to be greater in stuttering than non-stuttering children. Anderson and Conture’s results are highly suggestive of and consistent with a language planning/processing account (Bernstein Ratner, 1995) than a speech motor control account of stuttering (Wingate, 2002). The results point to difficulties with possibly a combination of morpho-syntactic planning and the retrieval of syntactic frames, difficulties with timely lemma / lexeme access and the subsequent delays in or disruptions of syntactic procedures (Bernstein, 1981; Bernstein Ratner, 1995).

In Miller and Deevy’s (2006) study of structural priming with 18 children with SLI (age range 4;6 to 6;10), and 32 typically developing children (18 age-matched and 18 MLU-matched), it was also found that SLI children were slightly more susceptible to structural priming than typically developing children. Moreover, in a study involving Dutch speaking Broca’s aphasia patients and age-matched neurologically intact controls (Hartsuiker & Kolk, 1998), structural priming effects were found in aphasic patients but not in unimpaired controls. The authors noted that structural priming was not only larger but also more reliable in aphasic patients than in unimpaired controls. The author concluded that aphasic patients’ deficits in syntactic constructions are at least partially attributable to limitations in cognitive resources; such limitations may be temporarily neutralised by structural priming.

The structural priming effect illustrates speakers’ utilisation of the preceding, primed syntactic frame in producing the ensuing sentence. In structural priming, speakers require less effort to link the participants of an event in conceptualisation to a specific syntactic configuration by the grammatical encoder, as the residuals of the
same linking pattern computed for the prime sentence facilitate subsequent syntactic processing (Corley & Scheepers, 2002; Ferreira & Bock, 2006). Therefore, in terms of processing demands on the part of speakers, structural priming of passive constructions encourages speakers to reuse the primed passive construction in expressing an event, so as to utilise the previously computed syntactic frame.

A number of studies have found that less common or less preferred structures such as passives and double-object alternations are more amenable to structural priming; whereas structures with which performance is already close to the ceiling, such as actives and intransitives, show little or no priming effect (Hartsuiker & Westenberg, 2000; Scheepers, 2003; Ferreira & Bock, 2006; Calude & Miller, 2009). This suggests that the facilitative effects of structural priming in alleviating processing loads are greater in situations where the structures in question heavily tax speakers’ processing resources than when the structures to be produced require less effort.

The fact that priming effects are more robust in children who stutter (Anderson & Conture, 2004; Savage & Howell, 2008), in patients with Broca’s aphasia (Hartsuiker & Kolk, 1998), in older adults (Altmann, et al., 2004), and marginally more conspicuous in children with SLI (Miller & Deevy, 2006) are in line with the prediction that structural priming would be more effective in less skilful language users (Pickering & Branigan, 1999; see also Blumstein, Milberg, Dworetzky, Rosen, & Gershberg, 1991 for evidence of greater syntactic priming effects in patients with non-fluent than fluent aphasia). In conversation, delays in expressing oneself may cause other interlocutors to become impatient, therefore for those with a reduced processing capacity, any assistance in easing the processing loads is crucial. In this respect, the benefits of a reduced processing load as reflected in the observed priming effects would be more noticeable in less proficient language users than in language users who are more skilful and have more processing resources at their disposal, and also in situations where the structures being processed place particularly heavy cognitive loads on the speaker. In this view, L2 learners are by definition also among the less proficient users of the target language, as shall be seen next. Additionally, compared to active constructions and off-line settings, producing passive constructions in an on-line setting indeed taxes L2 learners of considerably more processing resources.
2.5.4.1 Cross-linguistic Structural Priming

In recent years, research concentration in linguistic priming, including lexical and structural priming, has reached into the cross-language priming realm, of which those involving active-passive alternations are of particular pertinence to the present study.

Hartsuiker, Pickering and Veltkamp (2004) tested 24 native Spanish speaking Spanish-English bilinguals living in the UK and found cross-linguistic structural priming of English passives in dialogue. Hartsuiker et al. (2004) concluded that their study using two moderately related languages has demonstrated cross-linguistic structural priming between production and comprehension in the context of interactive language use.

Bernolet, Hartsuiker and Pickering’s (2007) study with Dutch-English bilinguals found more corroborating evidence for cross-linguistic priming effects as reported in Hartsuiker et al. (2004). In Dutch, both by- phrase final and verb final can be used to form passive sentences. Bernolet et al. (2007) primed the participants from Dutch to English and found an increased number of English passives following both by- phrase final and verb final Dutch primes at 29% and 21% respectively. Bernolet et al. (2007) maintained that the observed greater tendency to produce English passives following by- phrase final Dutch primes indicated that the alignment of word order would operate as a booster in cross-linguistic primes. Furthermore, the results in the third experiment of the study revealed that the number of English passives was significantly higher than in the baseline condition following Dutch verb final primes.

There are to date only a few cross-linguistic priming studies involving typologically distant language pairs. One such study is by Shin and Christianson (Shin & Christianson, 2007, 2009), who reported a cross-linguistic priming effect between the structure and word order of the Korean primes on English datives. It was found that while the target English sentences were sensitive to the word order of the Korean primes, priming effects persisted regardless of the word order of the primes.

There is evidence also for robust priming effects in learners’ L2. In one study investigating the implicit learning of Russian word order in speakers unfamiliar with Russian (mostly English speakers) by means of structural priming (Scheepers &
Myachykov, 2006) a clear priming effect was observed as well as some evidence for Russian word order learning. Another structural priming study with German L1 learners of English L2 found again a strong priming effect with the subcategorisation of ditransitive verbs (Gries & Wulff, 2005). The L2 target sentences learners produced correlated with the L2 primes but did not correlate with the verb-subcategorisation preferences of their L1 equivalents, thus ruling out the priming effect as a consequence of a translational strategy. This result suggests that learners gain benefits from L2 primes to facilitate their L2 production and this priming effect is not mediated by their knowledge of L1 syntax.

2.5.4.2 Summary

In summarising 2.5.4, structural priming reduces the processing load by elevating the activation level of one combinatorial node above the others, such that speakers could subsequently regenerate the same syntactic combinations with greater ease. The resilience and persistence of structural priming over some ten intervening sentences suggests the priming effect as a proceduralised performance or implicit learning of the primed target.

Less proficient speakers benefit more from the facilitative effects of structural priming. It has been shown that structural priming is most evident among less proficient speakers of a language, including children with SLI, children who stutter, older adults and aphasic patients. Less proficient speakers of the language naturally also include L2 learners, who having limited processing resources in L2, also benefit greatly from structural priming. Structural priming as an experimental paradigm therefore provides valuable insight into the processing nature of producing passives as a type of optional structure. It reveals how the effects of the extra processing loads that passive constructions carry are augmented in different populations, as well as how the processing loads are mitigated in the same populations in structural priming.

2.5.5 Working Memory and Executive Functions

In reviewing the literature on the processing of passives by various populations, a recurring theme is the explanatory construct of Working Memory, speakers’ deficiencies in it, particularly in relation to the Phonological Loop (verbal working
memory), as well as the suboptimal operation of functions of the Central Executive (Baddeley, 1996; Baddeley, et al., 1998; Baddeley, 2000a, 2000b, 2003).

In Baddeley’s (1986, 2007) model of working memory, the phonological loop has two subcomponents. The first of these is the articulatory rehearsal, which consists of mechanisms that enable a person to rehearse verbal and acoustic information over and over either aloud or silently. The second subcomponent of the phonological loop is a limited capacity store which temporarily holds verbal and acoustic information. The information in the phonological loop tends to fade away very quickly and its retention in the memory store is extended by cycling the information through articulatory rehearsal. The speed with which the information is articulated in articulatory rehearsal affects how much information is retained; the faster the rehearsal turnaround in the loop, the more information a person can remember (Hulme, Thomson, Muir, & Lawrence, 1984; Henry & Millar, 1991). The central executive is the supervisor or the coordinator component in the working memory model; it is responsible for several distinct cognitive functions including selective attention, inhibition of prepotent yet irrelevant/distractor stimuli, coordination of multiple tasks (Baddeley, 1996; Bauml, 2008).

Evidence has shown that low or reduction in the availability of free working memory correlate strongly with decreased inhibition (Rosen & Engle, 1998). This is well
illustrated in two studies on the performance of antisaccade tasks where the participants’ free working memory span was empirically manipulated (Roberts, Hager, & Heron, 1994; Unsworth, Schrock, & Engle, 2004). Anti-saccade tasks require participants to inhibit the prepotent, reflexive response of saccading to the cue (i.e. participants had to look in the opposite direction of a flashing cue on the screen). The studies found that when participants were required to keep a running tally of random single-digit numbers mentally while performing the antisaccade trials, i.e. in the condition where participants’ working memory resources were most heavily taxed, there was a significant increase in error rate and anti-saccade reaction time. However, in the pro-saccade trials where no inhibition was required, the added verbal working memory loads did not produce significant effects in error rate or longer pro-saccade reaction time. This demonstrates a cognitive resource trade-off between verbal working memory and executive functions: a heavily loaded verbal working memory places more demands on one’s cognitive resources, which means there are less cognitive resources available for executive functions. Conversely, if one wishes to allocate more cognitive resources to executive functions, it could result in the verbal working memory being overloaded, thus loss of information (also for clinical evidence of the correlation between reduced working memory and decreased inhibition, see Freedman, Martin, & Biegler, 2004; Hamilton & Martin, 2005; Crowther, Biegler, & Martin, 2005; Hamilton & Martin, 2007a, 2007b).

Turning our attention back to the specific relationship between working memory and syntax, Baddeley and Hitch (Baddeley & Hitch, 1974; Hitch & Baddeley, 1976) showed that passive sentences take up more working memory and executive resources during processing than active sentences. This at least partially accounts for the difficulties in processing passives experienced by the populations I have reviewed. There is now ample evidence to show that verbal working memory, selective attention to target stimuli and inhibition of prepotent distractor stimuli are reduced or otherwise deficient in young children (Dempster, 1992; Ridderinkhof, Band, & Logan, 1999; Durston, et al., 2002; Mazuka, Jincho, & Oishi, 2009), children and adults who stutter (Bosshardt, 1993; Anderson, Wagovich, & Hall, 2006; Bajaj, 2007), elderly adults (Davis & Ball, 1989; Zurif, et al., 1995; Grossman, Cooke, et al., 2002), patients with Down’s syndrome (P. P. Wang & Bellugi, 1994; Jarrold & Baddeley, 1997; Jarrold, et al., 2000; Jarrold & Baddeley, 2001; Jarrold, et

The parallelism between the speech processing of L2 learners and the atypical populations reviewed herein extends to verbal working memory and resources for inhibition and other executive functions as well. For example, verbal working memory allows a person to hold less information when the items to be remembered are in an L2 rather than in their L1; this holds true even for advanced L2 learners (Glicksberg, 1963; Cook, 1977, 1979; Brown, 1992; Brown & Hulme, 1992; Ellis, 1992; Service, 1992; Ellis, 1996; Temple, 2000; Service, Simola, Metsanheimo, & Maury, 2002; Myers-Scotton, 2006). Moreover, when healthy, native English speaking college students were placed under stressed conditions of high digit load, noise, and response deadlines to generate heavy working memory loads and time constraints, native speakers performed similarly to advanced L2 learners in grammaticality judgment tasks (McDonald, 2006).

Empirical and clinical evidence has highlighted the indisputable relationship between working memory and language abilities (Baddeley, 2000b, 2003; Martin, Inglis, & Kuminiak, 2004; Martin & He, 2004; Hanten & Martin, 2000) irrespective of whether verbal working memory plays a causal role in vocabulary acquisition and other aspects of L2 acquisition (e.g. Gathercole & Baddeley, 1993; cf. Gupta & MacWhinney, 1997; Miyake & Friedman, 1998; Gupta & Tisdale, 2009). Both FLA and SLA studies have found that verbal working memory is a reliable index of language proficiency. Increases in working memory spans correlate with language development, such that L1 children or L2 adult learners’ working memory spans increase in parallel with increases in their language proficiencies (Adams & Gathercole, 1996; Atkins & Baddeley, 1998; Gathercole, Service, Hitch, Adams,
Martin, 1999; Temple, 2000; Service, et al., 2002; Payne & Whitney, 2002; Payne & Ross, 2005; see also Hopp, in press; Mizumoto, 2007; for a review of the construct of working memory in SLA, see Juffs, 2004; Juffs, 2006). This finding has important implications for L2 on-line production. Less proficient learners can store less content information in L2 in the working memory, as the L2 formal properties of the information that would otherwise be processed automatically had the same information been in L1, now require dedicated storage in learners’ working memory. The formal properties of L2 compete with the content information of the utterances for learners’ working memory resources (Gathercole, Willis, Emslie, & Baddeley, 1991; Hulme, Maughan, & Brown, 1991; Brown & Hulme, 1992; Gathercole, 1995; Gathercole & Thorn, 1998; French & O’Brien, 2008; see also Rodgers, 1969; Tyler, 2001). Learners require more time to retrieve L2 words, they can store less L2 information in working memory, the speed with which L2 speech is articulated in their phonological loop is slow and the long and frequent hesitations mean that any piece of information has to remain in the phonological loop for an extended period of time (see Henry & Millar, 1991). All of these ultimately mean that the working memory of less proficient learners becomes overwhelmed very quickly and L2 words and any information represented in L2 fades away rapidly from working memory. Under such conditions, learners need to allocate more cognitive resources to coping with the heavy loads required in retaining a very limited amount of content information in verbal working memory, leaving little cognitive resources for sustaining executive functions.

Evidence therefore strongly suggests that L2 learners’ difficulties in processing passives are at least in part attributable to their operating with a working memory whose efficiency in storing new content information is compromised by the concurrent need to attend to the less familiar L2 formal properties of the information. The need to devote working memory to both the content information and the L2 formal properties of the information drains learners’ cognitive resources away from executive functions such as selective attention and inhibition, therefore restricting learners’ abilities to selectively attend to the most contextually prominent entity while inhibiting the prepotent agent as the default sentence subject. As learners become sufficiently proficient in L2, more aspects of language processing of L2 formal properties are proceduralised and automatised; the concomitant increases in
working memory efficiency for storing new content information will mean relatively smooth, rapid and efficient lexical access and temporary L2 information store. Learners can then channel sufficiently available cognitive resources to executive functions, allowing learners to selectively attend to the discourse-pragmatic contexts and manipulate L2 in such a way as to comply with the pragmatic orientations of the context.

2.6 Studies on Acquisition of English Passives by Mandarin Speakers

There have been a number of previous studies on L2 acquisition of the English passive construction by Chinese speakers. Among those studies, a good number of them was concerned with the overpassivisation of the unaccusative/ergative verbs by Chinese college students in EFL settings. Another common theme of these studies was their methodological orientation of Error Analysis on the subjects’ written performance. The target structures and the analyses of these studies were of limited interest and relevance to the present study (see Liu, 2003b for an overview of the various accounts of overpassivisation of English L2 by Mandarin speakers), therefore Section 2.6 will firstly present a summary of these studies in a tabulated form. The chapter will then proceed to highlight and elaborate on selective key, representative studies on overpassivisation as well as studies on the general acquisition of the English passive construction by Mandarin speakers that are more pertinent to the present thesis.
Table 2.2.
Studies involving non-online speech production of English L2 passive constructions by Mandarin speakers.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Zobl (1989)</td>
<td>114 university-aged students of various L1</td>
<td>N/A</td>
<td>Japanese (90), Arabic (10), Spanish (10), Chinese (1), Turkish (1), Thai (1), Indonesian (1)</td>
<td>Analysis of students’ written essays</td>
<td>Unaccusative/Ergative verbs</td>
<td>Unaccusativity Hypothesis (Perlmutter, 1978); Error Analysis</td>
<td>Overpassivisation is due to ergatives being subsumed under passives by English L2 learners.</td>
</tr>
<tr>
<td>Y.-P. Zhou (1989, 1992)</td>
<td>40 adolescents living in Shanghai (Age: 15–16)</td>
<td>N/A</td>
<td>Mandarin</td>
<td>Longitudinal, over 8 50-minute sessions</td>
<td>Past Tense, Present Perfect Tense, Passive</td>
<td>TEFL; measures effectiveness of explicit instruction of target constructions</td>
<td>There was some evidence suggesting that form-based explicit instruction of passives facilitated SLA.</td>
</tr>
<tr>
<td>Yip (1995)</td>
<td>20 university-aged advanced ESL students in the USA. Subjects were originally from Taiwan</td>
<td>No</td>
<td>Mandarin</td>
<td>Grammaticity judgement</td>
<td>Unaccusative verbs and notional passives</td>
<td>Learnability Theory (Pinker, 1984, 1989a)</td>
<td>L1 transfer of subjectless topic structure into L2. Also learners rely largely on canonical mapping. Ergative verbs are exceptions to canonical mapping.</td>
</tr>
<tr>
<td>Balcom (1997)</td>
<td>38 university students</td>
<td>Yes, but not included in the report</td>
<td>Chinese (20), Mandarin (15), Cantonese (3)</td>
<td>Grammaticity judgement, controlled production tasks</td>
<td>Unaccusative verbs</td>
<td>Unaccusativity Hypothesis (Perlmutter, 1978)</td>
<td>Following Zobl (1989), errors occur as learners are assumed to subsume unaccusatives under the syntactic rule for passivisation.</td>
</tr>
<tr>
<td>C.-Y. D. Chen &amp; L.-J. L. Liu (1998)</td>
<td>80 adolescents living in Taiwan (Age: 14–17)</td>
<td>20 native English speakers</td>
<td>Mandarin</td>
<td>Comprehension &amp; production tasks</td>
<td>Passive</td>
<td>Contrastive Analysis; L1 Transfer of structural and semantic properties of passives</td>
<td>The semantic property of adversity in L1 transfers is acquired in L2; the syntactic property of case absorption is transferred and acquired last.</td>
</tr>
<tr>
<td>Ju (2000)</td>
<td>35 graduate students at a US university</td>
<td>10 native English speakers</td>
<td>Chinese (7)</td>
<td>Forced-choice grammaticity judgement task</td>
<td>Unaccusative verbs</td>
<td>Cognitive factors to overpassivisation of unaccusatives</td>
<td>The degree of transitivisation varies depending on the presence of conceptualisable agents in the discourse.</td>
</tr>
<tr>
<td>J. Cai (2000)</td>
<td>25 x 4th year and 25 x 1st year English major students. The two groups represented 2 EFL levels</td>
<td>No</td>
<td>Mandarin</td>
<td>Analysis of students’ written prose (50 essays), questionnaires, 3 case studies</td>
<td>Ergative (unaccusative) verbs</td>
<td>Error analysis of paired and unpaired ergatives</td>
<td>Errors attributed to a combination of incorrect understanding of L2 rules and lower L2 proficiency as well as L1 transfer.</td>
</tr>
</tbody>
</table>

7 The variety of Chinese was not specified.
<table>
<thead>
<tr>
<th>Author</th>
<th>Methodology</th>
<th>Voice Type</th>
<th>Data Source</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Han (2000)</td>
<td>2-year longitudinal, qualitative study of learners' spontaneous writings produced in various discourse contexts</td>
<td>Notional passives</td>
<td>Discourse-syntactic approach</td>
<td>Errors attributed to L1 transfer, syntactisation of L1 discourse constrains in L2 syntax.</td>
</tr>
<tr>
<td>W. Chen (2002)</td>
<td>CLEC corpus (5 sub-corpora: Senior high school students; Junior/Senior non-English major and English major college students)</td>
<td>Over-used, under-used and malformed passives</td>
<td>Unaccusative Hypothesis (Perlmutter, 1978); Error analysis</td>
<td>An inadequate use of L2 passives is the most common error type. Errors due to a poor mastery of L2 passive morphology as well as to L1 transfer.</td>
</tr>
<tr>
<td>Y. Ma (2002)</td>
<td>CLEC corpus (specific sub-corpora unidentified)</td>
<td>Over-used, under-used and malformed passives</td>
<td>Error analysis</td>
<td>Errors mainly due to L1 transfer</td>
</tr>
<tr>
<td>Gu (2005)</td>
<td>CLEC corpus (specific sub-corpora unidentified)</td>
<td>L1 Mandarin learners’ use of concern in active/passive voice</td>
<td>Contrastive-descriptive analysis</td>
<td>Errors mainly due to L1 transfer</td>
</tr>
<tr>
<td>Yu (2005, 2006)</td>
<td>20 EFL learners from these groups: Senior high school students, English major sophomores, English lecturers and PhD</td>
<td>Unaccusative verbs</td>
<td>Unaccusative Hypothesis (Perlmutter, 1978); Semantic and Cognitive factors (Ju, 2000)</td>
<td>Contexts that strongly suggests external causation would more easily induce overpassivisation of unaccusatives</td>
</tr>
<tr>
<td>X.-H. Xu (2006b)</td>
<td>38 college students</td>
<td>Over-used, under-used and malformed passives</td>
<td>Error analysis</td>
<td>Overpassivisation due to L1 transfer. Learners' tend to omit be and use redundant be.</td>
</tr>
</tbody>
</table>
To the best of my knowledge, the first systematic corpus-based study of the acquisition of the English passive voice by Chinese learners was W. Chen’s (2002) study in May 2002, which was followed by the publication of Y. Ma’s (2002) article shortly after. These two studies were both based on the Chinese Learner English Corpus (CLEC) of college students’ written data. In addition to Chen (2002) and Ma (2002) there were two more studies based on the CLEC corpus (Zhuang, 2005; also Zhuang, 2007; Wu, 2006). As Y. Ma (2002) pointed out, the construction of L2 learner corpora was at its infancy stage globally and the CLEC corpus at the time was leading the way in corpus linguistic studies in China.

In W. Chen’s (2002) study, five sub-corpora from five populations within the CLEC corpus were examined: (1) high schoolers, (2) intermediate level non-English majors, (3) advanced level non-English majors, (4) intermediate level English majors, and (5) advanced level English majors. W. Chen arrived at a number of important conclusions in this study. Firstly, of the different types of errors analysed, the common trend was the higher the English level, the smaller the percentage of errors across the board. This suggests that interlanguage is a dynamic system which is constantly progressing towards the target language. Another prominent error type was misspelling, which highlighted spelling in general as a huge hurdle for Chinese learners to overcome. W. Chen reported no overpassivisation of unergatives in the data examined, but a relatively large presence of overpassivised unaccusatives. W. Chen believed that this was because unaccusatives assign the thematic role of theme or patient to the subject of unaccusatives, which made them prone to overpassivisation. The most common learner error type in her data was underpassivisation or the absence of passives when they were called for. W. Chen offered L1 transfer of topicalisation and the notional passive as the main reason for this error type. For instance, in the erroneous sentence *Chinese festival has handed down from generation to generation*, the subject probably topicalised *Chinese festival* and then patterned the sentence in accordance to the notional passive of their L1.

W. Chen’s (2002) conclusions were fairly representative of three other studies following hers (Ma, 2002; Li, 2006; Xu, 2006b), all of which made similar observations to W. Chen’s; all three studies attributed a great deal to L1 transfer. The researchers commented on the fact that the English passive construction interplays...
with a complex system of tense and modality, all reflected mainly in the verb. The level of sophistication as a result of such interplays poses difficulties to Chinese students. In contrast, the passive voice in Chinese is realised simply through the passive marker bèi or one of its alternants. X.-H. Xu (2006b) also commented briefly on the learners’ tendency to omit be or the passive participle, as well as using redundant be, such as a lot of trees were be cut down.

Y. Wang (2002, 2009c) ran a large-scale study involving over 300 subjects of various EFL proficiency levels. The subjects included English and non-English major undergraduate students as well as high school students. The focal points of the study were threefold. Firstly, following Hopper and Thompson (1980) and Pinker (1989a), Y. Wang proposed the Object Affected Condition (OAC) as an integral element in Chinese learners’ formation of English passives. The “Object” in Y. Wang’s term refers to the logical object or the semantic patient. In regards to OAC, following Hopper and Thompson’s (1980) Transitivity Hypothesis, Y. Wang proposed:

[We assume] that the object of an active sentence is crucial in determining passivization, and propose a simple and direct alternative: Object Affected Condition (OAC), in which the object argument is affected or can be construed as being affected by the action, either literally or in an extended abstract sense....So long as the object is affected, it can be in the subject position of a passive sentence. (Y. Wang, 2002, p. 69)

Secondly, closely related to OAC was the source of the object’s affectedness, or the verbs’ semantic element of causation. It was found that for both actional and psych-verb categories, those verbs belonging to the causative subcategories could be more easily passivised by learners. The finding was that the verb’s semantic element of causation and the consequent affectedness of the object make up the main driving force which disposes learners to produce passive constructions.

K. Wang (2006, 2009a) looked at learners’ English L2 development and their ability to use the English passive voice within the Lexical Mapping Theory (Pienemann, Di Biase, & Kawaguchi, 2005). K. Wang tested 6 native Mandarin speakers of various levels of English L2 abilities using Tomlin’s FishFilm as the speech elicitation task (Tomlin, 1995, 1997). The FishFilm has been employed previously for both
monolingual English speakers and a number of cross-linguistic studies (Diderichsen, 2001a, 2001b; Tomlin, 1995; Hayashi, Tomlin, & Yokota, 2002). Wang’s results indicated that (i) early Mandarin learners of English L2 encoded the agent as the subject despite the presence of contextual and instructional cues to the contrary. In PT terms, early learners were constrained by their limited L2 processing resources to produce sentences involving the default mapping of agent-to-subject; (ii) learners do not automatically transfer their L1 word order of “S ADJAGENT V” into their L2; and (iii) early learners are sensitive to the discourse-pragmatic contexts and may resort to other strategies to cope with the non-default mapping of patient-subject cuing.

In line with Tomlin’s (1995, 1997) original results, both the native speaker who acted as control and the advanced learners in K. Wang’s study reliably chose the passive voice in their narratives when the entity bearing the semantic patient role was the contextually more prominent figure. The early learners in this study, instead of acting in complete oblivion to the contextual cues, all showed a slight hesitation before deciding on using the active voice to describe events where the patient was contextually cued, thus demonstrating that they, too, were sensitive to the discourse-pragmatic contexts. Notwithstanding this, the early learners failed to produce any utterance in the passive voice.

Moreover, K. Wang (2006) reported that one of the late-intermediate learners adopted what he termed the “Patient-Active Strategy” in describing events where the patient was the cued entity. That is, rather than narrating in the active voice contrary to the patientive cuings, this learner promoted the patient entity to the sentence initial position, which was then followed by an active predicate that oriented the description of the event from the perspective of the patient, e.g. \textit{Pink fish come in black fish} rather than \textit{the pink fish was swallowed by the black fish}. This strategy allowed the late-intermediate learner to partially tailor her narrative to respond pragmatically appropriately to the visual stimuli, i.e. by promoting the patient to the sentence-initial position in reflection of its contextual prominence. Yet the learner was still constrained by her limited L2 processing resources to produce agentive passives. The use of agentive passives would entail the speaker adding the copula \textit{be}, selecting the passive form of the verb and using \textit{by} in forming the agent-adjunct.
There have been other PT based studies on the acquisition of passives, one of which looked specifically at Mandarin L1-English L2, the same language combination as this thesis (Kawaguchi & Zhang, 2007). Zhang tested 33 Mandarin speakers of various English L2 proficiencies with the FishFilm. She found a direct association between producing passives and learners’ L2 proficiencies as defined by the PT morpho-syntax hierarchy. She found that PT stage-2 learners did not produce any passive; PT stage-3 learners attempted passives, often with ill-formed syntax; PT stage-4 learners performed variably; and PT stage-5 learners could produce passives easily and with high accuracy. Zhang concluded that the inter-phrasal agreement procedure stage was the critical stage of L2 development associated with the production of passives. The other recent PT based study examined both the comprehension and production of English passives by L1 speakers of Mandarin and Cantonese, among other languages, focusing specifically on the morphology of passives (Keatinge & Keßler, 2009). Keatinge and Dagmar used the FishFilm as the production elicitation task and a static picture-naming task adapted from the FishFilm as the comprehension task in their study. They found that for comprehension, PT stage 4, the phrasal agreement procedure stage, was the critical prerequisite level. For production, PT stage 4 of the phrasal agreement procedure marked the beginning of the noncanonical patient-to-subject mapping, but learners’ passive morphology at stage 4 was very often ill-formed. In PT stage 5, the inter-phrasal agreement procedure stage, learners often produced non-target-like inflections and the preposition from instead of by for the agentive adjunct clause. By PT stage 6, the inter-clausal agreement procedure stage, learners produced native-like passives.

2.6.1 Summary

In summarising Section 2.6, a review of the SLA literature on Mandarin speakers acquiring the English L2 passive construction presented herein shows that the majority of such studies were either corpus-based or based on college learners’ written production. The most common approach of these studies was error analysis. There is an obvious gap in the literature on investigating the acquisition of the English passive construction in spontaneous speech by Mandarin speakers from a processing perspective. The present study is an attempt to address such a research gap from a L2 developmental perspective.
2.7 Acquisition of Ditransitive Passives

In first language acquisition, it was reported in an English/French/Tahitian French cross-linguistic study on ditransitive constructions that children acquire the syntax of ditransitive constructions first before they fully acquire the associated set of discourse-pragmatic properties and become adult-like in their usage. Adult-like performance is attained around eight years of age (Snyder, 2003). Children below the age of four do not utilise information status in using ditransitive constructions. As I point out in Section 4.3.2, the verb *give* was chosen as a target verb because it is neutral in terms of its lexical bias towards any particular ditransitive construction. However, it was found in Snyder’s study that children were slowest in acquiring *give* compared to *bring*, *make* and *take*, with a difference of approximately one year. Snyder speculated that it was due to the relatively opaque semantic distinction between the two ditransitive constructions compared to the other verbs tested (Snyder, 2003; compare with Ho, 2004, which reported the late acquisition of the verb “Bei2” (give) in L1 Cantonese Chinese). I would argue that this characteristic of the *give* ditransitives is germane to my investigation as it has the potential to be discriminatory in identifying those who show pragmatic competence in their L2 syntax from those who could not.

In terms of ditransitive passive constructions, the situation stands in contrast to the large number of studies covering various aspects of the acquisition of regular passives and overpassivisations. The acquisition of ditransitive passives has attracted virtually no attention in FLA and SLA. To my knowledge, there have only been two L1 studies on the comprehension of passives involving ditransitive verbs (O’Grady, 1977, unpublished but a brief summary is found in O’Grady, 1997, pp. 213-214; Roeper, Lapointe, Bing, & Tavakolian, 1981). Roeper et al.’s (1981) FLA study of comprehension of ditransitive passives found that children in their sample (between kindergarten and 4th grade) comprehended theme-subject passives almost perfectly regardless of the animacy combination of the theme-goal arguments. Nevertheless, only 13 of these children correctly comprehended goal-subject passives 50% of the time or better. In O’Grady’s (1977, as reported in O’Grady, 1997) FLA study of comprehension of ditransitive passives, the children tested (aged 6;0 to 7;6) correctly comprehended 86% of the transitive passives, but only 1.5% for agentive ditransitive
passives and 5.8% for agentless ditransitive passives. O’Grady did not specify whether the figures included theme-subject passives and goal-subject passives.

In second language acquisition, the acquisition of double-object alternation in using the English ditransitive verb *give* by German EFL learners was investigated in an unpublished study by Dehé and Comes (2006). They found that while both native English speaker control and German EFL learners showed sensitivity to the given-new discourse context, native English speakers employed word order in reflecting such discourse contexts to a greater extent whereas German EFL learners primarily relied on the prepositional construction (OBJ followed by OBLrecipient). Dehé and Comes (2006) provided a review of the literature showing that the prepositional construction is the default in German and interpreted the dominance of prepositional construction in the learners’ L2 as potentially a result of a combination of L1 influence and learners’ rudimentary discourse-sensitive use of L2 word order.

The literature does not offer a clear picture on what one can expect to see in Mandarin speakers’ acquisition of English ditransitive passives. FLA informs us that the pragmatic use of the full paradigm of ditransitive actives, particularly the verb *give*, is difficult to acquire (Snyder, 2003). Dehé and Comes’ (2006) SLA study with German L1-English L2 point to a great reliance on the L1 default alternation in L2 even for advanced EFL learners which, if true, should lead us to expect to see a preference for the goal-subject ditransitive passive, as the double object construction is the relatively unmarked ditransitive construction in Mandarin and English (Guo, 2007; Thompson & Koide, 1987; Thompson, 1990, 1995). The only published study on the acquisition of ditransitive passives highlights the complex nature of the ditransitive constructions relative to transitive passives and the finding of a greater level of difficulty in acquiring the goal-subject ditransitive passive (Roeper, et al., 1981). This identifies an obvious gap in the literature on this aspect of learners’ high-level L2 pragmatic-syntactic interface. This thesis will contribute to closing this gap.

### 2.8 Canonicity

Some tend to include structures such as passives in the category of noncanonical word order (Birner & Ward, 1998), however I distinguish canonicity in terms of (i)
word order, and (ii) argument-function mapping. The distinction is important as the two phenomena are accounted for in Processability Theory by means of two different hypotheses – Lexical Mapping Hypothesis and Topic Hypothesis, which I will discuss in detail in Chapter 3. For now, I shall provide a review of the literature on the crucial nature of both types of canonicity in speech processing. This section aims to explore the formal differences and processing similarities in canonical word order and canonical argument role structure. I will point out below the common trait behind the poor performance of noncanonical word order (e.g. topicalisations and scramblings) and noncanonical argument-function mapping (e.g. passives), namely speakers’ limited processing capacities rather than deficits in linguistic knowledge (Just & Carpenter, 1992; Carpenter, et al., 1994; Hopp, 2009, in press).

2.8.1 Canonical Word Order

*English Children*

Slobin and Bever (1982) set out to examine the effects of word order in children’s L1 comprehension across four typologically different languages: English (word ordered, non-inflectional), Italian (weakly ordered, weakly inflectional), Serbo-Croatian (weakly ordered, inflectional) and Turkish (minimally ordered, inflectional). They found that across these four languages, children systematically experienced difficulties with sequences that were incongruent with the canonical sentence form of their particular language. For the English and Italian children, this meant that overall, they responded consistently only to NVN sentences. For the Serbo-Croatian children, although the language generally has inflectional markings for the patient role, many sentences actually do not have any inflectional marking on either noun and are conventionally interpreted as having the first noun as agent. Serbo-Croatian children therefore developed a corresponding strategy and sometimes even overgeneralised it to all sentence forms, including those with clear and unequivocal inflections. For the Turkish children, it was found that although noun inflection served as the pivotal cue, word order nonetheless played some role in comprehension and sentence imitation even if it was not modelled in the input language.

In terms of the L1 acquisition of canonical c-structure where the thematic role mapping remains unchanged, Akhtar (1999) found that children from the two younger groups (M age = 2;8 and 3;6) were more likely to use novel, concocted
verbs taught in SOV and VSO orders in the respective novel, non-SVO orders than children from the older group ($M$ age = 4;4). This indicates that in terms of c-structure, young children would have to initially build sentence frames for newly taught verbs, which could either be driven through a generalisable sentence frame or input data. In Akhtar’s (1999) experiment, the sentence frames for the novel verbs in questions were artificially driven by specific data (input through overt instruction), which converge with generalisable frames. As children are exposed to more canonical SVO order, SVO becomes more ingrained for all verbs across the language and as such they become more resistant to non-SVO orders.

*English Adults*

Ferreira and colleagues (Ferreira, et al., 2002; Ferreira, 2003; Ferreira & Patson, 2007) found that adult native English speakers regularly misinterpret sentences in passive constructions as actives. In one study (Ferreira, 2003), adult native English speakers were tested on their comprehension of passive sentences and subject-cleft sentences (e.g. *It was the man who bit the dog*). It was found in this study that the speakers performed better in comprehending subject-cleft sentences than passive sentences. Ferreira pointed out that the speakers’ poor comprehension of passives could not have been due to their ignorance of passive constructions in their native language, nor could it be due to the fact that passives are infrequent, since their comprehension of the even less frequent subject-cleft construction outperformed that of the passives. Ferreira and colleagues argued for “good enough” processing to explain such phenomenon, i.e. English speakers are often quite content with settling for the interpretation of the default word order.

Love and Swinney (1996, 1998) and Osterhout and Swinney (1993) used cross-modal lexical priming (CMLP: Swinney, Onifer, Prather, & Hirshkowitz, 1979) to examine the on-line structural processing of English object-relative clauses (e.g. *John bought the book that Mary read*) and passive sentences, both of which deviate from the canonical order SVO. Additionally, Love and Swinney (1998) also reviewed some similar studies by others that involved Spanish. The authors suggested that for English and Spanish speakers, “it appears that the comprehension devise [attempts] to actively recover conceptual information in an underlying SVO order during ongoing comprehension” (Love & Swinney, 1998, p. 163, italic theirs).
In other words, there is more activation and thus processing that takes place immediately after the verb of a noncanonical sentence to cognitively unify and reconfirm the correct interpretation of the argument roles in noncanonical sentences.

*Cross-linguistic Evidence*

Earlier FLA studies on Japanese children’s comprehension of scrambled sentences found that children had considerable difficulties comprehending scrambled sentences (Hayashi, 1975; Sano, 1977). More recently, a study set out to verify whether Japanese children’s poor performance with scrambling as reported in the two earlier studies was due to their lack of grammatical knowledge on scrambling or their over reliance on the word order heuristics of NNV corresponding to SOV (Otsu, 1994, 2001). It was found that when children were supplied with a discourse context setting up a referent as the discourse topic, the children’s comprehension of the subsequent scrambled sentence where the established referent was scrambled to the preposed position improved dramatically, apparently facilitated by the given-new information regularity for which these children had by this stage developed sensitivity (Otsu, 1994, 2001; Sano, 2005; see also Mizumoto, 2007).

The eye-movement monitoring technique, self-paced reading and two questionnaires were used in a study to investigate Japanese university students’ on-line and off-line comprehension of Japanese scrambled sentences (Mazuka, Itoh, & Kondo, 2002). The researchers found that “in all three methods of testing…scrambled sentences were shown to be more costly than their canonical counterpart…and it incurs a psycholinguistically measurable cost” (Mazuka, et al., 2002, p. 157; see also Miyamoto & Takahashi, 2002).

In SLA of Japanese L2, Iwasaki (2003) studied the acquisition of Japanese scrambling by English L1 speakers. Learners were asked to do an on-line picture description task and an off-line fill-the-blanks task to determine their knowledge and use of scrambled word order. The study found that

there was a gap between L2 Japanese speakers’ knowledge of scrambling and their production, and revealed errors that were due to processing strategies, rather than lack of knowledge…It was found that L2 learners
make errors while speaking despite their knowledge of scrambling. (Iwasaki, 2003, p. 298)

However, Iwasaki was cautious in not making any firm suggestions on L1 transfer, noting that even Japanese L1 children also display a tendency to employ the canonical processing strategy (Sano, 1977).

An on-line ERP study of native German speakers as they processed the SVfO and SOVf (vf meaning finite verbs) word order in German main and subordinate clauses in reading showed that German speakers prefer to process finite verbs in second position, i.e. SVfO, even for subordinate clauses where such order would be ungrammatical (Weyerts, Penke, Münte, Heinze, & Clahsen, 2002). The authors of the study attributed this to the added processing costs to the processor in parsing SOVf sentences, particularly the extra memory costs; these processing costs were reflected in the ERP effects obtained and the longer reading time observed for SOVf sentences.

In studies of near-native German L2 speakers of English L1, Dutch L1 and Russian L1, it was found that the additional processing loads imposed by a mismatch between the information structure of the immediate context and the scrambled word order in on-line conditions was a crucial factor which impinged on the performance of advanced as well as near-native L2 learners (Hopp, 2007, 2009).

In a self-paced reading study of Finnish speakers, it was found that the processing difficulties associated with the noncanonical OVS could be greatly mitigated by providing informants with the appropriate discourse contexts (Kaiser & Trueswell, 2002). Moreover, the eye movement data from the same study also indicated that in comprehending the OVS structure, Finnish speakers make use of the discourse information as encoded in the OV structure in anticipating the referent of the upcoming constituent (Kaiser & Trueswell, 2002). Likewise, Vasishth (2003) found that in Hindi, a free word order language, discourse context is one of the factors that neutralises the increase in processing costs when self-paced reading noncanonical, indirect-object fronting sentences.
2.8.2 Canonical Argument-Function Mapping

The preceding section showed that natives and learners alike initially build their syntactic frame according to the canonical word order of the particular language. Sentences in the canonical word order such as (40) are easy to acquire. On this note, passive constructions (41a-b) also display the canonical word order of SV(X) similar to that of SVO in (40). However, English passives, as reviewed in this chapter, are more difficult and more prone to error for L1 children and L2 learners than the similarly word-ordered active construction ((40) and (41) have similar linear word order arrangement):

(40) George pushed Paul.
    SUBJ VERB OBJ

(41) (a) Mary was kissed.
    SUBJ VERB

(b) Mary was kissed by John.
    SUBJ VERB ADJ

According to Pinker’s “linking rules” (Pinker, 1984, pp. 297ff.), there is default linking or association between two ordered tiers, one for grammatical functions and the other for thematic roles. This regularity of association between elements of the two ordered tiers constitutes canonical mapping. Pinker’s proposition of the canonical mapping is illustrated in (42) (Pinker, 1984, pp. 297ff.):

(42) SUBJ OBJ OBL (grammatical functions)
    Agent theme/patient goal/source/location (thematic relations)

Syntactic structures and lexical items that respect the linking regularity shown in (42) are considered canonical. By the same token, syntactic structures and verbs that violate the linking regularity of agent-to-subject mapping, either by means of syntactic operations or by virtue of the verbs’ intrinsic non-default linking patterns, are considered noncanonical. Examples of noncanonical mapping according to Pinker’s theory include passive constructions (whose linking to SVO is patient-V-
agent) and what Pinker called “exceptional verbs” such as receive (whose linking to SVO is goal-V-theme).

In addition to the studies on passives reviewed thus far in Chapter 2, there is evidence of the effects of noncanonical mapping on comprehension and production being independent of the notion of noncanonical word order. In a study testing 3- to 5-year-old English speaking children on their use of novel verbs that differed in argument role alignments (Marantz, 1982). The different alignments or mappings tested were (i) Agent-Verb-Patient (e.g. Larry is moaking the book means Larry is pounding a book with his elbow), and (ii) Patient-Verb-Agent (e.g. The book is puming Larry means Larry is moving the book up and down on his knee). Marantz found that 3- and 4-year-olds seem to depend heavily on the canonical correspondence between the thematic role and the surface grammatical form. When it came to sentences involving the opposite mapping, however, the same children had considerable difficulty in their comprehension and production of them. While mapping (ii) tested in Marantz’s study was not itself a passive construction per se but was an exceptional verb, the study nevertheless showed the distinct effects of argument role alignment with surface grammatical forms apart from any word order effects. The study also shows the order of acquisition of argument-function alignments of verbs from an L1 perspective. This finding was supported by a later Japanese L1 acquisition study in which the acquisition of Japanese exceptional verbs such as morau (‘to receive’) occurred relatively late (Slobin, 1985). Finally, Mandarin Broca’s aphasic patients have more difficulties comprehending bǎ and bèi constructions, as both constructions follow the noncanonical SOV word order. Interestingly, Broca’s patients are found to fare worse with the passive bèi construction compared to the active bǎ construction, indicating a dimension of markedness in passives, i.e. noncanonical argument mapping, in addition its noncanonical SOV word order (Shi & Zhou, 2005).

In Chapter 3, I will provide a review of a lexicalist theory on the canonical relationship between thematic roles and grammatical functions and how this relationship is altered to form passive constructions. I have shown that canonicity in terms of mapping and word order are easier for speech processing, it is the default starting point for L1 children and for L2 learners. The two types of canonicity are
distinct, yet they share similarities in how they are handled cognitively by the interlocutors.

2.9 Summary of Chapter 2

In summarising Chapter 2, I began with a linguistic overview to compare and contrast passive constructions in Mandarin and English. Mandarin and English are typologically distant from each other in terms of morphology, information packaging and syntax. This typological constellation is important as a testing ground in further testing and validating the new hypotheses of PT. In terms of semantics, although the distributions vary, the semantic properties of passive constructions are similar in Mandarin and English. In terms of pragmatics, researchers have proposed the core notion of theme or topicality and its various manifestations such as givenness, animacy, audio-visually enhanced perception, animacy, saliency and visual attention as the discourse-pragmatic motivation of passive constructions.

Chapter 2 then offered a comprehensive review of the acquisition and processing of passive constructions from a number of L1 perspectives across the lifespan, including healthy native speakers and the suboptimal processing abilities evident in patients with congenital developmental impairments, adult-onset neuropathological impairments and aging related decreases in language processing. An understanding of the issue at hand from FLA and L1 perspectives helps to inform us of our understanding of it in SLA. The review showed passives in English and Mandarin are much delayed in L1 development and are processed with greater difficulties. The relative difficulties persist into adulthood and are also evident in that the processing of passives is more prone to developmental and neuropathological impairments. On the other hand, studies on structural priming demonstrated that such processing difficulties may be mitigated by structural priming, especially in less skilled speakers and those with less processing resources. Studies on working memory and executive functions such as selective attention and inhibition point to working memory as a key factor in the processing of passives in L2. Chapter 2 reviewed evidence from eye-movement studies and neurobiological studies, including neuroimaging and electrophysiological studies in addition to behavioural studies. These enhance our understanding of language processing as a neuropsychological process and further
complement our observations from purely behavioural studies (Hagoort, et al., 1999; Hagoort, 2008; Kai Wang, 2009b).

The final section of the chapter underscored the syntactic codings of noncanonical word order and noncanonical argument-function mapping as two distinctly different means of achieving the same pragmatic goal of patient promotion and agent demotion. Both forms of noncanonicity carry with them additional processing costs.
Chapter 3
Theoretical Framework

Chapter 3 introduces the theoretical framework on which this thesis is based, namely the Processability Theory (Pienemann, 1998; Pienemann, Di Biase, & Kawaguchi, 2005). Processability Theory is grounded in Levelt’s psycholinguistic model of speech generation, as well as Lexical-Functional Grammar, a typologically and psychologically plausible grammatical formalism, as its architectural bases. Therefore, I firstly provide an overview of Levelt’s (1989) speech generation model and its revision (Levelt, et al., 1999) and adaptations (Tomlin, 1997; Pickering & Branigan, 1998), which will give insight into the cognitive processes involved in the spontaneous production of passives. Next, a brief sketch of the Lexical Mapping Theory within the LFG formalism is outlined in Section 3.2.1. Lexical Mapping Theory provides the lexicalist perspective on the active/passive alternation for PT. Next in Section 3.3, I put Levelt’s speech generation model and LFG’s Lexical Mapping Theory in action; I propose an account of the flow of generating an English passive sentence from conceptualisation to sentence formulation by native speakers and L2 learners. Finally, I present in detail the Processability Theory (Pienemann, 1989; Pienemann, Di Biase, & Kawaguchi, 2005), which is a psycholinguistic theory of second language acquisition and is the theoretical framework of this thesis. The architectural bases of PT reviewed herein and PT’s recently proposed hypotheses form the basis of my empirical hypotheses in the next chapter.

3.1 Levelt’s Model of L1 Speech Production

In order to consider second language acquisition from a psycholinguistic perspective, it is firstly essential to have an understanding of the blueprint of how fluent, native monolingual speech is produced. There have been several psycholinguistic speech production models proposed in the past; Levelt’s (1989) speech generation model is one of the most influential. I will firstly provide an overview of Levelt’s (1989) speech generation model, followed by an overview of its revision (Levelt, et al., 1999).
The following figure, taken from Levelt (1989, p. 9), illustrates the flow of speech generation from intention to articulation:

![Speech Generation Model](image)

*Figure 3.1. Levelt’s (1989, p. 9) speech generation model.*

Levelt assumes that the architecture underlying speech generation is divided into three separate, highly specialised and autonomous processing components, namely (1) the Conceptualiser, (2) the Formulator, and (3) the Articulator. Levelt regards a speaker as an “information processor”. The various processing components work together to “translate the speaker’s intention to overt speech” (Levelt, 1989, p. 2). The focus of my thesis is the conceptualiser and the formulator; as such the bulk of
my discussion will centre around these two components accompanied by a brief
coverage of the articulator.

**Conceptualiser**

Mental conceptualisation tasks such as “conceiving of intentions, selecting the
information to express for the realisation of this purpose, ordering this information
for expressing, keeping track of what was said before” all take place in this
component. These mental activities are called conceptualising. The output of the
product of the conceptualiser is called preverbal message (Levelt, 1989, p. 9).

Two types of knowledge must be accessible to the speaker in order to encode a
message; these are **procedural** and **declarative** knowledge. According to Levelt,
procedural knowledge is part of the processors themselves. It functions in the manner
of “IF X THEN Y”, where X is the condition and Y is the action to be taken. For
instance, if one’s intention is to express $p$, then assert $p$. The $p$ here represents a
specific proposition. The resulting information from this procedure is temporarily
stored in the “working memory” (Baddeley, 1986; Gathercole & Baddeley, 1993).
Working memory is a limited capacity information storage (see Section 2.5.5). The
information contained therein is dynamically accessible to the speaker, and is
constantly attended to by the speaker. The declarative knowledge on the other hand,
as seen in the illustration above, contains mainly encyclopaedic knowledge or the
propositional knowledge generally available in long-term memory. It also includes
knowledge of the present discourse information such as the interlocutors of a
conversation, the situational knowledge, as well as the speaker’s keeping track of the
immediate progression of the conversation.

In conceptualising a message, two stages of message planning are involved:
macroplanning and microplanning. According to Levelt, macroplanning is the
speaker’s mental “elaboration of some communicative goal into a series of subgoals,
and the retrieval of the information to be expressed in order to realise each of these
subgoals” (Levelt, 1989, p. 11). The speaker at this stage takes into account the
cooperative principles (Grice, 1975), having regard to what is relevant to the
communicative task at hand (Sperber & Wilson, 1995) and the appropriate level of
politeness. The output of the macroplanning stage is an ordered sequence of
individual speech-act intentions. Once these speech acts are planned and ordered, their contents must be brought to a perspective, given a propositional format and an information structure. The microplanning phase is where all these take place. The speech-act intentions are assigned a perspective and an informational structure, i.e. marking specific content as topical, focused, given or new at the microplanning phase, thus giving the speech-act intentions all the necessary features for them to be shaped into a *preverbal message*.

The output of the conceptualiser is a preverbal message. The generation of preverbal message and the process of conceptualising are constantly self-monitored by the speaker. The preverbal message becomes an input to the next processing component – the *formulator*.

**Formulator**

The job of the formulator is to translate a conceptualisation into a linguistic structure, or formulate a grammatical structure based on the preverbal message input from the conceptualiser. It is at this stage that the more abstract conceptualisation structure is somewhat materialised into a more tangible linguistic structure.

The formulator processes the preverbal message input from the conceptualiser by accessing the mental lexicon. The lexical access here is to retrieve the actual lexical items to be used to express the preverbal message in the form of the surface structure. Levelt’s (1989) model incorporates the lexical hypothesis, which entails that the formulator is lexically driven, and that the morphological, syntactical and phonological status of the surface structure is dictated by the retrieved lexical items. As the formulator accesses a lexical item, the formulator in fact taps into the two-staged, four interrelated internal structures of the lexical item and accesses the specifications of the lexical item from these internal structures. The four kinds of specifications retrieved by the formulator are the lexical item’s meaning, syntactical, morphological and phonological properties. Levelt’s (1989) postulation of a two-stage lexical access in the formulator is illustrated here:
In essence, as the formulator selects a lexical item, it first verifies that the meaning of the lexical item satisfies the meaning of the concept that is to be expressed. It also verifies that the lexical item retrieved is of the appropriate syntactical properties, e.g. the conceptual arguments, the syntactic category, and the grammatical case of the lexical item. The meaning and the syntactic properties of a lexical item together form the lemma information (or lemma for short). The formulator next accesses the lexeme, i.e. the morphological and phonological properties of the lexical entry.

This two-stage lexical access postulation finds a wealth of support in many empirical psycholinguistic studies. Levelt (1989) offers the “tip-of-the-tongue” phenomenon as evidence for this assumption. The “tip-of-the-tongue” is when people know what they want to say but cannot pin down the right word with which to express it. This, according to Levelt (1989), tip-of-the-tongue indicates that the speaker has already accessed the lemma, but is unsuccessful at retrieving the phonological form of the lexical item, or the lexeme. Moreover, the slip-of-the-tongue phenomenon also lends support to Levelt’s model of lexical access (Butterworth, 1989; Poulisse, 1999, 2000).

In the revised version (Bock & Levelt, 1994; Bock, 1995; Bock & Huitema, 1999), the grammatical encoding process of the formulator is further decomposed into “functional processing” and “positional processing”. Functional processing evokes the lemma selection and functional assignment subprocesses. Positional processing
involves the creation of a serialised or linearly ordered set of word slots and inflectional slots and the retrieval of lexeme information.

In summarising the formulator, there are two sequential initiatives taking place at the formulator stage. Firstly with lemma access, the grammatical encoding enables the meaning specification to be given to the preverbal message. This is followed by the phonological encoding, which allows the integration of linguistic form specification with the meaning specification. The grammatical encoding then assigns the retrieved lexical items into their syntactic positions within the constraints of each individual language. The resulting information from the formulator is the phonetic plan or the surface structure. The phonetic plan is the input feeding into the third processing component of the model – the articulator.

Articulator

The phonetic plan goes into the articulator, which converts it into overt speech. The phonetic plan is temporarily stored in the “articulatory buffer” for self-monitoring. The information in this buffer is constantly self-monitored and analysed by the speech-comprehension system, and can be self-corrected in real-time if an error in the phonetic plan is detected by the speech-comprehension system.

3.1.1 Revision of Levelt’s Model of Lexical Access

Levelt’s speech generation model has undergone several revisions (Levelt, 1992, 1995, 1998, 1999a, 1999b; Bock & Levelt, 1994; Levelt, et al., 1999). A flow diagram of the revised model is included below as Figure 3.3. The changes to Levelt’s (1989) original speech generation model were primarily a result of experimental work involving measuring reaction times on word naming and lexical decision tasks and the like and the construction of a computational model of Lemma Access and Word Form Encoding by Activation and VERification, called WEAVER ++ (Roelofs, 1992; Levelt, et al., 1999).
Figure 1. The theory in outline. Preparing a word proceeds through stages of conceptual preparation, lexical selection, morphological and phonological encoding, and phonetic encoding before articulation can be initiated. In parallel there occurs output monitoring involving the speaker’s normal speech comprehension mechanism.

Figure 3.3. Levelt et al.’s (1999, p. 3) revised speech generation model.
The revision of the model (Levelt, et al., 1999; Levelt, 1999a, 1999b) incorporated Roelofs’ (1992) network model of lexical retrieval into its lexical access theory. This version adopted a feedforward activation-spreading network to account for the process flow from conceptual preparation to lexical selection, morphological encoding, phonological encoding, syllabification, and finally to phonetic encoding. The feedforward activation-spreading network has three strata: the conceptual stratum, the lemma stratum and the form stratum (see Figure 3.4 below). The three-strata partitioning replaces the two-stage partitioning of the metal lexicon proposed in the original model.
Fig. 2. Fragment of Roelofs’s WEAVER network model of the lexicon. The nodes in the upper layer represent whole lexical concepts. The arrow connections represent the semantic relations holding among them. There is bi-directional activation spreading at this level. The mid stratum is syntactic. The nodes represent lemmas, that is, syntactic words and their features. Among these properties are the word’s syntactic frame, its variable inflectional features (such as number), its gender (in gender marking languages), etc. The activation spreading is uni-directional from lemma node to feature nodes. The lemma’s connection to its concept node represents the sense of the word. The connection allows for bi-directional activation spreading. The arrow down from the lemma points to its form. Activation spreading is uni-directional here, which is maintained all the way down through the network. Only a selected lemma can spread its activation to the form level. The bottom stratum represents morpheme nodes with their connections to metrical and phoneme nodes. In their turn, the phoneme nodes point to all (stored) phonetic syllables in which they participate; they are not specified for their syllable position. There are no inhibitory connections in the network.

Figure 3.4. Diagram of feedforward activation spreading network, after Fig. 2 of Levelt (1999a, p. 227).
Each stratum contains nodes and labelled links between the nodes of the same stratum as well as links to the next stratum. The feedforward activation spreading is what ultimately drives the speaker to specify the intended target word. The advantage of feedforward activation spreading is its strict modularity; it does not allow backward spreading. Thus, the speed of language processing and the slips of the tongue errors are accounted for. Furthermore, Poulisse’s findings from an extensive research project on the slips-of-the-tongue in first and second language production lend support to the feedforward activation-spreading model (Poulisse, 2000).

In this revised version, one major difference is the inclusion of Roelof’s (1992) conceptual level as a separate level in addition to the lemma and word form levels at the lexical access stage. The inclusion of the conceptual level meant that lemmas no longer contain any semantic information. The conceptual level contains nodes of lexical concepts that are non-decompositional, that is to say, they consist of unitary, undivided wholes rather than sets of semantic features derived from semantic decompositions. The non-decompositional lexical concept in the conceptual level points directly to the specific lemma in the lemma level. The change from the original two-stage to the revised three-stage postulation of lexical access, the mapping of thoughts onto chunked lexical concept representations and the mapping of these representations in turn onto lemmas allows the revised theory to workaround the “hyperonym problem” (Levelt, 1989, 1992).

Levelt’s (1989) model of lexical access and its subsequent revisions (Bock & Levelt, 1994; Levelt, et al., 1999) are relevant to my thesis because learners’ conceptualisation of a passive event and their consequent specific conceptualisation of passive verbs in the conceptual stratum, the activation spreading to the passive verbs at the lemma stratum as well as the verification and implementation of the specifications in the lemmas are all crucial to learners’ success in producing passives. The revised model has since found more empirical data in favour of the revisions from cross-linguistic experiments: the spreading activation patterns throughout the three strata are supported by experiments of syntactic priming and grammatical gender agreements (Vigliocco, Lauer, Damian, & Levelt, 2002) and the effects of
lexico-semantic representations on conceptual representations for Japanese and Turkish speakers (Kita & Özyürek, 2003; Vigliocco & Kita, 2006; Kita, et al., 2007).

3.1.2 Tomlin’s Adaptation of Levelt’s (1989) Model

Tomlin (1997) in his focally attended referent as subject hypothesis offered a simplified model of how passive constructions are encoded based on Levelt’s (1989) speech generation model. Figure 3.5 illustrates this flow, which was derived from Levelt’s (1989) model.

![Model of discourse production involving active/passive alternation](image)

*Figure 3.5. Model of discourse production involving active/passive alternation (Tomlin, 1997, p. 175).*

The external stimuli can be an event that is unfolding in real time as witnessed by a speaker. The task of the speaker may be to provide a narrative of the event as it unfolds. The task, according to Tomlin (1997), in the case of a narration, is always composed of both a behavioural and a rhetorical component. The testimonial narration is the behavioural component of the task. Tomlin illustrated the rhetorical component with a play-by-play commentator and a colour commentator reporting the same ball game. The rhetorical components of the two commentators narrating task are different, which affected the commentators in their selection of what to report in their narratives.
The external stimuli are captured by the conceptualiser, which forms a conceptual event representation in real time. The conceptualiser is language independent. It feeds the conceptual event representation into the formulator to allow for functional grammar encoding. The conceptual event representation that is passed onto the grammar encoding part of the formulator “includes information regarding the attentional state of the cogniser as events are witnessed, and these representations are operated on by the grammar in real time to formulate utterances” (Tomlin, 1997, p. 172). As discussed in Section 2.4.7, Tomlin’s hypothesis claims that speakers clearly assign the attentionally detected parameter to the syntactic subject in English. Similarly, Levelt (1989) also proposed that the grammatical encoder would encode the topical lemma in a syntactic prominent position; and the early delivery of the topical message fragment from the conceptualiser would in many cases result in its winning the primacy in grammatical encoding (see also De Smedt, 1990, who saw the encoding of the subject as correlating strongly with the greatest conceptual accessibility of the topic).

3.1.3 Adaptation of Levelt Model for Structural Priming

Based on the well attested and reliable structural priming phenomenon (see Section 2.5.4), Levelt et al.’s (1999) model of lexical access was extended to explain the phenomenon of structural priming (see Figure 3.6) (Pickering & Branigan, 1998; Branigan, Pickering, & Cleland, 2000; Cleland & Pickering, 2006; for a similar proposition, see Fox Tree & Meijer, 1999 for structural priming among monolinguals; and Meijer & Fox Tree, 2003 for bilinguals).
Crucially, the extended version assumes that a lemma node is linked to combinatorial nodes, which specify possible constituent combinations with which the lemma may collocate. Therefore, when one hears the priming sentence “the aeroplane landed by the bank”, the priming effect for the passive structure “the girl is pushed by the boy” in the subsequent narrative is explained as the result of the “by-NP” clause in the prime sentence enhancing the link to the “by-NP” combinatorial node of the lemma “pushed”, thus momentarily giving it an edge for activation over other competing combinatorial nodes. Cross-modality structural priming studies have shown that the combinatorial nodes of the lemma stratum are modality-neutral, i.e. the priming effect persists even when the priming and the primed sentences are of different modalities (Cleland & Pickering, 2006). Furthermore, the lexically-driven nature of structural priming has been demonstrated in studies using single verbs in isolation as primes and the priming of complex noun phrases (Cleland & Pickering, 2003; Melinger & Dobel, 2005).

3.2 A Brief Sketch of Lexical-Functional Grammar

I mentioned briefly in Section 2.2.2 that LFG has three distinct yet parallel and corresponding representations, namely the a(rgument)-structure, f(unctional)-
structure and c(onstituent)-structure. The f-structures “deal with functional information (grammatical functions such as SUBJect and OBJect, but also discourse functions like TOPic) and have the form of matrices of attribute-value pairs”, the c-structures deal with constituency elements such as phrasal units and word order, while the a-structures “deal with predicate-argument information such as the number and type of arguments of a predicate and the semantic role borne by arguments.” (Austin, 2001, p. 8749) These parallel representations are linked by principles of correspondence rather than through derivation. The mapping of elements of the a-structure onto the f-structure and c-structure onto the f-structure is the driving force behind this grammatical formalism (Bresnan, 2001). The linking of the three parallel structures is illustrated in (43) using the example sentence Jane pats a cat.

(43)

Looking more closely at each structure beginning with the f-structure, the f-structure contains functional information, including grammatical functions (e.g. SUBJ, OBJ) as well as discourse functions (TOP, FOC). The f-structure represents attribute-value pairs. The f-structure of Jane pats a cat is illustrated in (44):
The PREDicate of the sentence is *pat*, which subcategorises SUBJ and OBJ. The PRED for the SUBJ is *Jane*, and the diacritic values of it are specified in the subsidiary f-structure, namely NUM(umber)=S[ingular] and PERS(on)=3rd. The PRED of OBJ is *cat*, which has NUM=Sg and DEF(initeness)=“-” (negative).

The f-structure is subject to three well-formedness conditions of unification. These conditions constrain the f-structure to ensure that sentences turn out grammatical. The conditions require that the information within an f-structure be (Austin, 2001, p. 8751):

- **unique** – attributes must have only one value.
- **complete** – an f-structure must contain all the grammatical functions that a given predicate requires.
- **coherent** – all the grammatical functions must be required by some predicate within the local f-structure.

The f-structure in (45) satisfies the uniqueness condition, as each attribute only has one value. It also satisfies the completeness condition, as the PRED *pat* requires a SUBJ and an OBJ; both are found in the f-structure. The f-structure also satisfies the coherent condition, as it does not contain any redundant grammatical function not subcategorised by the PRED *pat*. 
At the c-structure level, it is the level of representation of the language-specific phrase structure rules, which for this sentence is illustrated in (45).

(45)  

\[
\begin{align*}
\text{a. } & S \rightarrow \text{ NP VP} \\
& (\uparrow \text{ SUBJ}) = \downarrow \\
& \quad \uparrow = \downarrow \\
\text{b. } & \text{ VP } \rightarrow \text{ V NP} \\
& \quad \uparrow = \downarrow \\
& \quad (\uparrow \text{ OBJ}) = \downarrow
\end{align*}
\]

LFG uses the ↑ and ↓ symbols to indicate the grammatical information flow explicitly. The up-arrow refers to information about the mother node; the down-arrow refers to information about the referring node itself.

Finally, the lexicon is integral to the LFG formalism. The elements at the c-structure terminals are lexical entries retrieved from the mental lexicon. The entries and their annotations are language-specific, as is also the case in the c-structure phrase structure rules. The lexical entries required for *Jane pats a cat* are illustrated in (46):

(46)  

<table>
<thead>
<tr>
<th>Name</th>
<th>Part of Speech</th>
<th>PRED</th>
<th>SPEC</th>
<th>SUBJ PERS</th>
<th>SUBJ NUM</th>
<th>NUM</th>
<th>PERS</th>
<th>TENSE</th>
<th>NUM</th>
<th>PRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane</td>
<td>N</td>
<td>‘Jane’</td>
<td>‘a’</td>
<td>3rd</td>
<td>Sg</td>
<td>Sg</td>
<td>3rd</td>
<td>Present</td>
<td>Sg</td>
<td>‘pat &lt;SUBJ, OBJ&gt;’</td>
</tr>
<tr>
<td>pats</td>
<td>V</td>
<td>‘pat &lt;SUBJ, OBJ&gt;’</td>
<td>‘a’</td>
<td>3rd</td>
<td>Sg</td>
<td>Sg</td>
<td>3rd</td>
<td>Present</td>
<td>Sg</td>
<td>‘pat’</td>
</tr>
<tr>
<td>a</td>
<td>DET</td>
<td>‘a’</td>
<td>‘a’</td>
<td>3rd</td>
<td>Sg</td>
<td>Sg</td>
<td>3rd</td>
<td>Present</td>
<td>Sg</td>
<td>‘a’</td>
</tr>
<tr>
<td>cat</td>
<td>N</td>
<td>‘cat’</td>
<td>‘cat’</td>
<td>3rd</td>
<td>Sg</td>
<td>Sg</td>
<td>3rd</td>
<td>Present</td>
<td>Sg</td>
<td>‘cat’</td>
</tr>
</tbody>
</table>

The integrated c-structure is illustrated in (47), showing the phrase structure tree, the functional annotations, the explicit indications of grammatical information flow and the lexical entries of the terminal nodes.
Finally, feature unification, which refers to the merging of features, is a central concept in LFG (Falk, 2001). Syntactic features belonging to a single conceptual part of a sentence come from lower nodes and are merged at the mother node. Feature unification also ensures agreement, as syntactic features coming from lower nodes must not conflict with each other. An illustration of feature unification at the NP\textsubscript{obj} mother node is shown in (48):

The features NUM=Sg for the determiner \textit{a} and the noun \textit{cat} travel up to the NP mother node. The features of the two sister nodes are compatible; they are therefore unified at the mother node, thus also ensuring that agreement takes place. If however the NP\textsubscript{obj} is \textit{a cats}, the feature NUM=Sg coming from the determiner \textit{a} will fail to
unify with the NUM=Pl coming from the noun cats at the NP mother node. In LFG, ungrammaticality is automatically accounted for as part of the feature unification process.

3.2.1 A Brief Sketch of Lexical Mapping Theory

The notion of canonicity is an elusive one. One approach is to frame canonicity in terms of innateness (Pinker, 1984; Borger & Wexler, 1992). Others attempted to define canonicity in terms of frequency (St. John & Gernsbacher, 1998). Dryer (1995) pointed out that while there is a strong tendency for frequency and canonicity (which he called pragmatic unmarkedness) to coincide with each other, it does not necessarily have to be the case. He proposed that “pragmatic markedness is a property of the rules or principles of discourse grammar, which determine the choice by speakers of a particular construction from a set of discourse-governed alternants” (Dryer, 1995, p. 129). In this regard, the Lexical Mapping Theory provides an elaboration of canonicity as “a property of the rules of discourse grammar” from a lexicalist grammar perspective. It also details the formal mechanisms that disrupt canonicity for the sake of producing speaker-induced optional structures. I will now provide a brief sketch of the Lexical Mapping Theory of LFG.

Based on recent development in LFG (Bresnan, 2001), in the current version of PT (Pienemann, Di Biase, & Kawaguchi, 2005), a new set of principles in addition to c-structure feature unification, namely the mapping of a(rgument)- to f(unctional)-structure and c(onstituent)- to f(unctional)-structure, are proposed to explain the processability of L2 structures, particularly optional structures that reflect learners’ L2 syntax-pragmatics interface. More specifically, the Lexical Mapping Theory (LMT) in the revised version of LFG (Bresnan, 2001) provides the theoretical motivation for PT’s current approach to passives. It is therefore important to understand some key aspects of Lexical Mapping Theory in understanding the L2 acquisition and processing of English passive constructions.

Lexical Mapping Theory (Bresnan & Kanerva, 1989; Bresnan, 2001; Dalrymple, 2001) is a module within the revised LFG formalism that stipulates the general principles of mapping thematic roles onto grammatical functions mediated by a-structure. It is concerned with the principles that systematically constrain the
syntactic realisation of the arguments of a predicator. It formalises the default mappings of argument roles onto grammatical functions, or the mappings between a(rgument)-structure to f(unctional)-structure, essentially providing an account from a lexicalist perspective on what canonicity is, and then it explains how such mappings are altered by means of “morpholexical operations” to generate optional discourse-pragmatic structures such as passives and causatives (Bresnan & Kanerva, 1989, p. 25).

Following Bresnan (2001), a-structure in LFG has two facets, semantic and syntactic. The semantic side specifies the core participants in an event designated by a predicator. The syntactic side represents the minimal information needed to identify the syntactic dependents of an argument-taking head. A-structure is the interface between the semantics and syntax of a predicator. Bresnan (2001, p. 306) depicts the relationships between this information as in (49):

(49)  lexical semantics
       ↓
   a-structure
       ↓
final syntactic structure

LMT (Bresnan & Kanerva, 1989, p. 22) utilises four guiding principles in governing argument-function mapping:

(i) hierarchically ordered semantic role structures
(ii) a classification of syntactic functions along two dimensions
(iii) principles of lexical mapping from semantic roles to (partially specified) functions
(iv) well-formedness conditions on lexical forms

I will now briefly summarise the four guiding principles.

Hierarchically Ordered Semantic Role Structures
An a-structure consists of a predicator and its argument roles. For example, the a-structure of (50) is given in (51):

Firstly, in line with the suggestion of many researchers (e.g. Jackendoff, 1972; Foley & Van Valin, 1984; Givón, 1984b) LMT assumes a universal hierarchy of thematic roles, as in (52), and a universal hierarchy of grammatical functions, as in (53):

(52)  Thematic hierarchy (Bresnan, 2001, p. 307)
agent > beneficiary > experiencer / goal > instrument > patient / theme > locative

(53)  Relational hierarchy (Keenan & Comrie, 1977; Bresnan, 2001, p. 96)

<table>
<thead>
<tr>
<th>core</th>
<th>non-core</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBJ &gt; OBJ &gt; OBJ_θ &gt; OBL_θ &gt; COMPL &gt; ADJUNCT</td>
<td></td>
</tr>
</tbody>
</table>

(OBJ_θ refers to secondary object)

In the a-structure of (50), the left-to-right ordering of the argument roles of a predicate reflects the relative prominence of the roles as indicated by the thematic hierarchy in (51). In example (50), the agent of the predicate ‘kick’, which is the highest role on the thematic hierarchy, corresponds to the leftmost argument ‘x’. The patient, being the inherently less prominent role on the hierarchy, corresponds to the ‘y’ argument. Moreover, as shown in (53), grammatical functions are hierarchically ordered according to their degree of prominence. Core argument functions are more prominent than noncore-argument functions.
The mapping of a- to f-structure is not arbitrary but is rather constrained in a principle way by the classification of syntactic functions based on feature $[\pm r]$ (whether or not the syntactic function is restricted) $[\pm o]$ (whether or not it is objective). The primary grammatical functions are decomposed into a set of two dimensional, four natural classes, as shown in (54):

(54) Feature Decomposition of Argument Functions (Bresnan, 2001, p. 307)

<table>
<thead>
<tr>
<th></th>
<th>$-r$</th>
<th>$+r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-o$</td>
<td>SUBJ</td>
<td>OBL$\theta$</td>
</tr>
<tr>
<td>$+o$</td>
<td>OBJ</td>
<td>OBJ$\theta$</td>
</tr>
</tbody>
</table>

OBJ$\theta$ and OBL$\theta$ have the feature $[+r]$ (thematically restricted) because these functions are restricted in the limited semantic roles they can express. For example, OBJ$\theta$ can express only limited semantic roles such as OBJ$_{goal}$. Conversely, SUBJ and OBJ are $[-r]$ (thematically unrestricted), i.e. they can express any semantic role.

The feature $[+o]$ refers to objective or object-like functions “that appear as arguments of transitive categories of predicates (Verb and Preposition) but not of the intransitive categories Noun and Adjective” (Bresnan & Kanerva, 1989, p. 25). OBJ and OBJ$\theta$ have the feature $[+o]$. In contrast, SUBJ and OBL$\theta$ are $[-o]$, which refers to non-objective functions, “the kind of functions which complements intransitive predicates such as Nouns and Adjectives” (Bresnan, 2001, p. 307).

**Lexical Mapping Principles from Semantic Roles to Syntactic Functions**

LMT postulates three lexical mapping principles that associate thematic roles with partial specifications of syntactic functions. These principles are: (i) intrinsic role classifications, (ii) morpholexical operations and (iii) default classifications (Bresnan & Kanerva, 1989, p. 25).

Some semantic roles have intrinsic values, and they apply cross-linguistically. Agent has an intrinsic value of $[-o]$. Patient/Theme has an intrinsic value of $[-r]$. Locative has an intrinsic value of $[-o]$. 

---

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Morpholexical operations, according to Bresnan and Kanerva (1989, p. 26), “affect lexical argument structures by adding or suppressing thematic roles.” In the case of the passives, the highest thematic role (i.e. the agent) is suppressed.

\[(55) \quad \text{‘was kicked’} < x \quad y \quad >\]

\[\downarrow\]

\[\emptyset\]

The default role classifications apply last, after the a-structure has been morpholexically built up. The default role classifications depend on the thematic hierarchy in (52). It is designed to reflect the generalisation that the highest thematic role will be the SUBJ, receiving the \([-r]\) feature, and the lower ones will be non-subject, receiving the \([+r]\) feature.

**Well-formedness Conditions on Lexical Forms**

Finally, two other conditions constrain argument-function mapping, namely the Function-Argument Bi-uniqueness and the Subject Condition. Function-Argument Bi-uniqueness stipulates that “each a-structure role must be associated with a unique function, and conversely.” The Subject Condition requires that “every predicator must have a subject” (Bresnan, 2001, p. 311).

In summarising the mapping of a- to f- structures, Bresnan (2001, p. 311) states that thematic roles are freely mapped onto all compatible grammatical functions subject to a few general constraints: if it is the initial argument of the predicator, a most prominent role with the \([-o]\) feature has to be mapped onto SUBJ. If such a role is unavailable, a non-agentive role with the \([-r]\) feature must be mapped to SUBJ.

\[(56) \quad \text{Mapping Principles:}\]

a. Subject roles:

(i) The semantically most prominent role on the thematic hierarchy is mapped onto SUBJ when initial in the a-structure; \([-o]\). Otherwise:

(ii) A non-agentive, unrestricted role is mapped onto SUBJ; \([-r]\).

b. All other roles are mapped onto the lowest compatible grammatical function on the following hierarchy of core argument functions:
SUBJ > OBJ, OBJ0 > OBL0
(Bresnan, 2001, p. 311)

I will now demonstrate LMT in operation by presenting the active-passive alternation of the previous example (50):

(57a) Mark kicked the dog.
(57b) The dog was kicked by Mark.

The mapping of the active sentence (57a) in the English SVO order is as follows:

(58) Marked kicked the dog

<table>
<thead>
<tr>
<th>‘kick’</th>
<th>&lt; x  y &gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>intrinsic</td>
<td>[−o]  [−r]</td>
</tr>
<tr>
<td>default</td>
<td>[−r]</td>
</tr>
<tr>
<td>mapping principle</td>
<td>[+o]</td>
</tr>
</tbody>
</table>

____________________________________________________________________
SUBJ  *SUBJ/OBJ
well-formed Mark the dog

* Violates the Functional-Argument Bi-uniqueness

The verb kick has two semantic roles, Agent and Patient, each having [−o] and [−r] respectively. Agent is the highest on the thematic hierarchy, the default classification applies and it receives a [−r] feature. Thus the ‘x’ argument, bearing the agent role, is mapped to the most prominent grammatical relation, namely SUBJ. The ‘y’ argument, bearing the patient role, receives the [+o] feature in compliance with the Function-Argument Bi-uniqueness, and is therefore mapped to OBJ.

The mapping of the passive sentence (57b) in the English SVO order is as follows:
In the passive sentence (59), the highest semantic role on the thematic hierarchy, the agent, is suppressed by means of morpholexical operations. The ‘x’ argument cannot be linked to any syntactic argument in the f-structure. It can however appear as a modifying adjunct in the by-clause (Bresnan, 2001, p. 310). The ‘y’ argument has the intrinsic value of \([-r]\). In order to adhere to the well-formedness condition, the ‘y’ argument must receive the \([-o]\) feature and be mapped to SUBJ to fulfil the Subject Condition.

3.3 Production of Passive Sentences in Conceptualiser and Formulator

3.3.1 Generation of Passives by Native Speakers

I will now outline, based on Levelt’s (Levelt, 1989; Bock & Levelt, 1994; Levelt, et al., 1999) speech generation model and the modifications discussed in the preceding section, the steps involved in generating a simple English passive sentence in terms of the processing flow from the conceptualiser to the formulator.

If a speaker wishes to inform his or her audience that \textit{Mary was chased by the dog}, the conceptualiser first and foremost macroplans the speech act intention as a declarative sentence. I assume that the microplanning phase then brings the speech act content into the perspective of \textit{Mary} and makes \textit{Mary} the subject or the starting point of the sentence, assuming for my example that as far as the speaker is concerned, he or she takes the perspective of \textit{Mary} because \textit{Mary} is closer to ego
than the dog (MacWhinney, 1977; Kuno, 2005). The output of the microplanning phase is thus that the conceptualiser inputs the preverbal message, one that has been microplanned with what I shall call a “prominence flag” on the patient argument (Mary), into the formulator, either incrementally or as a whole (see also Junger, 1987 for a description of speaker’s assignment of the pragmatic function of the passive voice within the Functional Grammar model).

At the formulator stage, the preverbal message from the conceptualiser causes the grammatical encoder to initiate the first of the two-level grammatical encoding process – functional processing (Bock & Levelt, 1994). Functional processing is further decomposed into two subprocesses, lexical retrieval and functional assignment. The lexical selection process starts by activating the lexical concept nodes for MARY, CHASED and DOG within the mental lexicon. Next, the active lexical concept nodes spread-activate their corresponding lemma nodes, Mary, chased and dog (Levelt, et al., 1999). In dealing with the passive form of the lemma, which in the present example is chased, Levelt suggested that the lemma chase would firstly be activated; the diacritic parameter would subsequently lead to the stem being correctly inflected for the passive form. Levelt’s approach treats the passive form chased as one of the various related inflected forms of the verb stem (e.g. chase, chases, chasing) belonging to the same lexical entry (Levelt, 1989, p. 183).

However, following LFG (Kroeger, 2004), I take an alternative approach, namely I take the infinitive/active form and the passive form of a verb as two independent lexical entries. This is done partly on the assumption that the English passive forms of verbs are also adjectival in nature (Granger, 1983; Levin & Rappaport Hovav, 1986; Cook, 1990; compare Freidin, 1975; Townsend & Bever, 2001; and Croft, 1994 from a cognitive-semantic perspective; but see Beedham, 1981; and 1987 for the proposition of treating the passive as an verbal aspect). For example, the adjective angry in (60a) is paradigmatically related to sacked in (60b).

(60) (a) John was angry.
    (b) John was sacked.
Furthermore, in the case of get-passives, while get may be viewed as a serial verb followed by the passive form of the verb, get can rightly be viewed as a full-fledged verb as well, requiring an auxiliary verb for interrogatives and negations, as in (61a-d) (Haegeman, 1985, see also Section 2.3.1 of this thesis).

(61)  
(a) John got angry.  
(b) John got sacked.  
(c) John didn’t get sacked.  
(d) Did John get sacked?

Another important basis for this assumption is the fact that purely inflected forms of a verb (e.g. shooting and shoots for shoot) have the same conceptual specifications, subcategorisations and the same set of grammatical functions and conceptual arguments as the verb stem. This is not the case with the passive form. Compare the itemisation of the two lemmas below:

(62) kick:  
conceptual specification:  
EVENT (X, (foot in contact (Y, (FROM/TO (X, Y))))))  
conceptual arguments: (X, Y)  
syntactic category: Verb  
grammatical functions: (SUBJ, DO)

(63) (was) kicked:  
conceptual specification:  
EVENT (Y, (foot in contact (X, (FROM/TO (X, Y))))))  
conceptual arguments (X, Y)  
syntactic category: Verb / Adjective  
grammatical functions (SUBJ)

In (63), the underscore indicates that the components underscored may be omitted, in which case an adjectival / agentless passive would result. The core grammatical function in (63) is subject, onto which the semantic patient will be mapped; the
Taking the passive form of a verb as an independent lexical entry also finds support in the literature. For example, Levelt (1989, p. 183) likewise stated that following Butterworth (1983, 1989), in cases of derivations where the syntactic categories differ, the derived forms are stored as different lexical entries in the lexicon, each with their own lemma information. More recently, Kroeger (2004) also contended from an LFG perspective that both the stem and the passive version of verbs are listed in the lexicon as standalone entries.

From a cognitive-semantic perspective, Croft (1994; see also Xiong & Wang, 2001 for an analysis of the BEI passive following Croft) claims that since an agentless passive is conceptualised as a stative/adjectival, self-contained event without an external cause, which conforms to the idealised cognitive model of stative events, agentless passive is therefore the passive prototype. Croft (1994) posited that the introduction of an external agent through a by-clause departs from the prototype and is an overt means of violating the stative event idealisation. Studies in English L1 acquisition (e.g. Lee, 1974; Horgan, 1976; Israel, et al., 2000) also indicated that the earlier acquired predicate adjectival construction is the precursor of the agentless passive construction. English children’s development of the passive then stems from agentless and gradually extends to full verbal use.

Finally, de Bot’s (1992) adaptation of Levelt’s (1989) original model to bilinguals pointed out a parallel with Dutch/German cognates; cognates that share the same form may result in two lemmas being called upon because of the differences in their syntactic annotations such as gender. Additionally, ambiguous words in a language are likewise connected with the same form from different lemmas.

Having established the proposed alternative approach, I now continue with the processing flow. The grammatical encoder is fed the preverbal message coming from the conceptualiser. The grammatical encoder consists of two processes: functional processing and positional processing (Bock & Levelt, 1994; Bock, 1995; Bock & Huitema, 1999). First, functional processing is initialised. Functional processing
executes the lexical selection subcomponent to select the lexical items or the lemmas required from the mental lexicon. As mentioned earlier, the grammatical encoder detects the “prominence flag” or the attentional value as attached to the patient argument in the preverbal message (Bock & Levelt, 1994; Tomlin, 1997); it is probably at this stage then that the functional assignment subprocess applies the morpholexical operation as postulated in LMT to suppress the agent and promote the patient (Bresnan & Kanerva, 1989). Depending on the communicative intention of the speaker, the functional assignment subcomponent may either map the agent the dog to a modifying adjunct of a by-clause or omit the agent altogether (compare Dalrymple, 2001, p. 208). The functional assignment subcomponent maps the patient argument to the subject, the most prominent grammatical function. This creates a noncanonical mapping of patient to SUBJ. Next, the positional processing is initialised. The syntactic subcomponent of the positional processing creates an ordered set of word slots, in this case placing the patient argument in the sentence-initial position, which is the most prominent position in the constituent structure. The mapping and the linear ordering of the patient argument to the subject is then congruent with the conceptual argument specification that is annotated in the lemma chased. The lexical retrieval subcomponent of the positional processing is concerned with retrieving the lexeme or the formal aspects of the lexical item. Lexical retrieval of positional processing and lexical selection of functional processing are two distinct subcomponents belonging to two different processes of the grammatical encoder. The grammatical encoder applies the “Functorisation Rule” (Pienemann, 1998, p. 67) and retrieves the functor was.

As languages differ in the flexibility of word order linearity, such flexibility is reflected in language-specific grammatical encoders (Levelt, 1989). The grammatical encoder of a language with a relatively free word order would have a more flexible positional processing procedure which more readily allows violations of its default word order in preserving the pragmatic prominence of the patient, thus resulting in scrambling. Chinese, being a typologically topic-comment language, is a good example of this flexibility. On this point, Sugimura (2005) noted that:

it has been made evident from many linguistic phenomena that Chinese syntax is designed to produce topicalisations with ease. Topicalisation as a
syntactic structure is a very mature one in Chinese...in organising a new sentence, the topic is the most foregrounded element in the speaker’s mind while at the same time plays the role of a discourse coherence facilitating device. (Sugimura, 2005, pp. 102-103, my translation)

On the other hand, the grammatical encoder of another language may have a functional assignment subprocedure which more readily permits violations of its canonical agent-to-subject mapping during the course of attributing more prominence to the patient, thus resulting in passives (Bock & Levelt, 1994). English as a typologically subject-prominent language displays this characteristic. In comparing noncanonical syntax in Chinese and English, Li and Thompson (1976, p. 457) offered this interesting comment regarding the low proportion of passive structures in Mandarin:

In subject-prominent languages, the notion of subject is such a basic one that if a noun other than the one which a given verb designates as its subject becomes the subject, the verb must be marked to signal this ‘non-normal’ subject choice...In topic-prominent languages, it is the topic, not the subject, that plays a more significant role in sentence construction. Any noun phrase can be the topic of a sentence without registering anything on the verb. It is, therefore, natural that the passive construction is not as widespread in topic-prominent languages as it is in subject-prominent languages.

In short, languages like Chinese are more tolerant of topicalisation than some other languages such as English; topicalisation is a more common discourse strategy than passives in Chinese, whereas the opposite is true for languages like English (Sugimura, 2005). The varying degrees of flexibility of the word order linearity as a typological characteristic of Chinese and English add to the typological contribution of my thesis to PT. The passive voice is not as operative in Mandarin L1 as it is in English L2; my thesis probes into the question of learners’ development of a grammatical encoder that allows more robust manipulations of argument-function mapping than word-order mapping.

3.3.2 Generation of Passives by Learners

In the case of fully-proficient native speakers, speech production takes place accurately and effortlessly. In Levelt’s (1989) model, each component calls the relevant procedure to work on the input and delivers the end product to the next component swiftly and seamlessly. This, however, is not the case with learners.
When an English L2 learner attempts to produce the same passive sentence in English, the same processes would need to be involved to arrive at a successful articulation. If the flow is disrupted, there will be infelicities in the output, the speech production may even come to a halt. I shall now discuss what could go astray in the event that the learner experiences difficulties with producing a passive sentence.

When a learner attempts to produce the sentence *Mary was chased by the dog*, the first stage is conceptualisation. Levelt (1989, pp. 103-104) assumed that the conceptualiser is language-specific. However, in both de Bot’s (1992) and Tomlin’s (1997) adapted versions of Levelt’s (1989) model, it was suggested that the macroplanning phase of the conceptualiser is likely to be language-independent, whereas the microplanning phase is language-specific.

The output of the conceptualiser is a preverbal message that is microplanned with a patient argument flagged for prominence. The preverbal message also contains information regarding the language in which the utterance will be in (de Bot, 1992). This preverbal message activates the formulator for English, which takes in the preverbal message input and begins to work on it.

The preverbal message causes the grammatical encoder in the formulator to initiate the lexical retrieval process for the necessary lexical items. The grammatical encoder activates the lexical concept nodes for MARY, CHASED and DOG within the mental lexicon. Next, the three active lexical concept nodes spread-activate their corresponding lemma nodes, *Mary*, *chased* and *dog*. At the formulator stage, the learner may experience three possible difficulties:

*Convergence in Lemma Selection:* When the lexical concept node CHASED spreads activation to the lemma node, the closely related lemmas *chase* and *chasing* also become activated and converge with the target lemma *chased*. Compared to the passive-voice lemma *chased*, the active-voice lemma *chase/chasing* may be highly activated by virtue of them being relative high-frequency nodes independent of any direct spread-activation from the lexical concept node. Moreover, unlike passive/past-tensed verbs, the active/gerund form *-ing* behaves regularly and exists with every verb in the English lexicon; the active/gerund form would have a
relatively lower activation threshold. If the active-voice entry is selected, this would lead to the learner producing a grammatically ill-formed sentence, *Mary was chasing by the dog or potentially a semantically reversed utterance, Mary was chasing the dog.

**Absence or Non-functionality of Target Lemma in Lexicon:** The learner may lack the lemma node chased to which the lexical concept can spread the activation simply because the lexical entry chased has not been created in the mental lexicon; or perhaps the lexical entry has been created but the lemma contains only crude and sketchy annotations and is thus non-functional. In either case either chase or chasing may be the most activated lemma node.

**Incongruence to the Canonical a- to f-structure Mapping:** Experiments carried out under the Competition Model (MacWhinney, et al., 1984; MacWhinney, 1987; Sasaki, 1997, 1998; MacWhinney, 2002) have clearly demonstrated that sentences in the canonical order in terms of voice and word order are the easiest for both native speakers and learners to process. The learner’s grammatical encoder, as is also the case with native speakers, is conditioned to perform the default argument-function mapping, or a- to f-structure mapping. Therefore when a preverbal message is delivered to the formulator with a non-default prominence flag indicated for the patient, the learner has to expend great efforts in altering the default argument-function mapping in order to promote the patient syntactically and realise the non-default conceptual prominence flag through syntax (Pienemann, Di Biase, & Kawaguchi, 2005). Since any deviation from the default processing pattern requires additional mental resources on the speaker’s part, possibly involving the inhibition of the urge to habitually and canonically map the agent to the subject (Grossman & White-Devine, 1998; Grossman & Rhee, 2001), the learner may lack the requisite processing capacity to perform such a mapping. The learner may also disregard the conceptual prominence flag as a trade-off to concentrating the processing resources on preserving the intended propositional content in the linguistic output; in other words, prominence assignment or the maxim of relation in syntactic arrangement may be prioritised out in favour of ensuring the adherence to the maxim of quality (Grice, 1975).
When the learner encounters the situations mentioned above and wishes to implement the correct prominence assignment in L2 syntax, they may deal with the situation in a number of ways. The spill-over activation intended for *chased* was spread to *chasing*, the low threshold for the active form *chasing* was quickly satisfied by virtue of its high frequency and the utterance *Mary was chasing*… was produced; the learner may, upon self-monitoring (Levelt, 1989) and subsequently verifying the conceptual argument annotation of the lemma *chasing* against the thematic role of *Mary*, come to realise that *chasing* is not the correct target and that continuing with the rest of the utterance would result in an incorrect proposition being uttered. The Incremental Processing Formulator (IPF) model (De Smedt, 1990) suggests that learners may at this point realise that they are at a syntactic dead end and may initiate a repair by re-attempting to retrieve the correct target lexical item.

In the case of the correct target lemma *chased* being absent or non-functional in the mental lexicon, or if the grammatical encoder finds the incongruence of the noncanonical mapping insurmountable (see Grossman & White-Devine, 1998; Grossman & Rhee, 2001), the IPF model (De Smedt, 1990) suggests that the learner may abandon the utterance articulated so far and restart a new utterance employing the default mapping, i.e. using the available lemma *chasing*. Similarly, Pienemann suggested that when learners reach a point where the requisite processing procedure has not yet been acquired, they will resort to a primitive strategy involving “direct mappings of conceptual structures onto surface forms” (Pienemann, 2005, pp. 13-14).

Poulisse, Bongaerts & Kellerman’s (1990) study using introspective techniques suggested that L2 learners may anticipate lexical problems and use other strategies to circumvent the lexical problem they foresee. In a like manner, highly disfluent children were observed to produce more simple grammatical constructions than the non-disfluent group in a study and the author hypothesised that disfluent children would use simple or immature syntactic constructions as a strategy to avoid complex-structure induced disfluencies (Muma, 1971). It is therefore conceivable that a similar pattern be found in L2 learners with regards to passives. Learners may decide against attempting to start down the track of a passive construction out of anticipation of potential issues with retrieving the passive-voice lemma or aligning arguments in the noncanonical, non-linear order (see also de Bot, 1992).
3.3.3 Summary

In summarising Section 3.3, I outlined the processing flow of producing simple passive sentence in English from conceptualisation to grammatical encoding. I also showed the difficulties that learners may encounter in producing a passive sentence following the same processing flow. At functional processing in the grammatical encoder, problems may arise during lexical selection due to (i) the passive lemma has to be created as an entry in the L2 mental lexicon and has to be correctly annotated; and/or (ii) the passive lemma has to compete with the active lemma, which has a lower activation threshold. These two factors may impede the successful selection of the passive lemma. At positional processing in the grammatical encoder, problems may arise during lexical retrieval because (iii) the passive lexeme has to compete with the active lexeme, which has a lower activation threshold; and (iv) the noncanonical subcategorisation information and the noncanonical argument-function mapping information specified in the target passive lemma require that the SUBJ slot be filled with the patient argument during positional processing in the grammatical encoder; this operation is in itself also marked.

The nonconicity of the passive voice and the associated processing difficulties mean that learners whose processing capacities are limited either fall short and produce ungrammatical sentences, or they may adopt avoidance or compensatory strategies to bypass passives and preserve the intended proposition in their L2 utterences.

3.4 Processability Theory

Earlier studies on the acquisition of word order such as the Morpheme Studies (Dulay & Burt, 1974), the Natural Order Hypothesis in the Monitor Theory (Krashen, 1982) and PT’s precursor, ZISA’s Multidimensional Model (Clahsen, Meisel, & Pienemann, 1983) confirmed that L2 learners acquire L2 syntactical order in a set sequence regardless of their L1. However, all of the previous studies failed in providing an adequate explanation as to why learners’ L2 develop in such an orderly fashion. Pienemann’s (1998) Processability Theory was based on Levelt’s (1989) speech production model, particularly the formulator component of the model. It strove to provide an explanation to account for this phenomenon based on a psychologically plausible speech processing model.
The Processability Theory hypothesises that in second language acquisition, learners acquire L2 morphological and syntactical constructions in a predictable and verifiable order. PT hypothesises that the L2 learner’s language processing procedures form a hierarchical set of stages in which the acquisition of the lower level procedure is the prerequisite for acquiring the next procedure up the hierarchy (Pienemann, 1998). This means that by assessing the L2 learner’s developmental status, i.e. to which stage of procedure the learner has attained by accumulating all the processing prerequisites prior to this stage, the learner’s morpho-syntactic course of development may be predicted and determined based on the morpho-syntactic encoding procedures already acquired.

The grammatical engine of PT, as I mentioned, is the Lexical-Functional Grammar. LFG (Kaplan & Bresnan, 1982; Bresnan, 2001) is a lexical feature-unification based theory of grammar. It also offers a psychologically plausible process that explains how speakers arrive at morpho-syntactically correct utterances by means of a lexically driven grammar (Pienemann, 1998). LFG is a grammatical framework that has been extensively tried and tested against an array of diverse languages. It is also lexically driven, hence compatible with Levelt’s model. These make LFG very attractive as a theory of grammar which PT may adopt as its grammatical formalism.

The underlying assumption of PT is the psychological constraints on L2 learners’ ability to process language output. As learners become more proficient with a language processing routine, tasks involving it become less psychologically demanding for learners and are more automatised, thus freeing up the learners’ cognitive resources to move on to acquiring the next set of routines on the L2 developmental trajectory. PT incorporates the processing theory with the linguistic theory in an attempt to predict the acquisitional sequence of the processing routines or procedures in a given L2 (Pienemann, 1998).

In speech generation, grammatical encoding proceeds in an incremental fashion in the formulator. In Levelt’s (1989) model, Levelt followed Kempen and Hoenkamp’s (1987) Incremental Procedural Grammar in proposing that grammatical encoding is activated in the formulator in the following sequence:
I will illustrate the incremental processing routines using the example sentence *Jane loves that cat*. As soon as the preverbal message enters into the formulator, the formulator first activates the lemma access procedure to retrieve the appropriate lemma as per the preverbal message, e.g. *cat*. The lemma of *cat* specifies that the lexical category of *cat* is N(oun). The category N then activates the noun phrase (NP) procedure, which determines whether it would access any additional modifier to assemble a noun phrase, in this case the demonstrative *that* for the NP *that cat*. Note that the NUM(ber) value of the head noun *cat* and the modifier *that* are both “singular”; the value of the two lemmas is initially stored at the category procedure memory buffer and they must be unified by the NP phrasal procedure as the noun phrase is assembled. Next, the phrase assembled has to be assigned a grammatical function and be integrated into the rest of the sentence. The phrasal procedures need to be attached to the S(entence)-node, allowing the S(entence)-procedure to determine the grammatical function of the phrases, i.e. whether *that dog* would be mapped to NP_{SUBJ}, NP_{OBJ}, etc. The values of the phrases are stored in the memory buffer of the S-procedure to allow feature unification. For example, the NUM(ber) and PER(son) values of *Jane* are stored in the S-procedure until the 3rd-person singular -s inflection is added to the verb *love*. The S-procedure then verifies that the NUM and PER features of NP_{SUBJ} and VP are congruent. The S-procedure is also known as the inter-phrasal procedure, as it coordinates grammatical information across phrasal boundaries. Finally, the subordinate procedure is activated if so required. An example of an instance of the subordinate procedure is the sentence *I wonder why Jane loved the car*. The features of the matrix clause *I wonder* must unify with the subordinate clause *why Jane loved the car* to ensure that the subordinate clause does not appear in the regular order *why did Jane love the car* as though it was a matrix clause.
These processing procedures encapsulated in the formulator form the processing hierarchy that underlies PT. In de Bot’s (1992) adaptation of Levelt’s model to L2, he hypothesised that there would be one formulator for each language. PT follows de Bot (1992) in claiming that learners will need to acquire their own L2 mental lexicon as well as build language-specific procedures in the language-specific formulator to handle L2. Since L1 proceeds in this hierarchical and incremental order, the predicative power of this hierarchy for L2 acquisition is that learners also build, acquire and process L2 in the same hierarchical order.

Table 3.1
*Processing procedures applied to English L2 morphology (see Pienemann, 2005).*

<table>
<thead>
<tr>
<th>Stages</th>
<th>Processing procedure</th>
<th>L2 Process</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>S-Procedure</td>
<td>Subj-Verb agreement</td>
<td>Mary showers everyday. She reads newspapers in the morning.</td>
</tr>
<tr>
<td>4</td>
<td>VP-Procedure</td>
<td>VP agreement</td>
<td>I can swim. We are eating.</td>
</tr>
<tr>
<td>3</td>
<td>NP-Procedure</td>
<td>NP agreement</td>
<td>Look! two flowers. Mary have five books.</td>
</tr>
<tr>
<td>2</td>
<td>Category Procedure</td>
<td>Form variation</td>
<td>I going home. Cars very good.</td>
</tr>
<tr>
<td>1</td>
<td>Word/Lemma</td>
<td>Single words, formula</td>
<td>How are you? School.</td>
</tr>
</tbody>
</table>

Table 3.2
*Processing procedures applied to English L2 syntax (see Pienemann, 2005).*

<table>
<thead>
<tr>
<th>Stages</th>
<th>Processing procedure</th>
<th>L2 Process</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Subordinate clause Procedure</td>
<td>Cancel inversion, Tag questions</td>
<td>I wonder why Jane loves it. Do you know where he works? Mary doesn’t like it, does she?</td>
</tr>
<tr>
<td>5</td>
<td>S-Procedure</td>
<td>Aux-2\textsuperscript{nd}</td>
<td>What does Bob do every morning? Where can I buy some flowers?</td>
</tr>
<tr>
<td>4</td>
<td>AUX+SVO</td>
<td>Yes/No question Aux+SVO</td>
<td>Is Mary a reporter? Can you give food to the dog?</td>
</tr>
<tr>
<td>3</td>
<td>ADJ+SVO Do-Front</td>
<td>WH+SVO Adv+SVO</td>
<td>Why you have this pen? Do he going home?</td>
</tr>
<tr>
<td>2</td>
<td>Canonical order</td>
<td>Canonical SVO(?)</td>
<td>I like Sydney. You like cats?</td>
</tr>
<tr>
<td>1</td>
<td>Word/Lemma</td>
<td>Single words, formula</td>
<td>How are you? School.</td>
</tr>
</tbody>
</table>
The hierarchical order of the speech processing procedures in (78) and hence in Table 3.1 is implicational, i.e. the acquisition of the higher stage entails the accumulative acquisition of all of the lower stages. In other words, in order to acquire a procedure located on the hierarchy, learners would need to have acquired the procedures in the stages below it. Therefore, the key to determining if a grammatical construction is processable is whether the exchange of grammatical information involved in the construction in question is handled by a procedure that a learner has acquired. Pienemann (1998, p. 7) explained it this way:

A word needs to be added to the target language lexicon before its grammatical category can be assigned. The grammatical category of a lemma (i.e. certain semantic and grammatical aspects of a word) is needed before a category procedure can be called. Only if the grammatical category of the head of a phrase is assigned can the phrasal procedure be called. Only if the phrasal procedure has been completed and its value is returned can the function of the phrase (subject, object etc.) be determined. Only if the function of the phrase has been determined can it be attached to the S-node and sentential information be stored in the sentence procedure.

Processability Theory has been tested for several typologically different languages as L2, such as Scandinavian languages (Glahn, et al., 2001), German (Pienemann, 1998; Sayehli, 2001; Håkansson, Pienemann, & Sayehli, 2002), Swedish (Pienemann & Håkansson, 1999), Serbian bilingual first acquisition (Medojević, 2009), Arabic (Mansouri, 1997, 2002, 2005), Spanish (Taylor, 2004), Turkish (Özdemir, 2004), Italian (Di Biase, 2002; Di Biase & Kawaguchi, 2002; Kawaguchi & Di Biase, 2005), Japanese (Kawaguchi, 2002, 2005; Kawaguchi & Di Biase, 2005), and Chinese (Zhang, 2001, 2002, 2004; Gao, 2005). The empirical evidence from these tests supports the cross-linguistic application of the Processability Theory.

3.5 Extending Processability Theory

As mentioned at the outset of this thesis, native speakers have at their disposal different linguistic options with which they may attribute prominence to a particular entity in their narrative. They may do so by (i) prosodic means, (ii) by mapping the entity to the sentence subject, or (iii) by placing the entity in the sentence-initial position (Levelt, 1989, pp. 260ff.).
The formalisation of grammaticised discourse functions and the Lexical Mapping Theory module in the recently revised architecture of LFG (Bresnan, 2001) incorporate a discourse-pragmatic aspect into this lexicalist grammar, thus allowing PT to expand in parallel with it. A new dimension was introduced to PT (Pienemann, Di Biase, & Kawaguchi, 2005) by extending PT beyond its original scope of six developmental stages of morpho-syntactic constructions. The current version extends PT’s coverage from the acquisition of obligatory morpho-syntax to non-obligatory, “speaker-induced discourse-pragmatic choices” available in the L2 (Di Biase, 2005), such as the means of attributing prominence mentioned by Levelt as mentioned in (i) and (ii) above.

The current PT proposes three hypotheses, namely the Unmarked Alignment Hypothesis (UAH), the Lexical Mapping Hypothesis (LMH) and the Topic Hypothesis (TopH). UAH explains the initial syntax in L2 acquisition and serves as the basis for the other two hypotheses. LMH and TopH explain learners’ developmental trajectories from initial, canonical to more advanced L2 syntax.

**Unmarked Aligned Hypothesis** states the following:

In second language acquisition learners will initially organise 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)
UAH explains learners’ initial syntax. It states that learners will initially adopt the canonical word order and the canonical mapping of semantic roles onto grammatical functions in organising their syntax because (a) it is the least processing-intensive means of syntax organisation (Pinker, 1984; see also Sasaki, 1998); and (b) the unmarked order is context-neutral, that is, the phrase structure in the default word order is generated while not being under any discourse-context influence (Choi, 1999). UAH predicts that early L2 learners will initially be constrained by their rudimentary L2 procedural skills to produce only the unmarked, canonical word order and canonical argument-function mapping. Early learners lack the syntactic procedural skills to produce constructions that involve either linearly or functionally noncanonical alignments.

Occasionally, learners may wish to assign prominence to entities other than the agent of a sentence out of discourse-pragmatic concerns. The ability to manipulate syntax and morphological markings in harmony with the contextual orientations will contribute to more effective communication. Attendance to secondary meanings such as discourse-pragmatics, however, depends on learners having become relatively proficient in L2 and having largely proceduralised aspects of language processing such as phonology and lexical access (Kasper & Rose, 2002; Segalowitz, 2003).
In this regard, concerning the processing costs and the processability of structures involving noncanonical argument-function mapping, the **Lexical Mapping Hypothesis** states the following:

L2 learners initially map the most prominent onto SUBJ and gradually learn how to attribute prominence to a particular thematic role, e.g., promoting the patient (rather than the agent) role to SUBJ, first in single clauses such as in Passive constructions and later in complex predicates such as Causative constructions. (Kawaguchi & Di Biase, 2005)

Following LFG’s Lexical Mapping Theory (Bresnan, 2001), PT’s Lexical Mapping Hypothesis predicts that L2 learners would initially map the most prominent semantic role of a-structure, which according to the Thematic Hierarchy in (42) is the agent, onto the grammatical function located at the top end of the Relational Hierarchy, which according to (43) is the SUBJ. As noted under UAH, this is the least processing-intensive argument-function alignment. This being the alignment of the highest elements of two scales or hierarchies is also the “harmonic alignment” in Optimality Theory terms (Prince & Smolensky, 1993/2002, p. 149). This alignment leads to utterances in the active voice. Passive constructions require learners to promote the patient, the second least prominent role on the Thematic Hierarchy, to the SUBJ. Structures such as passives that require learners to depart from the canonical mapping and violate the harmonic alignment carry additional processing costs; LMT predicts that their acquisition is constrained by their processability and will take place at a much later developmental stage.

The promotion of the patient and the demotion of the agent in the example sentence *Mark kicked the dog* is illustrated below:

\[
\begin{array}{c|c|c|c}
\text{Agent} & \text{Patient} & \text{VERB} & \text{OBJ} \\
\text{SUBJ} & \text{OBJ} & \text{OBJ} & \text{OBJ} \\
\text{Mark} & \text{kicked} & \text{the dog.} & \\
\end{array}
\]
In the active sentence (65a), *kick* requires two arguments at conception, “x” and “y”, corresponding to agent and patient. The agent is mapped to the subject and the patient to the object. In the passive sentence in (65b), the ontologically less prominent patient is mapped to the most prominent grammatical SUBJ. The ontologically more prominent agent is demoted and is optionally realised as the ontologically least prominent ADJAGENT. Structures of this type of noncanonical mapping are more complex, as they involve linguistic non-linearity as formalised in Lexical Mapping Theory (Bresnan & Kanerva, 1989; Bresnan, 2001), which make them beyond the processing capacity of less proficient learners.

Another means of attributing prominence syntactically is to topicalise an entity by placing it in the ontologically most prominent sentence-initial position. Concerning this type of non-linearity, the **Topic Hypothesis** states the following:

> 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)

In LFG, the relationship between grammatical functions and discourse functions are formalised, as shown in (66) following Bresnan (2001) and Di Biase and Kawaguchi (2006):
The discourse functions TOPIC and FOCUS are grammaticised in LFG (Bresnan, 2001). The SUBJ is unique in that it is both a core argument and a grammaticised discourse function. The SUBJ is taken as the default topic in LFG (Bresnan, 2001).

<table>
<thead>
<tr>
<th>(67a)</th>
<th>Agent</th>
<th>Patient</th>
<th>(thematic role)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOP</td>
<td>VERB</td>
<td>OBJ</td>
<td>(grammatical function)</td>
</tr>
<tr>
<td>Mark</td>
<td>broke</td>
<td>the window.</td>
<td>(constituent structure)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(67b)</th>
<th>Agent</th>
<th>VERB</th>
<th>Patient</th>
<th>(thematic role)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOP</td>
<td>SUBJ</td>
<td>VERB</td>
<td>OBJ</td>
<td>(grammatical function)</td>
</tr>
<tr>
<td>Yesterday</td>
<td>Mark</td>
<td>broke</td>
<td>the window.</td>
<td>(constituent structure)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(67c)</th>
<th>Patient</th>
<th>Agent</th>
<th>(Patient)</th>
<th>(thematic role)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOP</td>
<td>SUBJ</td>
<td>VERB</td>
<td>(OBJ)</td>
<td>(grammatical function)</td>
</tr>
<tr>
<td>The window,</td>
<td>Mark</td>
<td>broke</td>
<td>(the window)</td>
<td>(constituent structure)</td>
</tr>
</tbody>
</table>

The canonical structure is where the sentence topic position is occupied by the SUBJ, therefore according to the Topic Hypothesis, learners do not initially differentiate between SUBJ and TOP; SUBJ is taken as the sentential TOP, as in (67a). At the
next phase, learners learn to assign the discourse function TOP to ADJ and non-core arguments (e.g. 67b), gradually extending the elements to which the TOP function is assigned to include core arguments such as (67c).

The structural complexities and processing difficulties of topicalised sentences lie firstly in the separation of the SUBJ as the default sentence TOP and secondly in the disruption of linear SVO word order, both as stipulated in the Unmarked Alignment Hypothesis (Figure 3.7).

Finally, Pienemann (1998) in the original PT and later with colleagues (Pienemann, Di Biase, Kawaguchi, & Håkansson, 2005) also proposed a processability based hypothesis of L1 transfer, namely the Developmentally Moderated Transfer Hypothesis (DMTH). It claims that learners do not transfer L1 grammatical features to their L2 at the initial state, providing that the L1 features in question are located higher up the processability hierarchy. When learners develop the processing prerequisites corresponding to the ones necessary for the said L1 features, those features may then transfer across to the learners L2.

The extended PT (Pienemann, Di Biase, & Kawaguchi, 2005) proposes that the key predictive factor lies with learners’ processing capacity, i.e. whether learners have the necessary processing resources for a given morpho-syntactic or a discourse-pragmatic structural choice. I have provided a brief description on how LMH and TopH are concerned with learners’ capacity to employ noncanonical alignments between the three levels of representation, namely the a-to f- and c-to f- structures. While my thesis is primarily concerned with Lexical Mapping Hypothesis, this section has illustrated PT’s accounting for speaker-induced discourse-pragmatic choices; the passive constructions under discussion are only but one type of the various structural choices available to learners.

### 3.6 Summary of Chapter 3

Chapter 3 firstly presented two architectural bases of the Processability Theory, starting with Levelt’s psycholinguistic model of speech production and its extensions, followed by Lexical-Functional Grammar and the Lexical Mapping Theory module
within it. I then illustrated the flow from Conceptualisation to Formulation of producing a passive sentence by native English speakers and English L2 learners. The chapter then proceeded to provide a review of the theoretical framework of my thesis, namely the original version and the current extended version of Processability Theory (Pienemann, 1998; Pienemann, Di Biase, & Kawaguchi, 2005), a psychologically plausible, processing constraint-based theory of SLA.
Chapter 4
Research Questions and Methodology

In the previous chapter, I showed that recent developments in LFG’s Lexical Mapping Theory and in PT have formalised the processing of discourse-pragmatic structures, thereby providing the theoretical apparatus for investigations into the development of optional discourse-pragmatic structures in non-beginners of L2. The objective of my thesis is to investigate learners’ development of various English passive constructions to see (i) whether there is a relationship between their L2 development of passives and morpho-syntax; and (ii) whether there is indeed a subset of structural choices both within and in addition to the passive voice category that form a developmental path. The thesis further investigates whether professional language training such as tertiary level interpreting and translation (hereafter I&T) training leads to more accelerated development of English passives compared to general tertiary level academic training conducted in English.

4.1 Research Questions and Hypotheses

The six research questions are:

(Q1) Are passive constructions more difficult for English L2 learners to process than active constructions?

(Q2) Is there a relationship between learners’ L2 morpho-syntactic development and their acquisition of L2 passives?

(Q3) Among learners who have acquired the inter-phrasal procedure, do they show differential performance in passive-eliciting tasks of different degrees of cognitive demand?
(Q4) When learners do not produce passive constructions contrary to the contextual orientations, what alternative strategies, if any, do they adopt to process the same discourse-pragmatic information?

(Q5) Is there a passive-specific developmental path?

(Q6) Does tertiary level Interpreting and Translation training accelerate development of noncanonical mapping of L2 passives compared to other tertiary level non-interpreting and translation training?

The hypotheses are numbered to correspond to the research questions which they will address. Each hypothesis is presented along with its theoretical motivations or assumptions.

For Research Question (Q1):

Hypothesis 1A: (null hypothesis) Learners across all L2 proficiency levels will require the same amount of time in initiating active and passive constructions.

Hypothesis 1B: Passives will require more effort to process than actives. The gap between the time required to produce passives and actives will be wider for less proficient learners than for more proficient learners.

I take the latency time taken by informants to initiate an utterance (Speech Onset Latency: SOL) as the measure of processing costs in their generation of actives and passives. An informant’s latency time to the onset of uttering NP1 is an appropriate variable to measure processing difficulty because a series of on-line speech production and syntactic priming studies have shown that English (head-first, SVO) and Japanese (head-last, SOV) speakers alike dedicate more processing resources to NP1 than to the remainder of the sentence (Smith & Wheeldon, 1999, 2001; Martin, Miller, & Vu, 2004; Allum & Wheeldon, 2007). Additionally, it was found in a
series of picture naming studies that English speakers initiate processing of verbs prior to speech onset, and the processing of partial information of the verb in fact delays reaction time in sentence initiation (Lindsley, 1975, 1976). This means that when the lexical items are empirically controlled in an experiment (i.e. the colours and *fish* in Tomlin’s *FishFilm*), any difference in latency in narrating agent/patient-cued trials will reflect primarily the difference in a combination of processing argument role assignment to NP1 and processing the argument-function mapping information of the verbs. Since passives require noncanonical argument-function mapping, I hypothesise that the extra processing costs for passives as measured in the latency time to NP1 stems from two sources: (i) informants devote additional executive resources in selectively attending the cued patient while inhibiting the urge to habitually and canonically map the agent to the subject (see Grossman & White-Devine, 1998; Grossman & Rhee, 2001); and (ii) informants process lower frequency passive predicates whose lemma contain noncanonical argument-function mapping information (Lindsley, 1975, 1976). In particular, as I argued in Section 2.5.5, the effects of inhibiting canonical mapping will be more pronounced in L2 learners than natives, more pronounced in less proficient than more proficient learners. Since L2 speech places greater working memory demands on learners than on natives, less proficient learners are inefficient in temporary L2 information storage and retrieval in their working memory, their executive functions such as selective attention and inhibition of L2 speech is also reduced. As more elements of L2 speech become proceduralised and automatised, learners’ working memory and executive functions become more robust, they rely less on operations carried out in their declarative memory, leading to reduced speech onset latencies and more fluent L2 speech (Gathercole & Baddeley, 1993; Baddeley, 2003; also compare with Paradis, 2004).

For Research Question (Q2):

*Hypothesis 2A: Since passive constructions have the word order of SV(X), Mandarin L1 learners who have acquired the canonical SVO word order will also be able to produce passive constructions.*

For (Q2), two hypotheses are theoretically possible. As noted in Section 2.8.2, since passive constructions shares the same c-structure SV(X) order as the active
construction, this allows for the possibility of Hypothesis 2A, which predicts that once learners acquire the canonical SVO order, producing the c-structure comparable passive construction will require no more processing effort than producing the active construction.

**Hypothesis 2B:** Since the passive involves noncanonical mapping of argument roles onto grammatical functions, English passive constructions will emerge only in Mandarin L1 learners who have acquired functional assignment and the inter-phrasal S-procedure.

The original PT (Pienemann, 1998) provided a framework to consider L2 development in terms of feature unification in learners’ morpho-syntax. Lexical-Functional Grammar’s formalisation of grammaticised discourse functions TOP and FOC allows the current PT (Pienemann, Di Biase, & Kawaguchi, 2005) to propose a developmental trajectory for learners’ processing of discourse-pragmatic information in L2. In terms of syntactic well-formedness of passives, learners need inter-phrasal feature unification to support their correct production of subject-verb agreement and passive morphology. Nevertheless, since the processing of grammatical information and discourse-pragmatic information are two parallel developmental hierarchies, there is no direct reciprocal relationship between grammatical feature unification and the noncanonical patient-SUBJ or patient-TOP functional assignment of optional discourse-pragmatic structures (Di Biase & Kawaguchi, forthcoming). I predict that learners need to have acquired the inter-phrasal S-procedure, i.e. features belonging to either Stage 5 of Morphology (3rd-person singular -s inflection) or to Stage 5 of Syntax (WH + Aux + SUBJ), before they can produce passives. However, learners who have acquired the inter-phrasal procedure do not necessarily have the capacity to produce passives.

For Research Question (Q3):

**Hypothesis 3:** Given the same amount of time, learners who produce passives in a task that requires greater cognitive load will be able to produce passives in a task that requires less cognitive load, but not vice-versa.
Kawaguchi and Zhang (2007) found that among the Japanese L2 learners who had acquired the inter-phrasal procedure, some could produce passives only in the off-line storytelling task, while others could produce passives in the off-line task as well as the on-line FishFilm task. They suggested that this could be due to the different level of cognitive demands required in processing passives on-line and off-line. When processing L2 in the off-line, self-paced manner, learners who relied much on the less efficient declarative memory could still process L2 passives. However, the same learners could not do the same under time constraints in the on-line FishFilm task. Following Kawaguchi and Zhang (2007), I predict in Hypothesis 3 that learners who can produce L2 passives on-line can further be differentiated into those who can produce passives only in low-demand on-line tasks and those who can produce passives in low- and high-demand on-line tasks.

For Research Question (Q4):

*Hypothesis 4: In on-line tasks where the context is conducive to producing the passive construction, learners will employ other less costly alternative strategies to cope with the noncanonical mapping of patient-to-subject cuing.*

Speakers have numerous structural means to express the discourse topic and focus (Levelt, 1989). In L2 learners, however, the dynamic nature of information flow in ongoing discourse means that learners’ structural implementation of discourse-pragmatics is constrained by their limited L2 processing capacities. Constraints in processing capacities will thus mean that learners will attempt to respect the discourse-pragmatic demand by means of other less processing-intensive structural means. On these bases, Hypothesis 4 predicts that early learners will resort to other strategies within the constraints of their processing capacity to cope with the contextual cuing that is incongruent with the canonical mapping.

For Research Question (Q5):
Hypothesis 5A: Learners will acquire agentless passives before agentive passives.

Studies in English L1 acquisition have found that of the few spontaneous passives by children, almost all of them are agentless passives (e.g. Harwood, 1959; Beilin & Sack, 1975; Horgan, 1976). Agentless passives are precursors to agentive passives in typically developing and SLI children’s L1 language development (Israel, et al., 2000; Pearson & Roeper, 2004). However, the situation with adult L2 learners is unclear. PT’s Unmarked Alignment Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005) makes the following prediction concerning the a- to f-structural alignment involved in agentless/adjectival passives in SLA:

\[\text{given that it is the suppression of the agent role that creates nonlinear a- to f-structure mapping, the absence of suppression mechanisms allows for canonical mapping in predicative adjectives and stative passives in interlanguage English. This implies that the corresponding syntactic structures conform to the Unmarked Alignment Hypothesis. In other words, these (stative) passive constructions yield canonical order (i.e. SV(X)) at c-structure level. This makes them similar to some English adjectival constructions….Given the canonical mapping process inherent in [adjectival passive] structures….the Unmarked Alignment Hypothesis predicts that learners of English as a second language may be able to produce these structures at an early stage. (Pienemann, Di Biase, & Kawaguchi, 2005, p. 242, italic theirs)}\]

The developmental order of agentless passives in SLA is yet to be determined. Hypothesis 5A is an attempt to close this gap. Following on PT’s Unmarked Alignment Hypothesis, I predict that agentless passives, which are structurally less complex than agentive passives and involve canonical mapping, will emerge in learners before agentive passives.

Hypothesis 5B: Learners will more likely produce a passive when an event is adversative to the semantic patient than when it is not.

Conceptual accessibility has been found to be a crucial factor in speech processing; the more conceptually accessible an entity is, the easier it is for a speaker to process it (Bock & Warren, 1985; Bock & Levelt, 1994). In adversative passives, adversity is tied to the notion of conceptual accessibility in the sense of a direct, transparent, and
individuated relationship between meaning and its linguistic form (DeKeyser, 2005). Hearing that someone is kicked envotes a clearer imagery and is more easily delimited in one’s mind than hearing that someone is missed. In light of this, I hypothesise that learners’ acquisition of adversative passives will precede that of non-adversative passives.

**Hypothesis 5C:** Learners will not differ in their performance in producing theme-subject and goal-subject passives involving ditransitive verbs.

There has been virtually no research done on the acquisition of the passivisation of datives in English (O’Grady, 1977, unpublished but a brief summary is found in O’Grady, 1997, pp. 213-214; Roeper, et al., 1981; Dehé & Comes, 2006). In terms of the dative alternation in active voice, numerous researchers have pointed out the crucial role that information structure plays in choosing one object alternation over the other in ditransitive constructions in the active voice, i.e. given information precedes new information (Givón, 1984a, 1988; Thompson, 1990; Collins, 1995; Levin, 2006). However, the exact nature of the processing of passivised datives in SLA remains unclear. I hypothesise that Mandarin L1 learners of English L2 will not initially employ word order alternations in ditransitive passives to mark information status. The ability to alternate between theme-subject passives (e.g. *The book was given to Tom by Anna*) and goal-subject passives (e.g. *Tom was given the book by Anna*) in accordance with the discourse-pragmatic context, comes as learners’ L2 advances and their processing capacity increases to the point where they can syntactically attribute prominence to a particular entity in line with the contextual disposition.

For Research Question (Q6):

**Hypothesis 6:** Two semesters of tertiary level I&T training will accelerate the development of noncanonical mapping of L2 passives compared to 2 semesters of tertiary level non-I&T training delivered in English.
The reason for choosing trainee I&T practitioners as a special group of informants is the fact that I&T practitioners who are acquired bilinguals working between their L1 and an L2 are by definition L2 learners who function in their native language and L2 interlanguage (Campbell, 1998).

The inclusion of grammaticised discourse functions TOP and FOC in Lexical-Functional Grammar and subsequently in PT provides a framework of inquiry into higher-end, advanced optional structures of learners’ syntax-pragmatics interface. From a teachability perspective (Pienemann, 1984, 1998), L2 training that focuses on formal properties which are processable to learners will accelerate acquisition. The principle can be extended to L2 training that focuses on the functional-pragmatic properties of L2 language use. Professional language training such as tertiary level interpreting and translation training is one such form of specialised training. I&T training involves focusing on L2 strategic language use and the decoding/encoding of pragmatic information between the working languages. For example, it is critical for interpreters to maintain the pragmalinguistic force of exchanges in a courtroom interpreting setting (Hale, 2007). Part of the aim of specialised I&T training is to highlight the expression of pragmatic force through the informed, strategic use of language. In this sense, it can be regarded as a type of focus-on-function L2 language training.

I hypothesise that two semesters of specialised I&T training will accelerate advanced learners’ acquisition of passives compared to two semesters of non-I&T tertiary academic training delivered in English.

4.2 Research Methodology

In the previous chapter, I put forward six research questions and several corresponding research hypotheses on the acquisition of various passive constructions by Mandarin L1 learners of English L2. In order to test these hypotheses, I conducted two studies:

1. A cross-sectional study with ESL learners of various L2 proficiency levels in Australia, as well with a group of tertiary
educated EFL learners in Taiwan.

2. A longitudinal study of the pretest/posttest design with two groups of advanced learners: students enrolled in the Master of Interpreting and Translation (MA I&T) program and students enrolled in other postgraduate level non-I&T programs at University of Western Sydney.

The cross-sectional study will provide answers to (Q1), (Q2), (Q4) and (Q5); the longitudinal study will provide the answer to (Q6).

(Q1) Are passive constructions more difficult for English L2 learners to process than active constructions?

(Q2) Is there a relationship between learners’ L2 morpho-syntactic development and their acquisition of L2 passives?

(Q3) Among learners who have acquired the inter-phrasal procedure, do they show differential performance in passive-eliciting tasks of different degrees of cognitive demand?

(Q4) When learners do not produce passive constructions contrary to the contextual orientations, what alternative strategies, if any, do they adopt to process the same discourse-pragmatic information?

(Q5) Is there a passive-specific developmental path?

(Q6) Does tertiary level Interpreting and Translation training accelerate development of noncanonical mapping of L2 passives compared to other tertiary level non-interpreting and translation training?

The results of these studies are discussed in Chapter 5. The current chapter is organised as follows: Section 4.3 provides the setting of the studies, including the participants, the data type, the tasks and the apparatus used, and the method of data
collection and transcription. Section 4.4 discusses the methods of quantitative and qualitative data analysis adopted. Section 4.5 finally sums up the chapter.

4.3 Method of Data Collection

4.3.1 Tasks and Informants

*Cross-sectional Study*

Fifteen students enrolled in the Master of Interpreting and Translation program and 13 students enrolled in various postgraduate-level, non-I&T programs at University of Western Sydney were recruited to form the Advanced Level Learner group in the study. (See Table 4.1 for advanced learners’ academic majors and IELTS levels) The results of informants IT01 and NT05 were later excluded because IT01 came to Australia at 11 years of age and NT05 later reported that her performance of the tasks was compromised due to her uncorrected poor eyesight.
Table 4.1

Summary of educational background, IELTS scores and PT stages of Advanced Level Learners in cross-sectional study.

<table>
<thead>
<tr>
<th>Informant No.</th>
<th>Postgraduate Course (In progress)</th>
<th>Undergraduate (Completed)</th>
<th>IELTS Band</th>
<th>PT Stage(^8) (Syn/Morph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT01</td>
<td>I&amp;T</td>
<td>Business</td>
<td>-</td>
<td>6/5</td>
</tr>
<tr>
<td>IT02</td>
<td>I&amp;T</td>
<td>English</td>
<td>6.5</td>
<td>5/5</td>
</tr>
<tr>
<td>IT03</td>
<td>I&amp;T</td>
<td>Advertising</td>
<td>7.0</td>
<td>5/5</td>
</tr>
<tr>
<td>IT04</td>
<td>I&amp;T</td>
<td>English</td>
<td>6.5</td>
<td>6/5</td>
</tr>
<tr>
<td>IT05</td>
<td>I&amp;T</td>
<td>English</td>
<td>6.5</td>
<td>5/5</td>
</tr>
<tr>
<td>IT06</td>
<td>I&amp;T</td>
<td>Applied Linguistics</td>
<td>7.5</td>
<td>(6)/5</td>
</tr>
<tr>
<td>IT07</td>
<td>I&amp;T</td>
<td>English</td>
<td>7.0</td>
<td>(6)/5</td>
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<tr>
<td>IT08</td>
<td>I&amp;T</td>
<td>English Literature</td>
<td>7.0</td>
<td>6/5</td>
</tr>
<tr>
<td>IT09</td>
<td>I&amp;T</td>
<td>English</td>
<td>6.5</td>
<td>(6)/5</td>
</tr>
<tr>
<td>IT10</td>
<td>I&amp;T</td>
<td>English</td>
<td>7.0</td>
<td>(6)/5</td>
</tr>
<tr>
<td>IT11</td>
<td>I&amp;T</td>
<td>Linguistics</td>
<td>7.5</td>
<td>6/5</td>
</tr>
<tr>
<td>IT12</td>
<td>I&amp;T</td>
<td>English</td>
<td>7.5</td>
<td>6/5</td>
</tr>
<tr>
<td>IT13</td>
<td>I&amp;T</td>
<td>Linguistics</td>
<td>5.5</td>
<td>5/5</td>
</tr>
<tr>
<td>IT14</td>
<td>I&amp;T</td>
<td>Civil Engineering</td>
<td>7.0</td>
<td>5/5</td>
</tr>
<tr>
<td>IT15</td>
<td>I&amp;T</td>
<td>English</td>
<td>6.5</td>
<td>(6)/5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Informant No.</th>
<th>Postgraduate Course (In progress)</th>
<th>Undergraduate (Completed)</th>
<th>IELTS Band</th>
<th>PT Stage(^8) (Syn/Morph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT01</td>
<td>Nursing</td>
<td>Nursing</td>
<td>5.5</td>
<td>5/5</td>
</tr>
<tr>
<td>NT02</td>
<td>Accounting</td>
<td>Accounting</td>
<td>6.5</td>
<td>6/5</td>
</tr>
<tr>
<td>NT03</td>
<td>Cultural Studies</td>
<td>Cultural Studies / English</td>
<td>-</td>
<td>6/5</td>
</tr>
<tr>
<td>NT04</td>
<td>Accounting</td>
<td>Information System</td>
<td>5.5</td>
<td>(5)/5</td>
</tr>
<tr>
<td>NT05</td>
<td>Communications</td>
<td>Film and Media</td>
<td>6.0</td>
<td>5/5</td>
</tr>
<tr>
<td>NT06</td>
<td>Nursing</td>
<td>Nursing</td>
<td>6.0</td>
<td>5/5</td>
</tr>
<tr>
<td>NT07</td>
<td>Nursing</td>
<td>Nursing</td>
<td>5.5</td>
<td>5/4</td>
</tr>
<tr>
<td>NT08</td>
<td>Nursing</td>
<td>Nursing</td>
<td>6.0</td>
<td>5/5</td>
</tr>
<tr>
<td>NT09</td>
<td>Nursing</td>
<td>Nursing</td>
<td>6.0</td>
<td>5/5</td>
</tr>
<tr>
<td>NT10</td>
<td>Nursing</td>
<td>Nursing</td>
<td>6.0</td>
<td>5/4</td>
</tr>
<tr>
<td>NT11</td>
<td>Accounting</td>
<td>Accounting</td>
<td>5.5</td>
<td>6/5</td>
</tr>
<tr>
<td>NT12</td>
<td>Accounting</td>
<td>Law</td>
<td>5.5</td>
<td>6/5</td>
</tr>
<tr>
<td>NT13</td>
<td>Nursing</td>
<td>Nursing</td>
<td>6.5</td>
<td>5/5</td>
</tr>
</tbody>
</table>

In addition, five students enrolled in the Certificate I level ESOL course (English for

\(^8\) Informants were assessed on their L2 morpho-syntax PT stages by means of the tasks specified in subsection (a) of Section 4.3.2 and results provided here. Where the PT stage of an informant is noted in brackets, it indicates that structures were supplied for the stage but there was insufficient evidence in the elicited data to satisfy the emergence criterion (see Section 4.4.1) to claim acquisition of processing procedures of the particular PT stage.
Speakers of Other Languages), 10 students enrolled at the Certificate II level and five students enrolled at the Certificate III level were recruited to form the Low Level Learner group in the study (Table 4.2). A total of 46 learners serving as L2 informants and nine tertiary educated English native speakers serving as control participated in this study.

Table 4.2
Summary of ESOL level, educational background and PT stages of Low Level Learners in cross-sectional study.

<table>
<thead>
<tr>
<th>Informant No.</th>
<th>ESOL Certificate (In progress)</th>
<th>Highest Education</th>
<th>PT Stage(^8) (Syn/Morph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE01</td>
<td>I</td>
<td>Year 12</td>
<td>(5)/4</td>
</tr>
<tr>
<td>BE02</td>
<td>I</td>
<td>College</td>
<td>3/(4)</td>
</tr>
<tr>
<td>BE03</td>
<td>I</td>
<td>Junior College</td>
<td>5/(5)</td>
</tr>
<tr>
<td>BE04</td>
<td>I</td>
<td>Year 12</td>
<td>5/(5)</td>
</tr>
<tr>
<td>BE05</td>
<td>I</td>
<td>Junior College</td>
<td>(3)/(4)</td>
</tr>
<tr>
<td>CE01</td>
<td>II</td>
<td>Year 12</td>
<td>5/(5)</td>
</tr>
<tr>
<td>CE02</td>
<td>II</td>
<td>Year 12</td>
<td>5/(5)</td>
</tr>
<tr>
<td>CE03</td>
<td>II</td>
<td>College</td>
<td>5/5</td>
</tr>
<tr>
<td>CE04</td>
<td>II</td>
<td>Year 9</td>
<td>(6)/5</td>
</tr>
<tr>
<td>CE05</td>
<td>II</td>
<td>Year 12</td>
<td>5/4</td>
</tr>
<tr>
<td>CE06</td>
<td>II</td>
<td>Undergraduate</td>
<td>(6)/5</td>
</tr>
<tr>
<td>CE07</td>
<td>II</td>
<td>College</td>
<td>5/5</td>
</tr>
<tr>
<td>CE08</td>
<td>II</td>
<td>College</td>
<td>5/5</td>
</tr>
<tr>
<td>CE09</td>
<td>II</td>
<td>Year 12</td>
<td>5/5</td>
</tr>
<tr>
<td>CE10</td>
<td>II</td>
<td>Year 12</td>
<td>(5)/(5)</td>
</tr>
<tr>
<td>CL01</td>
<td>III</td>
<td>Year 12</td>
<td>5/5</td>
</tr>
<tr>
<td>CL02</td>
<td>III</td>
<td>Undergraduate</td>
<td>5/5</td>
</tr>
<tr>
<td>CL03</td>
<td>III</td>
<td>Undergraduate</td>
<td>5/5</td>
</tr>
<tr>
<td>CL04</td>
<td>III</td>
<td>Undergraduate</td>
<td>5/5</td>
</tr>
<tr>
<td>CL05</td>
<td>III</td>
<td>Undergraduate</td>
<td>5/5</td>
</tr>
</tbody>
</table>

Thirty-seven learners of various EFL proficiency levels were recruited in Taiwan in this study (Table 4.3). Among the 37 informants, 31 were recruited from the City Campus of Soochow University and seven were recruited as a result of their responding to an advertised invitation of participation. All of the EFL learners reported that they had never studied or lived in English speaking countries. Four informants (TW01, TW09, TW32, TW35) in the EFL Group had secondary education as their highest education level. These four informants were later excluded from the study so that the EFL Group consisted of tertiary educated informants, allowing for more relevant comparisons to be drawn between the Taiwan EFL Group and the Australian tertiary level ESL groups. All of the informants in this study had
had at least six years of formal EFL classroom instruction at the time of participation. The informants in Australia received AUD$10 and the informants in Taiwan received NT$150 for their participation.

Table 4.3
**Summary of educational background, length of EFL instruction received and PT stages of EFL informants in cross-sectional study.**

<table>
<thead>
<tr>
<th>Informant No.</th>
<th>Highest Education</th>
<th>No. of Years of EFL Instruction</th>
<th>PT Stage&lt;sup&gt;8&lt;/sup&gt; (Syn/Morph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TW01</td>
<td>Year-12</td>
<td>6</td>
<td>5/4</td>
</tr>
<tr>
<td>TW02</td>
<td>Undergraduate</td>
<td>7</td>
<td>5/4</td>
</tr>
<tr>
<td>TW03</td>
<td>Undergraduate</td>
<td>12</td>
<td>5/5</td>
</tr>
<tr>
<td>TW04</td>
<td>Undergraduate</td>
<td>10</td>
<td>5/4</td>
</tr>
<tr>
<td>TW05</td>
<td>Undergraduate</td>
<td>7</td>
<td>5/4</td>
</tr>
<tr>
<td>TW06</td>
<td>Undergraduate</td>
<td>11</td>
<td>5/4</td>
</tr>
<tr>
<td>TW07</td>
<td>Undergraduate</td>
<td>9</td>
<td>5/5</td>
</tr>
<tr>
<td>TW08</td>
<td>Undergraduate</td>
<td>12</td>
<td>5/5</td>
</tr>
<tr>
<td>TW09</td>
<td>Year-9</td>
<td>3</td>
<td>5/4</td>
</tr>
<tr>
<td>TW10</td>
<td>Postgraduate</td>
<td>14</td>
<td>5/5</td>
</tr>
<tr>
<td>TW11</td>
<td>Undergraduate</td>
<td>8</td>
<td>5/4</td>
</tr>
<tr>
<td>TW12</td>
<td>Undergraduate</td>
<td>7</td>
<td>5/4</td>
</tr>
<tr>
<td>TW13</td>
<td>Undergraduate</td>
<td>8</td>
<td>5/4</td>
</tr>
<tr>
<td>TW14</td>
<td>Undergraduate</td>
<td>11</td>
<td>5/5</td>
</tr>
<tr>
<td>TW15</td>
<td>Undergraduate</td>
<td>12</td>
<td>5/4</td>
</tr>
<tr>
<td>TW16</td>
<td>Undergraduate</td>
<td>10</td>
<td>5/5</td>
</tr>
<tr>
<td>TW17</td>
<td>Undergraduate</td>
<td>13</td>
<td>5/5</td>
</tr>
<tr>
<td>TW18</td>
<td>Undergraduate</td>
<td>8</td>
<td>5/4</td>
</tr>
<tr>
<td>TW19</td>
<td>Undergraduate</td>
<td>10</td>
<td>3/5</td>
</tr>
<tr>
<td>TW20</td>
<td>Undergraduate</td>
<td>15</td>
<td>5/5</td>
</tr>
<tr>
<td>TW21</td>
<td>Undergraduate</td>
<td>15</td>
<td>5/5</td>
</tr>
<tr>
<td>TW22</td>
<td>Undergraduate</td>
<td>10</td>
<td>5/5</td>
</tr>
<tr>
<td>TW23</td>
<td>Postgraduate</td>
<td>20</td>
<td>(6)/5</td>
</tr>
<tr>
<td>TW24</td>
<td>Undergraduate</td>
<td>7</td>
<td>5/4</td>
</tr>
<tr>
<td>TW25</td>
<td>Undergraduate</td>
<td>8</td>
<td>5/5</td>
</tr>
<tr>
<td>TW26</td>
<td>Postgraduate</td>
<td>8</td>
<td>5/(5)</td>
</tr>
<tr>
<td>TW27</td>
<td>Undergraduate</td>
<td>9</td>
<td>(6)/5</td>
</tr>
<tr>
<td>TW28</td>
<td>Undergraduate</td>
<td>6</td>
<td>5/5</td>
</tr>
<tr>
<td>TW29</td>
<td>Undergraduate</td>
<td>8</td>
<td>5/(5)</td>
</tr>
<tr>
<td>TW30</td>
<td>Undergraduate</td>
<td>9</td>
<td>5/4</td>
</tr>
<tr>
<td>TW31</td>
<td>Undergraduate</td>
<td>11</td>
<td>5/5</td>
</tr>
<tr>
<td>TW32</td>
<td>Year-12</td>
<td>6</td>
<td>4/2</td>
</tr>
<tr>
<td>TW33</td>
<td>Undergraduate</td>
<td>8</td>
<td>5/4</td>
</tr>
<tr>
<td>TW34</td>
<td>Undergraduate</td>
<td>15</td>
<td>(5)/5</td>
</tr>
<tr>
<td>TW35</td>
<td>Year-12</td>
<td>8</td>
<td>5/5</td>
</tr>
<tr>
<td>TW36</td>
<td>Undergraduate</td>
<td>10</td>
<td>5/5</td>
</tr>
<tr>
<td>TW37</td>
<td>Undergraduate</td>
<td>10</td>
<td>5/5</td>
</tr>
</tbody>
</table>

*Pretest/Posttest Study*

The same 28 University of Western Sydney students from the Advanced Level Learner Group of the cross-sectional study (Table 4.1) also participated in a one
teaching-year longitudinal study. A three-session, pretest/posttest design was employed in the study. Session 1, the pre-treatment session, took place in March 2008. Session 2, the during-treatment session, took place in July 2008. Session 3, the post-treatment session, took place in November 2008. All 28 informants took part in all three data collection sessions.

4.3.2 Data Elicitation Procedure

As my thesis focuses on the spontaneous, on-line spoken production of L2 learners, the data are limited to spoken speech data I collected in one-on-one data elicitation sessions with the informants.

Table 4.4
Overview of speech elicitation tasks.

<table>
<thead>
<tr>
<th>Task</th>
<th>Time Constraint</th>
<th>Elicited Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitual Actions (<em>Amy</em>)</td>
<td>Self-paced</td>
<td>3rd Person Singular -s</td>
</tr>
<tr>
<td>Story Completion (<em>Bob</em>)</td>
<td>Self-paced</td>
<td>WH-questions</td>
</tr>
<tr>
<td>Slideshow</td>
<td>On-line</td>
<td>Passives</td>
</tr>
<tr>
<td>FishFilm</td>
<td>On-line</td>
<td>Passives</td>
</tr>
</tbody>
</table>

Picture Tasks

Informants were first assessed for their L2 development of morpho-syntax using the PT hierarchy proposed for English L2 (Pienemann, 2005). To this end, two picture-based communicative tasks of approximately 10 minutes were administered to each informant. Following Pienemann’s “Habitual Actions” and “Story Completion” tasks (Pienemann, 1998, p. 280), two sets of pictures entitled A Day in the Life of Amy (Habitual Actions) and Bob and His Customers (Story Completion) (see Appendix A) were used in this section to target respectively the subject-verb 3rd-person singular -s inflection, a Stage 5 feature (morphology), and WH + AUX +SUBJ syntax, a Stage 5 feature (syntax). The Day in the Life of Amy picture set depicts the daily routine of a girl named Amy. With the Amy picture set, informants were asked to look at each of the pictures and describe to the interviewer what Amy does everyday. The Bob and His Customers picture set is a short comic strip. The pictures in the Bob picture set were designed to be vague and cryptic. Informants were encouraged to ask the interviewer questions in relation to each of the pictures presented to help them
explore the storyline behind the comic strip. Informants were encouraged to ask WH questions so as to receive answers that were more substantial than simply Yes or No. In determining the PT stages of informants, I relied on the implicational nature of the PT developmental hierarchy, which has been well-established. The implicational nature of the hierarchy means that the acquisition of a feature located at a particular stage implies the acquisition of the L2 procedures located at the lower stages (Pienemann, 1998, 2002, 2003). Therefore I took the operative production of a Stage 5 syntactic feature, for example, as the basis for assuming that the learner had successfully acquired the syntactic processing procedures of Stages 1-4.

The habitual actions and story completion tasks were used to establish the learners’ state of L2 development within the PT hierarchy. The conventional speech elicitation tasks used in PT, such as spot-the-difference picture tasks have been shown to be effective in eliciting obligatory morpho-syntactic features (Pienemann, 1998). They are however less effective in eliciting optional linguistic constructions such as passives and topicalisations. To this end, I employed two computer-based speech elicitation tasks designed to elicit passive constructions in a more controlled and empirically manipulable way (Tomlin, 1995; K. Wang, 2008). The computer-based tasks also ensured the on-line nature of the elicited L2 speech data.

**Slideshow Task**

The Slideshow was a 9-minute computer-based on-line speech elicitation task which I designed to target various active and passive constructions involving different verbs and thematic relations (see Appendix B) (K. Wang, 2008). The slideshow task was presented on a Dell Inspiron 6400 laptop computer with Windows XP (Home Edition Service Pack 2), Intel Core 2 Duo CPU 1.73 GHz, 2 GB of RAM and a 15.4-inch monitor. The task was displayed and controlled on the computer using version 3.2.5.1 of the DisplayMaster with DirectX (DMDX) software (Foster & Foster, 2003; Foster, 2007). The Slideshow contained a self-paced task instruction in Chinese at the start of the task, followed by four practice trials and then 40 trials. Each trial began with either a black and white picture or a simple black and white animation visual stimulus depicting a simple event involving one, two or three entities. Each

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9 The native English controls were given the same self-paced task instruction in English.
trial lasted for 9000 ms. from the onset of the visual stimulus. The visual stimulus appeared on the computer screen for approximately 2500 ms., after which the screen turned white and stayed so until the full 9000 ms. expired. At the conclusion of the 9000 ms., the screen turned red for 1000 ms., followed by the onset of the next trial. Details of the visual stimuli are included in Table 4.5.

Prior to the commencement of the task, informants were first run through a list of vocabulary items which they would likely need for the task. However, I stressed to them that vocabulary was not the focus of the study and that they could freely substitute words they did not know with other words so long as the core meaning was conveyed. A hypothetical example given to the informants to illustrate the point was that it was equally acceptable for the purpose of the study to say *A man tapped a girl* in describing a visual stimulus depicting a teacher shaking hands with a student.

Informants were given explicit instruction both verbally by the investigator prior to the commencement of the task, and visually on the computer screen in a self-paced manner at the commencement of the task. The instruction was given verbally and on the computer screen in the informants/controls’ L1. In each visual stimulus, one of the entities in the event was in colour, the rest in black and white (e.g. *A picture showing a teacher, coloured in blue, shaking hands with a student, drawn in black and white*). The instruction explicitly directed informants to keep their eyes on the coloured entity and focus on it at all times. Informants were instructed to describe in one sentence what was happening with the coloured entity as depicted in the slide as quickly as possible upon stimulus onset. They were told that the colour was purely for their visual perception and there was no need to mention any colour in their verbal description. I also informed them that since I was most interested in knowing what was happening with the coloured entity, they were to begin their sentence with the coloured entity. The saliency extrinsically endowed to a particular entity in an event through the manipulation of colour (Horgan, 1976; Lempert, 1984), along with the researcher’s explicit instruction to the informants, helped to create a dynamic and coercive extra-linguistic context condition that would incline informants to produce the active or the passive construction when the agent or the patient (or the theme/goal in a ditransitive event) was coloured respectively. The instruction directed the informants to stop their verbal description and get ready for the next trial when the
screen changed from white to red, as the red screen indicated the conclusion of a trial. This effectively created a time constraint of 9000 ms. from the stimulus onset, within which time the informants had to formulate and produce a full sentence description. Placing informants under time constraints ensures the on-line nature of L2 processing, which the task aims to achieve. The task was scripted in DMDX to play in full randomisation of the order of presentation of trials. The following table shows the properties of the visual stimuli:
Table 4.5
Details of visual stimuli used in Slideshow task. See also Appendix B.

<table>
<thead>
<tr>
<th>No.</th>
<th>Transitivity</th>
<th>Role of coloured entity</th>
<th>Target structure</th>
<th>Adversity</th>
<th>Agent ADJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>T</td>
<td>Agent</td>
<td>The girl was feeding the cat</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>P2</td>
<td>T</td>
<td>Patient</td>
<td>The dog was fed by the boy</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>P3</td>
<td>T</td>
<td>Agent</td>
<td>The man was feeding the birds</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>P4</td>
<td>D</td>
<td>Theme</td>
<td>The bone was fed to the dog by the man</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>1</td>
<td>T</td>
<td>Patient</td>
<td>The car was towed by the truck</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>T</td>
<td>Patient</td>
<td>The bird was shot</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>D</td>
<td>Theme</td>
<td>The credit card was given to the doctor</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>Theme</td>
<td>The gift was given to the girl</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>T</td>
<td>Patient</td>
<td>The church was struck by lightning</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>T</td>
<td>Patient</td>
<td>The boy was hit by the ball</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>T</td>
<td>Agent</td>
<td>The man was chasing the butterfly</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>D</td>
<td>Agent</td>
<td>The waitress was serving the man some tea</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>T</td>
<td>Agent</td>
<td>The lady was painting the room</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>T</td>
<td>Patient</td>
<td>The boy was licked by the dog</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td>T</td>
<td>Patient</td>
<td>The girl was kissed by the boy</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>T</td>
<td>Patient</td>
<td>The girl was pushed by the boy</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td>T</td>
<td>Agent</td>
<td>The girl was pulling the toy duck</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14</td>
<td>T</td>
<td>Patient</td>
<td>The cat was patted by the girl</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td>T</td>
<td>Patient</td>
<td>The cat was held by the lady</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>16</td>
<td>T</td>
<td>Patient</td>
<td>The mouse was chased by the cat</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>17</td>
<td>T</td>
<td>Agent</td>
<td>The cowboy was shooting the policeman</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>18</td>
<td>T</td>
<td>Agent</td>
<td>The man was patting the dog</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>19</td>
<td>T</td>
<td>Agent</td>
<td>The girl was licking the ice cream</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>20</td>
<td>T</td>
<td>Patient</td>
<td>The father was holding the baby</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>21</td>
<td>T</td>
<td>Patient</td>
<td>The man was hit by a bicycle</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>T</td>
<td>Agent</td>
<td>The lady was pushing the trolley</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>23</td>
<td>T</td>
<td>Agent</td>
<td>The man was playing baseball</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>24</td>
<td>T</td>
<td>Patient</td>
<td>The fence was painted by the woman</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>25</td>
<td>T</td>
<td>Patient</td>
<td>The bottle was broken by the ball</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>26</td>
<td>T</td>
<td>Agent</td>
<td>The ball broke the window</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>27</td>
<td>T</td>
<td>Agent</td>
<td>The man is kissing the woman</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>28</td>
<td>D</td>
<td>Agent</td>
<td>The man was giving a gift to the boy</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>29</td>
<td>D</td>
<td>Goal</td>
<td>The lady was given some flowers by the man</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>30</td>
<td>D</td>
<td>Theme</td>
<td>The gift is given to the lady by the man</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>31</td>
<td>D</td>
<td>Theme</td>
<td>The banana was given to the doctor by the monkey</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>32</td>
<td>D</td>
<td>Goal</td>
<td>The monkey was given some flowers</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>33</td>
<td>T</td>
<td>Patient</td>
<td>The keys were dropped</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>34</td>
<td>T/AP</td>
<td>Patient</td>
<td>The boy was hurt</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>35</td>
<td>T/AP</td>
<td>Patient</td>
<td>The pencil was broken</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>36</td>
<td>D</td>
<td>Goal</td>
<td>The man was served some tea by the</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Transitivity is used here in a general sense, referring to the transitivity status of the verb of the trial in its infinitive form. This is unrelated to the passive voice’s function of detransitivisation (Givón, 1984b, 1994).
Each trial is marked for the transitivity of the verb, the semantic role of the coloured entity, and in cases of passives whether the trials indicate adversity and whether the stimuli include the agent, which can potentially be realised as the sentence adjunct.

With regards to the selection of the target ditransitive verbs, several issues were taken into account in determining their suitability for the purpose of the current study. Firstly, not all ditransitive verbs participate in object alternation. According to Pinker (1989a) the three types of constraints to object alternation in English are: (1) phonological/etymological restrictions (e.g. compare build and its Latinate equivalent construct in Peter built Mary a house and *Peter constructed Mary a house), possession/animacy restrictions (e.g. compare Peter sent Mary a parcel and #Peter sent the wharf a parcel) semantic property restrictions (e.g. compare Peter told Mary the story and *Peter whisper Mary the story). There may also be subtle semantic differences between the two alternative forms, e.g. in Peter taught the students Greek and Peter taught Greek to the students, the former suggests that the students successfully learned at least some Greek, whereas such suggestion is not necessary in the latter (Gropen, Pinker, Hollander, Goldberg, & Wilson, 1989; Gropen, Pinker, Hollander, & Goldberg, 1991; Goldberg, 1992, 1995). Moreover, lexical biases of specific verbs may show a disproportionate predisposition for one ordering over the other (Wasow, 1997; Wasow & Arnold, 2003), and the frequency of a subcategorisation of a verb may create a bias in sentence comprehension and disambiguation (Jennings, Randall, & Tyler, 1997; Traxler, 2002, 2005).

In light of these circumstances, it was necessary to select ditransitive verbs that could be used to ascertain the informants’ ability to form the passive form of either the double object construction or the prepositional object construction without the informants being unduly constrained or biased by the specific verbs. To this end, I chose the verb give for the following reasons: (1) it is the most frequently occurring ditransitive verb (Goldberg, 1995); (2) it is the most prototypical member of the category of genuine ditransitive verbs, which carry “an underlying proposition denoting an event type in which a provided entity is transferred to an affected entity”.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>D</td>
<td>The cat was given a fish</td>
</tr>
<tr>
<td>38</td>
<td>T</td>
<td>The lightning struck a tree</td>
</tr>
<tr>
<td>39</td>
<td>T</td>
<td>The doctor was shot</td>
</tr>
<tr>
<td>40</td>
<td>T/AP</td>
<td>The arm was broken</td>
</tr>
</tbody>
</table>

\(T=\text{Transitive}, \ D=\text{Ditransitive}, \ AP=\text{Adjectival Passive}, \ ADJ=\text{Adjunct}\)
or X causing Y to have Z (Mukherjee, 2005, p. 12; see also Goldberg, 1995; Pinker, 1989a, 1989b); (3) the subtle semantic differences between the alternating constructions are largely neutralised with give (Goldberg, 1995); (4) the choice between the alternating constructions of give is largely determined by discourse-pragmatic factors (Levin, 2006, 2008; Rappaport Hovav & Levin, 2008); (5) evidence from the International Corpus of English (British Component) shows comparable distributions of the two alternating passive constructions of give, i.e. the Goal-SUBJ form (e.g. Mary was given the book) and the Theme-SUBJ form (e.g. The book was given to Mary) account for 9% and 10.2% respectively of the total number of tokens for the verb give (Mukherjee, 2005, p. 114).

In addition, I also selected serve as a target ditransitive verb. Serve is unique in that it is a monotransitive verb that can be optionally ditransitive (contrast The coffee was served; The customer was served vs. The money was given; *The shopkeeper was given) (Dowty, 1978, 1991). This inherent flexibility of serve makes it a good candidate for the ditransitive trials of the current study.

**FishFilm**

*FishFilm*11 (Tomlin, 1995, 2002) is a 4.6-minute computer-based on-line speech elicitation task targeting the active-passive alternation using the verb *eat* and the noun *fish*. The *FishFilm* task was discussed in detail in Section 2.4.6 (see also Appendix B). It visually manipulates speakers’ focal attention to create a dynamic context that favours either the active or passive construction. It has been demonstrated to reliably incline native English speakers to give narratives using the simple passive construction (Tomlin, 1995, 1997). The *FishFilm* paradigm was first applied to SLA in K. Wang’s (2006) preliminary study and has since been applied in other SLA studies of English L2 (Zhang, 2007a; Keatinge & Keßler, 2009), Chinese L2 and Japanese L2 (Kawaguchi & Zhang, 2007; Kawaguchi & Di Biase, forthcoming) and English-Serbian bilingual first children (Medojević, 2007, in preparation). The animation clip was chosen as the third task to be administered to

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11 Expressed consent to use the *FishFilm* clip for research purposes is given on Tomlin’s website, which states: “The Fish Film is copyrighted: © 2002-04 Russell S. Tomlin, though I am pleased for anyone to use the film in support of basic research in linguistics, psychology, and related disciplines.” (Tomlin, 2006)
informants. Informants on the *FishFilm* task were instructed to keep their eyes on the fish with an arrow on it and to pay particular attention to it, as the investigator was most interested in what would happen to the fish. Informants were asked to describe what happened to the fish with an arrow on it as soon as it became known to the informants. In this task, no explicit instruction was given to require informants to commence the sentence with the arrowed fish, however a potential habituation effect spilled over from the instruction for the preceding *Slideshow* task to commence sentences with the cued entity could be present in the *FishFilm* task.

In both the *Slideshow* and the *FishFilm*, informants were exposed to two attention-capturing cues, one exogenous (the coloured entity and the flashing arrow in the respective tasks) and the other endogenous (explicit instruction to pay close attention to the visually cued entity, as well as the instruction to start the sentence with the coloured entity in the *Slideshow* task) (Posner, 1980). The two cues together create a coercive pragmatic context that inclines the informants to make the cued entities the starting point of their sentences.

In terms of the degree of demand of the on-line tasks on informants, firstly the time constraint of *FishFilm* and *Slideshow* was similar. In *FishFilm*, the duration between the dynamic event of one trial and the next trial was approximately 9 seconds; in *Slideshow*, the duration of the white screen following the brief presentation of each visual stimulus was also 9 seconds. Secondly, *FishFilm* and *Slideshow* did differ in the amount of cognitive load they placed on informants, notwithstanding that both were on-line tasks. In *FishFilm*, the action (eating) and the event participants (fish) remained constant and the syntactic structures involved were the alternating simple active and simple passive. This meant that once the required set of lexical items were accessed, informants could reuse the same lexical items and the two alternate structural patterns throughout the task, leading to potential structural and lexical priming effects. The repetitiveness of *FishFilm* made it a relatively light cognitive load task. Conversely, the *Slideshow* was a heavy cognitive load task in a number of aspects: (1) every trial depicted a different action and different event participants, which required informants to dynamically access sets of lexical items to respond to the stimuli; (2) randomisation further ensured that the trials were non-predictable and minimise priming; (3) as the *Slideshow* depicted actives, agentless passives, agentive
transitives and ditransitives, informants needed to consider and decide among more than just two alternating structures; and (4) the Slideshow placed a greater demand on informants’ visuospatial short-term memory. Unlike the FishFilm, which displayed the event participants on the screen throughout the nine seconds of a trial, the visual stimulus of each trial in the Slideshow remained on the screen for only 2–3 seconds before the screen cleared. Once the screen cleared, the stimulus was no longer available for informants to refer to; they had to retrieve the information from their visuospatial short-term memory. In Baddeley’s (1986, 2007) model of working memory, the visuospatial short-term memory and the phonological short-term memory are separate and independent memory stores that involve different systems. However, there have been reports suggesting that the two systems share many characteristics, and that taxing one’s visuospatial working memory disrupts one’s performance in verbal serial recall tasks (Jones, Farrand, Stuart, & Morris, 1995; Farrand & Jones, 1996). I assume therefore that the need to retrieve information from the visuospatial short-term memory when doing the Slideshow was an additional demand on informants’ cognitive resources; the demand contributed to the overall greater load of Slideshow compared to FishFilm.

Pretest/Posttest Study
The advanced learners were invited after the data collection session for the cross-sectional study to two more follow-up sessions. The Slideshow and FishFilm tasks were administered to the informants in Session 2 and 3 in the same manner as they were in Session 1. Informant NT11’s data were excluded in the pretest/posttest study due to a technical malfunction in Session 2 that resulted in loss of audio signal in the recording.

4.3.3 Audio Recording of Sessions
Informants’ oral responses were digitally recorded on the laptop computer in the MP3 format. Additionally, DMDX was also configured to record responses in the WAV format. For the FishFilm task, the stereo input for the MP3 recording was split into two separate channels: informants’ oral responses were fed into the right channel and the audio beep signals accompanying the dynamic event (see Section 2.4.6) were fed into the left channel, thus allowing for more precise determination of reaction times to stimuli. Each data collection session lasted between 30 to 50 minutes. The
audio recording of the sessions was then transcribed by the researcher. Di Biase’s (2000) transcription convention was followed in transcribing the data collected.

4.4 Method of Data Analysis

4.4.1 Acquisition Criterion

The determination of acquisition criteria is fundamental in SLA. It is central to the replicating and empirically falsifying of hypotheses in language acquisition (Jansen, 2000). Studies in the PT framework have traditionally placed emphasis on the emergence of grammatical features as the indicator of learners’ development of L2 morpho-syntax (Pienemann, 1998; Jansen, 2002; Zhang, 2003). Under the PT framework, “emergence” is defined from a speech processing perspective as “the point in time at which certain skills have, in principle, been attained or at which certain operations can, in principle, be carried out” (Pienemann, 1998, p. 138). Di Biase and Kawaguchi further pointed out that emergence is determined when the distributional analysis displays “a productive application of the rule in appropriate contexts. This excludes echoic and formulaic applications by demanding that the rule is supplied more than once in lexically and structurally varied environments” (Di Biase & Kawaguchi, 2002, pp. 287-288). The emergence of a certain L2 operation marks the beginning of its acquisition process, i.e. their advancement towards the native norm in the target language. Since PT is concerned with learners’ ability to process L2 grammatical features that require certain L2 procedural skills, not learners’ degree of proficiency in doing so, emergence is the preferred acquisition criterion over mastery, as it focuses on learners’ capability of L2 processing at a given moment while avoiding the arbitrariness of setting a specific percentage benchmark in defining mastery. Pienemann (1998) and Pallotti (2007) both proposed accepting three sources of evidence in determining emergence: minimal pairs or evidence of structural variation (e.g. having *dog* and *dogs* in the data), lexical variation (e.g. having *ten dogs* and *ten cats* in the data), and overgeneralisation (e.g. *those child*<s>s</s>, indicating the procedure for plural -s marking, although applied incorrectly in this instance, is nonetheless operational in the learner’s L2). Following Pienemann (1998), the current study adopts emergence as the acquisition criterion for obligatory L2 morpho-syntax.
4.4.2 Qualitative and Quantitative Analyses

The current study adopts a combination of qualitative and quantitative approaches (Larsen-Freeman & Long, 1991), which is commonly used in SLA studies (Chaudron, 2003). The research questions introduced in the previous chapter are repeated here:

(Q1) Are passive constructions more difficult for English L2 learners to process than active constructions?

(Q2) Is there a relationship between learners’ L2 morpho-syntactic development and their acquisition of L2 passives?

(Q3) Among learners who have acquired the inter-phrasal procedure, do they show differential performance in passive-eliciting tasks of different degrees of cognitive demand?

(Q4) When learners do not produce the passive construction contrary to the contextual orientations, what alternative strategies, if any, do they adopt to process the same discourse-pragmatic information?

(Q5) Is there a passive-specific developmental path?

(Q6) Does tertiary level Interpreting and Translation training accelerate development of noncanonical mapping of L2 passives compared to other tertiary level non-interpreting and translation training?

In answering (Q1), (Q5) and (Q6), quantitative analyses of learners’ empirical data were undertaken and contrasts to the speech data of native speakers were drawn. For (Q2), (Q3) and (Q4), learners’ data were analysed qualitatively in order to identify and categorise the strategies learners adopted. Once learners’ alternative strategies were established, data were quantified to further determine if there was also a developmental sequence for the alternative strategies.
Obligatory Context

Distributional analysis arose out of the crucial nature of examining the obligatory contexts for a target structure in determining the emergence of the structure in question (Pienemann, 1998). This type of analysis better captures the logic and dynamics of learners’ interlanguage than simply going over learners’ errors. The notion of obligatory context works well for morphological inflections and obligatory word orders. There are however structures whose use may be optionally determined, the passive being one such structure. Various attempts have been made in the past to critically define or operationalise the discourse-pragmatic contexts for certain optional structures such as the passive structure and pronominal NPs (Tomlin, 1983; Tomlin & Pu, 1989; Tomlin, 1990; Pu, 1991; Tomlin, 1997). I propose using a modified version of the distributional analysis in answering (Q4) and (Q5), one that specifies the relationship between the unfolding discourse-pragmatic contexts and speakers’ structural choice in their narrative description of events. In view of the theoretical assumptions and motivations given in Section 4.3.2, as well as the corroborating results of the native English speaker controls, I shall deem the discourse-pragmatic contexts created by the two computer-based tasks as coercive enough to be treated in the same manner as obligatory contexts for the purpose of carrying out various distributional and statistical analyses of passive structures in learners’ interlanguage.

Measuring Speech Onset Latency

In testing Hypothesis 1A and 1B, I measured the SOL manually using the digital audio editing software Audacity (Mazzoni, 2006), as illustrated in Figure 4.1.
Speech onset latency is the time between the onset of the dynamic event of one fish swallowing the other fish as indicated by the onset of the beep signal and the onset of an informant’s response. The orange box shown in Figure 4.1 indicates the speech onset latency as graphically represented and measured in Audacity.

**Scoring Scheme**

Informants’ responses to the Slideshow and the FishFilm tasks were scored according to the following scheme. An informant scored a 3 when they mapped the cued entity of a trial to the subject and the utterance was in the target voice (e.g. *The boy was hit by the ball*). An informant scored a 2 when they mapped the cued entity to the subject but the utterance was not in the target voice (e.g. *The boy was playing baseball*). An informant scored a 1 when they map the non-cued entity to the subject and the utterance was semantically correct (e.g. *The ball hit the boy*). A score of 0 was awarded when an utterance was semantically incorrect (e.g. #*The boy hit the ball*; #*The ball was hit by the boy*).

I have adopted a number of quantitative measures, including frequency, proportion of occurrence in percentage, parametric statistical tests such as *t*-test and ANOVA (for reaction time and frequency data) and nonparametric statistical tests such as Friedman’s two-way ANOVA of rank test and Wilcoxon signed-rank test (for rank data in the pretest/posttest study).
4.5 Summary of Chapter 4

This chapter first presented the research questions and research hypotheses. It then described the methodology adopted in the thesis in answering the research questions and empirically testing the research hypotheses. A combination of quantitative and qualitative analyses were used for data analysis.
Chapter 5

Results and Discussion

In this chapter, I will discuss the results of the cross-sectional study of Mandarin L1 learners of ESL in Australia and EFL in Taiwan, and the results of the pretest/posttest study of postgraduate I&T and non-I&T students. Section 5.1 presents the statistical analysis of the processing costs for passive constructions as indicated in the reaction time or the speech onset latency time of the control group and the learner groups in the FishFilm task. Section 5.2 presents an overview of the informants’ English L2 morpho-syntactic performance in PT developmental stage terms and how it relates to their performance of passive constructions. Section 5.3 reports learners’ differential performance in processing passives in tasks of high and low cognitive demands. Section 5.4 provides a qualitative analysis of the alternative structures to passive constructions in the FishFilm and Slideshow tasks by the informants. This is then followed by a quantitative analysis of the informants’ speech data in Section 5.5. Section 5.6 provides statistical analyses of data from the pretest/posttest study. The first five sections correspond to the five research questions outlined in Section 4.1. Section 5.7 is an addendum in which I discuss the characteristics of learners’ use of the passive morphology. Finally, the chapter concludes with a general discussion in Section 5.8.

5.1 Processing Costs for Passives

I begin by considering the processing costs involved in processing active compared to passive constructions.

(Q1) Are passive constructions more difficult for English L2 learners to process than active constructions?

In carrying out the FishFilm task, I discovered that informants generally narrated in either of the following manners: (a) an informant remained silent and watched the trial unfold all the way until the dynamic event, and then proceeded with their
narrative (e.g. … [beep] The red fish was eaten by the blue fish); or (b) an informant began narrating as soon as the two fish appeared, usually uttering NP1, and paused for the dynamic event to take place, after which the informant then completed the sentence with either an active or a passive predicative VP (e.g. The red fish .. [beep] was eaten by the blue fish). Two informants switched between (a) and (b). Type (a) will hereafter be referred to as “Beep+S” and type (b) as “Beep+VP”, indicating whether it was the onset of a full sentence or only the VP that followed the beep. I will focus on Beep+S in this thesis for the following two reasons. Firstly, I had expected learners to give their narratives in the Beep+S manner; Beep+VP was the unexpected pattern. Secondly, data that conformed to the Beep+S pattern were most unambiguous and allowed for better analysis for the purpose of this study, whereas more confounding factors would contribute to the reaction time in the Beep+VP pattern. My initial prediction of the SOL for both patterns is that native speakers and learners would take longer when the patient was visually cued. This was borne out in the Beep+S pattern. Contrary to my prediction, data for Beep+VP revealed an opposite SOL pattern; native speakers and learners generally had shorter SOL when narrating patient-cued trials in Beep+VP compared to agent-cued trials. This is accounted for by the faster lexical retrieval of closed-class auxiliary verbs compared to open-class lexical verbs in the Beep+VP pattern. For a full discussion on the Beep+VP data, see Appendix C.

There are 16 agent-cued (active) trials and 16 patient-cued (passive) trials in the FishFilm, offering the informant 16 opportunities for narrating in the appropriate voice in either Type (a) or (b). Informants who produced less than eight valid and measureable SOL spans were excluded from this analysis. A measure of SOL span was considered valid when the narrative conformed to the Beep+S or Beep+VP criteria as set out in (a) or (b) above. An example of invalid and excluded measures of SOL would be where the informant guessed ahead of the dynamic event and began narrating ahead of the dynamic event. Another example is where an informant commenced narrating as soon as the two fish entered the screen, therefore working towards a Beep+VP, but became undecided between whether to call the cued fish a “white fish” or a “pale fish” and was distracted from the dynamic event. The informant was still backtracking on the white fish at the moment of the dynamic event, thus rendering the SOL of this Beep+VP invalid.
5.1.1 Beep+S Narratives

Table 5.1 shows the statistics for speech onset latencies of Beep+S narratives in *FishFilm* by proficiency group.

<table>
<thead>
<tr>
<th>Informant Group</th>
<th>Active (ms.)</th>
<th>Passive (ms.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control (n = 4)</strong></td>
<td><em>M</em> = 500, <em>SD</em> = 202</td>
<td><em>M</em> = 658, <em>SD</em> = 209</td>
</tr>
<tr>
<td><strong>Advanced Level Learners (n = 8)</strong></td>
<td><em>M</em> = 661, <em>SD</em> = 342</td>
<td><em>M</em> = 755, <em>SD</em> = 313</td>
</tr>
<tr>
<td><strong>Low Level Learners (n = 12)</strong></td>
<td><em>M</em> = 604, <em>SD</em> = 191</td>
<td><em>M</em> = 951, <em>SD</em> = 261</td>
</tr>
<tr>
<td><strong>EFL Learners (n = 13)</strong></td>
<td><em>M</em> = 618, <em>SD</em> = 220</td>
<td><em>M</em> = 849, <em>SD</em> = 203</td>
</tr>
</tbody>
</table>

![Figure 5.1](image-url) Mean speech onset latencies of Beep+S narratives in *FishFilm* by informant group as shown in Table 5.1.

The hypothesis being tested with the *FishFilm* is repeated here:

*Hypothesis 1B: Passives will require more effort to process than actives. The gap between the time required to produce passives and actives will be wider for less proficient learners than for more proficient learners.*

In narrating the *FishFilm*, under the agent-cued context condition, which disposed
informants to mapping the agent to the subject, both native speakers and learners were faster in initiating the utterance following the dynamic event. On the other hand, under the patient-cued context condition, which disposed informants to mapping the patient to the subject, the Control group and all of the learner groups were on average slower (generating longer SOL) in initiating the utterance following the dynamic event (Table 5.1).

Table 5.2
One-tailed paired t-test of difference in SOL between patient-cued/agent-cued trials in FishFilm by proficiency groups.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>t statistics</th>
<th>p</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>158.000</td>
<td>92.166</td>
<td>t(3) = 3.43</td>
<td>.021*</td>
<td>.554</td>
</tr>
<tr>
<td>Adv. Level</td>
<td>93.500</td>
<td>79.892</td>
<td>t(7) = 3.31</td>
<td>.006**</td>
<td>.284</td>
</tr>
<tr>
<td>EFL Group</td>
<td>230.923</td>
<td>148.247</td>
<td>t(12) = 5.62</td>
<td>&lt;.001**</td>
<td>1.091</td>
</tr>
<tr>
<td>Low Level</td>
<td>347.000</td>
<td>208.190</td>
<td>t(11) = 5.78</td>
<td>&lt;.001**</td>
<td>1.770</td>
</tr>
</tbody>
</table>

* Significance ≤ .05  ** Significance ≤ .01

A one-tailed paired t-test showed that the difference in SOL for patient-cued trials compared to agent-cued trials across all groups was significant (Table 5.2). Informants of every proficiency group took longer to initiate passive sentences than active sentences; I thereby reject the null hypothesis and Hypothesis 1B is supported.

A 2 (grammatical voices) x 4 (proficiency groups) mixed ANOVA was then conducted to compare the speech onset latencies of my native English speakers, advanced and low level ESL learners, and tertiary educated EFL learners. An analysis of variance revealed a main effect for the pragmatic voice orientation condition, $F(3, 33) = 52.361$, $p < .001$, but no significant difference in the mean speech onset latency between groups $F(3, 33) = .745$, $p = .533$. However, as is evident from Figure 5.1, the between-group difference in SOL was much larger for the patient-cued pragmatic condition than with agent-cued condition. The interaction between proficiency and grammatical voice was significant, $F(3, 33) = 4.545$, $p = .009$, $\eta^2_p = .613$. Moreover, the effect of the patient-cued condition on the delay in SOL, as measured by the effect size estimate, was more pronounced in Low Level learners (Cohen’s $d = 1.770$) than in Advanced Level learners (Cohen’s $d = .284$), further corroborating the finding that the contextual voice orientations interact with informants’ L2 proficiency levels.
To investigate further the main effect of contextual voice orientation found in the mixed ANOVA, a one-way ANOVA was run on the SOL of agent-cued pragmatic condition. The difference in the SOL in the agent-cued context pragmatic across informant groups was not significant, $F(3, 33) = .406, p = .75$. This eliminates the active construction as the source of the main effect.

![Figure 5.2](image)

*Figure 5.2. Mean difference in speech onset latencies under the agent-cued (active) and patient-cued (passive) context conditions.*

Table 5.3

*p*-value matrix of post hoc multiple pairwise comparisons (Fisher’s protected LSD) for speech onset latency difference of agent/patient-cued trials.

<table>
<thead>
<tr>
<th>Proficiency Groups</th>
<th>Control</th>
<th>Adv. Level</th>
<th>EFL Learners</th>
<th>Low Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>-</td>
<td>.506</td>
<td>.422</td>
<td>.044*</td>
</tr>
<tr>
<td>Adv. Level</td>
<td>.506</td>
<td>-</td>
<td>.060</td>
<td>.001**</td>
</tr>
<tr>
<td>EFL Learners</td>
<td>.422</td>
<td>.060</td>
<td>-</td>
<td>.073</td>
</tr>
<tr>
<td>Low Level</td>
<td>.044*</td>
<td>.001**</td>
<td>.073</td>
<td>-</td>
</tr>
</tbody>
</table>

* Significance ≤ .05  ** Significance ≤ .01

A second follow-up one-way ANOVA was conducted on the difference in SOL of active/passive trials (Figure 5.2) to determine the relationship between L2 proficiency and contextual voice orientation, i.e. active- or passive-eliciting conditions. It was found that the effect of different contextual voice orientation conditions differed significantly between proficiency groups, $F(3, 33) = 4.545, p$
\[ \eta_p^2 = .613 \text{.} \] A post hoc analysis using Fisher’s protected LSD (Table 5.3) indicated that the patient-cued context condition or passive oriented trials delayed the speech onset of low level learners (\( M = 347.333, SD = 208.190 \)) more than they did of the native speakers (\( M = 158, SD = 92.166 \)), of the advanced learners (\( M = 93.500, SD = 79.892 \)), and of the EFL learners, (\( M = 230.923, SD = 148.247 \)). The latter two groups of learners, however, did not differ significantly from the native speaker Control Group.

**5.1.1.1 Discussion**

Firstly, the results of data analyses from Table 5.1 suggested that there appeared to be no qualitative difference between the EFL group and the ESL groups, i.e. university educated informants in both learning contexts responded more slowly in passive than active trials. The effect of patient-cued context condition did not differ significantly between the EFL and ESL university educated learners (\( p = .060 \) of the EFL / Advanced Level Group pairwise comparison in Table 5.3). Furthermore, informants of various L2 proficiencies did not differ significantly in SOL in the agent-cued condition (\( F(3, 33) = .406, p = .75 \)). On the other hand, the significantly longer speech onset latency time for producing passives compared to actives in the Beep+S manner across all proficiency levels illustrates the extra processing costs inherent in producing passive constructions (Table 5.2).

From a lexicalist perspective, LFG’s Lexical Mapping Theory (Bresnan & McHombo, 1987; Bresnan, 2001), and its PT derivant Lexical Mapping Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005) propose the noncanonical patient-subject mapping as the origin of the extra processing costs associated with producing passives. Crucially, learners’ L2 proficiencies interact with the pragmatic voice orientation of the context such that the noncanonical mapping orientation of a context condition exerts a larger negative impact on less proficient learners than on more proficient learners in producing the discourse-pragmatically appropriate L2 structure. The non-significant finding in the Control / Advanced Learner Group pairwise comparison shows that as learners’ L2 proficiencies increase and become more native-like, the additional processing costs associated with passive constructions diminish accordingly. The reduction in the SOL of passives as learners’ L2 proficiencies increase reflects learners’ L2 development into more fluent,
more automatised speech. Once again, based on these results, I reject the null hypothesis and accept the alternative Hypothesis 1B.

5.2 Informants’ PT Stages of L2 Morpho-syntax and Passives

Research Question 2, repeated below, is concerned with the relationship between learners’ PT stages of L2 morpho-syntax and their acquisition of passive constructions:

(Q2) Is there a relationship between learners’ L2 morpho-syntactic development and their acquisition of L2 passives?

As noted in the methodology section, in determining informants’ PT developmental stages, the emergence criterion was adopted. Speech data elicited from informants in the free conversation and by means of the two picture-based tasks constituted the speech data against which the emergence criterion was applied to determine the informants’ PT stages of L2 morpho-syntax. A summary of the PT stages of the informants organised by group proficiency is shown in Table 5.4:

Table 5.4
Summary of informants’ PT stages of L2 morpho-syntax.

<table>
<thead>
<tr>
<th>Informant Group</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Level (n = 26)</td>
<td>0</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>Low Level (n = 20)</td>
<td>2</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>EFL Learners (n = 33)</td>
<td>0</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>Total (n = 79)</td>
<td>2</td>
<td>2</td>
<td>75</td>
</tr>
</tbody>
</table>

Seventy-five out of 79 informants reached the inter-phrasal stage in either L2 morphology or syntax, or both. The 4 informants who did not reach the inter-phrasal stage are shown in Table 5.5:

Table 5.5
Informants who did not acquire the inter-phrasal procedure.

<table>
<thead>
<tr>
<th>Informant</th>
<th>Syntax</th>
<th>Morphology</th>
<th>Agentive Passive</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE01</td>
<td>(5)</td>
<td>4</td>
<td>×</td>
</tr>
<tr>
<td>BE02</td>
<td>3</td>
<td>(4)</td>
<td>×</td>
</tr>
<tr>
<td>BE05</td>
<td>(3)</td>
<td>(4)</td>
<td>×</td>
</tr>
<tr>
<td>CE10</td>
<td>(5)</td>
<td>(5)</td>
<td>(√)</td>
</tr>
</tbody>
</table>
Where the PT stage of an informant is noted in brackets, it indicates that structures were supplied for the stage but there was insufficient evidence in the elicited data to satisfy the emergence criterion (see Section 4.4.1). Table 5.5 thus shows that learners at phrasal stage or below did not produce any passive construction. Stage 5 of the inter-phrasal procedure appears to coincide with the emergence of the passives.

5.2.1 Discussion

The valid range of L2 proficiencies examined in this study was limited, as all but four of my informants had already acquired the inter-phrasal procedure according to the emergence criterion. Therefore, my data do not allow me to make any conclusive claim with regards to any implicational relationship between lower stages of L2 morpho-syntax and passives. Table 5.5 appears to indicate that the inter-phrasal procedure located at PT Stage 5 is the prerequisite for processing passive constructions (Kawaguchi & Zhang, 2007; Keatinge & Keßler, 2009; Kawaguchi & Di Biase, forthcoming). It is however not a guarantee or a sure indicator of the acquisition of passives.

5.3 Passives in On-line Tasks of Different Cognitive Demands

Research Question 3 and Hypothesis 3, repeated below, are concerned with learners’ processing of passives in tasks of different cognitive loads:

(Q3) Among learners who have acquired the inter-phrasal procedure, do they show differential performance in passive-eliciting tasks of different degrees of cognitive demand?

*Hypothesis 3: Given the same amount of time, learners who produce passives in a task that requires greater cognitive load will be able to produce passives in a task that requires less cognitive load, but not vice-versa.*

Among learners who had acquired the inter-phrasal procedure, there was a range of performance of passive constructions in *FishFilm* and *Slideshow*, both within and between informants. Table 5.6 shows the summary of four categories of performance on agentive passives for *FishFilm* and *Slideshow* by selected learners who were representative of each category of performance.
Table 5.6  
*Examples of the range of abilities in producing passives in Slideshow and FishFilm by selected learners of the inter-phrasal stage.*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Informant</th>
<th>FishFilm (N=16)</th>
<th>Slideshow (N=22)</th>
<th>Remarks on Morphosyntax of Agentive Passives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Noncanonical Mapping (Non-Passives)</td>
<td>Agentless Passives</td>
<td></td>
</tr>
<tr>
<td>Canonical Mapping</td>
<td>1</td>
<td>CE02</td>
<td>0</td>
<td>0 0</td>
<td>1 2 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CE03</td>
<td>16</td>
<td>0 0</td>
<td>7 3 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CE05</td>
<td>15</td>
<td>0 0</td>
<td>2 3 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BE01</td>
<td>12</td>
<td>0 0</td>
<td>3 1 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BE03</td>
<td>16</td>
<td>0 0</td>
<td>3 1 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW19</td>
<td>12</td>
<td>1 0</td>
<td>15 4 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW25</td>
<td>15</td>
<td>0 0</td>
<td>2 3 0</td>
</tr>
<tr>
<td>FishFilm: No Verbal Passive</td>
<td>2</td>
<td>CE09</td>
<td>8</td>
<td>3 3</td>
<td>9 0 0</td>
</tr>
<tr>
<td>Slideshow: Agentless</td>
<td></td>
<td>BE04</td>
<td>0</td>
<td>4 11</td>
<td>4 3 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW30</td>
<td>0</td>
<td>2 12</td>
<td>1 4 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CE10</td>
<td>0</td>
<td>1 15</td>
<td>6 1 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CE01</td>
<td>0</td>
<td>0 14</td>
<td>1 3 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CE06</td>
<td>0</td>
<td>0 13</td>
<td>3 1 0</td>
</tr>
<tr>
<td>FishFilm: Training Effect</td>
<td>3</td>
<td>NT03</td>
<td>0</td>
<td>0 16</td>
<td>1 3 1</td>
</tr>
<tr>
<td>Slideshow: Agentless</td>
<td></td>
<td>TW05</td>
<td>0</td>
<td>0 16</td>
<td>2 1 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CL03</td>
<td>0</td>
<td>0 15</td>
<td>3 4 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW33</td>
<td>0</td>
<td>0 15</td>
<td>1 8 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NT04</td>
<td>0</td>
<td>0 16</td>
<td>1 8 13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT08</td>
<td>0</td>
<td>0 16</td>
<td>3 6 12</td>
</tr>
<tr>
<td>FishFilm: Agentive Slideshow: Agentive</td>
<td>4</td>
<td>Native Control</td>
<td>AU06</td>
<td>0</td>
<td>0 16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AU09</td>
<td>0</td>
<td>0 16</td>
<td>1 3 18</td>
</tr>
</tbody>
</table>

(^“Noncanonical Mapping (Non-Passives)” includes Patient-Active Strategy, Topicalisation and Intransitivity Strategy. See Section 5.4)
Considering firstly the between-learner (between-subject) differences, at one end of the spectrum, some learners at the inter-phrasal did very well in producing passive constructions, e.g. TW21 produced 21 passives in the Slideshow task and 16 passives for the patient-cued trials in the FishFilm. IT11 and TW36 both produced 19 passives and missed only three trials in the Slideshow task. At the other end of the spectrum, learners such as CE02 and TW25, who were also at the inter-phrasal stage, only produced structurally ambiguous agentless/adjectival passives (see Table 5.6).

In terms of the within-learner (within-subject) differences, Table 5.6 also shows that learners at the two extremes (e.g. constrast CE03 with IT08) of the spectrum either produced agentive passives for both tasks or did not produce any verbal passive for either of the task.

Category 1 performance is characterised by learners’ absolute reliance on the canonical agent-subject mapping. Very few learners at the inter-phrasal stage belonged to Category 1, as learners at the inter-phrasal stage typically did not rely solely on canonical mapping. Category 2 is characterised by the use of alternative strategies involving noncanonical mapping in FishFilm and ambiguous agentless/adjectival passives in Slideshow. In Category 3, performance in FishFilm shows a possible training effect such that learners failed to produce passives for the first few trials, but then passives emerged and improved over trials as the learners became accustomed to or trained by FishFilm. Note also that the passive morphology in Category 3 is largely inaccurate and unstable. Moreover, in Category 3, agentive passives emerge in FishFilm but not in Slideshow. In Category 4, agentive passives in FishFilm are done with relative ease and high accuracy. In Category 4, agentive passives begin to emerge in Slideshow, the passive morphology in Slideshow ranges from inaccurate and unstable to accurate and stable.

5.3.1 Discussion

Learners at the inter-phrasal stage who fell into Category 3 above (shown in yellow in Table 5.6) provided crucial data in testing Hypothesis 3. These learners could produce passives in FishFilm where the cognitive load placed on the learners was light (shown in blue). When placed under increased cognitive loads, such as in the Slideshow task, the same learners could not produce agentive passives (shown in
orange). Learners who produced agentive passives in the low-demand condition did not necessarily produce agentive passives in the high-demand condition. However, there was no evidence of a reverse pattern in the data; i.e. every learner who produced agentive passives in the high-demand Slideshow task also produced agentive passives in the low-demand FishFilm task.

As noted in the methodology section. I attribute the relative ease in processing FishFilm to the fact that most variables in FishFilm were controlled and remained constant. These included the set of lexical items required to narrate the events, the type of event, the adversity status of the events, the number of event participants, the matched animacy level of event participants, the exogenous perceptual cue employed, as well as the repetitive nature of the task. The Slideshow task on the other hand placed a greater cognitive load on informants in terms of dynamic shifts of selective attention from trial to trial, and also a greater load on informants’ working memory for the need to store and manipulate different exogenous perceptual cues, the different number of event participants in agentless passive, transitive and ditransitive trials, the need to access and retrieve different sets of lexical items from trial to trial, and the need to negotiate event participants of different animacy levels in the conceptualiser.

Previous SLA studies using the FishFilm task found that it was able to differentiate between inter-phrasal staged learners who could only produce passives in the off-line, self-paced storytelling task, from those who could produce passives on-line in the FishFilm (Kawaguchi & Zhang, 2007; Di Biase & Kawaguchi, 2009). Table 5.6 shows that results from Slideshow and FishFilm in this cross-sectional study corroborated the differentiation in processing passives off-line and on-line as reported earlier. In particular, I have shown that in addition to the off-line/on-line processing dichotomy with regards to passives, there is in fact gradience in the complexity and cognitive load that one could manipulate in on-line tasks, to further discriminate among inter-phrasal staged learners who have a higher degree of automatisation in L2 from those who struggle more and need to rely more on other compensatory strategies.

This brings to the fore the desirability of “mastery” in addition to “emergence” as an
additional L2 developmental criterion to further strengthen the explanatory power of PT. Processability Theory has traditionally steered away from the arbitrarily defined “mastery” as the acquisition criterion, favouring instead the emergency criterion (Pienemann, 1998; Pallotti, 2007). PT has therefore avoided the pitfalls of the “mastery” acquisition criterion so far, which does not provide an accurate picture of learners’ operational and productive use of a given feature in L2. The emergence criterion has been integral to PT as a tool of assessing learners’ initial acquisition of an L2 processing procedure.

PT and its Steadiness Hypothesis have always advocated that as long as the modality of spontaneous L2 speech production remains the same across tasks, the emergence criterion can be applied to determine the acquisition of a specific L2 processing procedure (Pienemann, 1998; although see Ågren, 2008, 2009, for attempts at applying PT to the written modality). Data from learners’ processing of passives in tasks of different cognitive demands show that once the emergence point of a learner’s L2 procedures has been determined by means of the emergence criterion, it is ideal to take the inquiry of their L2 development further by going from L2 emergence to L2 automatisation. The degree of L2 automatisation depends on the extent to which all of the processes involved in L2 production are operated by means of the procedural memory rather than the declarative memory (Paradis, 1994, 1997, 2004). The more processes are proceduralised, the fewer there are that need to be slowly and labouriously executed in one’s declarative memory, thus the more automatic and fluent one’s L2 production will be.

The clear discrimination of learners who rely on off-line like, metalinguistic calculations in spoken production from those who have largely proceduralised and automatised the processes required to produce the same given L2 features will be a desirable attribute for PT to develop. The results from my cross-sectional study highlight this aspect. In fact, my results nicely echo one of the most recent research directions within PT that is receiving increased attention, i.e. the very issue of controlled versus automatic processes in learners’ L2 production and the automatisation of grammatical encoding to allow more resources for semantic and pragmatic processing (Di Biase & Kawaguchi, 2009; Bettoni & Di Biase, forthcoming; Di Biase & Kawaguchi, forthcoming).
5.4 Alternative Strategies

While passives may be the optimal constructions given the right context, they are still a set of discretionary, non-obligatory constructions. Speakers and learners therefore could potentially employ other structural means in attempting to communicate a particular proposition in the same given pragmatic context. The optionality of passives is seen from the proportion of passive utterances to the number of passive-eliciting trials in the study. A total of 1558 responses to patient-theme cued trials were collected across all learner groups in the cross-sectional study, of which only 736 or 47.24% were narrated in the passive voice. In comparison, the control group produced 155 out of the total of 171 trials for the same set of stimuli, i.e. 90.64% success rate. This meant that other than the times when the learners simply abandoned the trials or produced semantically incorrect responses, they adopted a range of alternative constructions in place of passives. This section addresses Research Question (Q4) and reports on a number of strategies which I have identified that the learners used as alternatives to passives.

(Q4) When learners do not produce the passive construction contrary to the contextual orientations, what alternative strategies, if any, do they adopt to process the same discourse-pragmatic information?

**Hypothesis 4:** In on-line tasks where the context is conducive to producing the passive construction, learners will employ other less costly alternative strategies to cope with the noncanonical mapping of patient-to-subject cuing.

5.4.1 Agent-Active Strategy

Agent-Active Strategy (AAS) is when learners choose to ignore the contextual cues, reporting everything from the perspective of the agent and narrate in the active voice.

(68) (IT02 S24)\textsuperscript{12} the man is ah painting the wall

(IT02 S14) a little girl is patting a cat

\textsuperscript{12} The notation is made up of the Informant Code (e.g. IT02) and the Slideshow Trial No. (e.g. S24) or the FishFilm Trial No. (F18). In the examples given here, the coloured or the cued entity is in bold.
The idea of having an agent in any volitional event was so attractive that informants sometimes felt compelled to impose an agent in their narrative even when none was overtly depicted in the visual stimulus, as shown in (69) where the agents inserted by the informants are in square brackets:

(69)  (IT02 S39)  [somebody] is shooting a man
(IT07 S03)  [somebody] give credit card . to a doctor
(TW01 S03)  [pro-drop] give . give the credit card . to the doctor
(TW06 S03)  [I] give credit card to a doctor
(TW16 S04)  [the woman] . give a girl . present
(CL01 S03)  [the person] use the credit card to pay the doctor
(CL04 S03)  [somebody] give a card to a man
(CE09 S02)  [somebody] shot the . ah . big red bird
(CE09 S03)  [somebody] give to . a man . a Mastercard
(CE01 S37)  [somebody] is giving a a cat a fish
(BE04 S02)  [pro-drop] shoot . a bird
The ease of processing actives has already been established in the Beep+S narratives for the *FishFilm*. The Agent-Active Strategy that learners adopt is akin to the first alternative strategy reported in Marchman et al. (1991) for FLA. They reported that young native English children often disregarded the discourse-pragmatic contexts and narrated everything in the active voice. More accurately, the Agent-Active Strategy is not an alternative strategy in the sense of preserving or encoding the pragmatic thrust in the narratives; it is simply the default structural choice to convey the propositional meaning in a pragmatically neutral manner. This is also in line with PT’s Unmarked Alignment Hypothesis and Lexical Mapping Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005), which assert that learners begin in L2 by accepting the agent as the default starting point and the resultant active construction as the norm, the agent being the least effortful role to map onto the subject.

5.4.2 Patient-Active Strategy

The Patient-Active Strategy (PAS) is where an informant maps the cued patient to the subject function and maintains the canonical word order SVO, but achieves noncanonical mapping through lexical means, either by employing so-called exceptional verb like *accept, get, receive, suffer*, or by turning the patient argument into a volitional, agent-like argument. The critical verb in the examples given in (70) is underlined, followed by the target verb that the visual stimulus intended to elicit in angle brackets.

(70) (IT02 S10) a boy *is playing with* his dog <was licked>
    (IT04 P02) a *dog is waiting* for the food from her owner <was given>
    (IT05 S15) a little *cat is sitting in her master’s hand* <was held>
    (IT08 S14) a *cat is playing with a girl* <was patted>
    (NT01 S11) a *girl is waiting her boyfriend kiss* <was kissed>
    (NT01 S16) *mouse is running from the cat* <was chased>
    (NT07 S05) the house *the house suffer* <was hit > from lightning
    (NT07 S11) the woman *have have love with boyfriend* <was kissed>
    (NT10 S11) the woman *is dating with her her boyfriend* <was kissed>
    (CL02 S11) I think the lady *is dream the kiss from some from his*
boyfriend <was kissed>

(CE04 S03) a credit card. is coming to a man <was given>

(CE08 S29) she she will having flower <was given>

(TW11 S11) a girl. is very happy <was kissed>

(TW05 S21) the man try to stop the bicycle

(TW32 F06) black fish. uneat. un-eat red fish <was eaten>

Marchman et al. (1991, p. 80) reported L1 English children adopting this very strategy to stand in for passives. Children would often provide event descriptions that have the cued entity in the subject, followed by predicates in the active voice (e.g. The tiger let the bear lick him). Studies in L1 adult speech also show that once speakers decided on an entity as the starting point, they could employ various semantic and syntactic structures as the predicate to complete the sentence (Nappa, et al., 2004; Gleitman, et al., 2007). For example, it was reported that when a speaker’s focal attention was visually oriented to “the man” on a screen, the speaker could readily produce either the passive version the man was chased by the dog, or the active version the man was running from the dog (Nappa, et al., 2004).

Exceptional verbs such as receive allow learners to take advantage of their intrinsic noncanonical a-structure or argument-function alignment pattern and map non-agents to SUBJ, thus making the non-agent argument assume a quasi-agent role (Pinker, 1984, 1989a).

(71a) give <x, y, z>

<table>
<thead>
<tr>
<th>SUBJ</th>
<th>VERB</th>
<th>OBJ</th>
<th>OBJ2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>agent</td>
<td>goal</td>
<td>theme</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The man gave the girl the present
(71b) was given <x, y, z>

<table>
<thead>
<tr>
<th>SUBJ</th>
<th>VERB</th>
<th>OBJ</th>
<th>ADJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>goal</td>
<td>theme</td>
<td>agent</td>
<td></td>
</tr>
</tbody>
</table>

The girl was given the present by the man

(71c) receive <x, y, z>

<table>
<thead>
<tr>
<th>SUBJ</th>
<th>VERB</th>
<th>OBJ</th>
<th>OBL</th>
</tr>
</thead>
<tbody>
<tr>
<td>goal</td>
<td>theme</td>
<td>agent/source</td>
<td></td>
</tr>
</tbody>
</table>

The girl received the present from the man

In (71b) and (71c), the argument-function mapping pattern for the passive verb given and the active verb receive are identical. However, exceptional verbs such as in (71c) form sentences in the canonical c-structure; such sentences require less complex morphological formulation. Informant TW32’s data is illustrative of another kind of exceptional verb. TW32 was unable to produce passives. He made three attempts in the FishFilm with the novel word un-eat before reverting to using agent-actives consistently until the task finished. The informant afterwards revealed that since he could not work out how to produce passives, he reasoned that he needed a word that meant the opposite of eat, for which he improvised un-eat. He soon felt that un-eat was not a legitimate English expression, discontinued its use and switched to the active voice. TW32’s failed attempts illustrate the use of legitimate and innovative lexical items of an embedded noncanonical mapping pattern in place of passives.

The notion of agency, be it overtly or covertly implicated, is deeply embedded in PAS. Patient-Active Strategy includes structures on an agency-passivity continuum, ranging from those that express explicit wilfulness on the part of the subject (e.g. The man ran away from the dog) to those that depict the subject as a quasi-agent (e.g. The girl is waiting her boyfriend kiss), and finally to those that truly represent the subject as a semantically inert event participant (e.g. The house suffer from lightning). PAS demonstrates the appeal that the notion of agency has on speakers in general (Nappa,
et al., 2004), but more particularly on the less competent than the more competent
speakers of a given language; competence in the contexts of L1 development
(Marchman, et al., 1991; Pinker, 1984, 1989a), age-related L1 attrition (Bates, et al.,
1995; Bates & Goodman, 1997; Paradis, 2007), pathology-related L1 attrition (Menn,
et al., 1998; Menn, 2000; Gahl, et al., 2003), and competence in the context of
learners’ L2 development (Kawaguchi, 2007; K. Wang, 2009a; Di Biase &
Kawaguchi, forthcoming), the last one being most crucial to this thesis. The agent-
like traits in sentences of the Patient-Active Strategy make it a highly attractive
alternative strategy to processing passive constructions.

5.4.3 Topicalisation

Topicalised XP + SVO
Informants often used topicalisation instead of passives. Topicalisation can be further
divided into two subtypes: (a) Topicalised XP + SVO (also known as left-
dislocation); and (b) Two-clause Topicalisation. Examples shown in (72) below
demonstrate type (a), Topicalised XP + SVO.

(72) (TW19 S02)  a bird and a arrow hurt her . hurt it
(TW19 F18) now it’s the grey fish . and the blue fish eat the red fish
(TW12 S32) and maybe there’s a monkey and someone give her give him
give it a flower
(TW19 F18) now it’s the grey fish . and the blue fish eat the red fish
(NT07 F03) the blue fish . the green fish eat the blue fish
(NT13 S21) a man with a bicycle . and the bicycle is slide down
(CL01 S21) a man . look the . bicycle fell down
(CL01 S05) on the church there is a flash
(CL02 S03) the credit card . ah I think the doctor receive the credit card
(CE03 F04) the green fish .. it’s in purple fish stomach
(CE08 F04) green fish . the pink fish is eating green one
(BE01 F29) brown fish . white white ate brown fish
(BE02 S21) this man and bike . and bike hit this man . for for this man
(BE02 S24) painting painting this man painting for wall
(BE01 F03) blue fish and green fish . ah green fish eat blue fish
PT (Pienemann, 1998) predicted ADJ+SVO to be the next step after canonical SVO. The Unmarked Alignment Hypothesis and the TOPIC Hypothesis later fine-tuned ADJ+SVO into predicting learners’ linking of the TOP discourse function with the grammatical function ADJ (XP+SVO) as the structure which would emerge prior to the topicalisation of core arguments (e.g. OBJ). In the case of the latter, the structure involves a marked alignment (Pienemann, Di Biase, & Kawaguchi, 2005). A prominent characteristic of my learners’ topicalisation construction is the use of O₁+SVO₁, i.e. the topicalised and coreferential OBJ (e.g. green fish. the pink fish is eating green one).

**Two-claused Topicalisation**

Type (b) Two-claused Topicalisations are illustrated in (73):

(73)  
(TW11 S16)  *the mouse was running* and the cat . catch after he
(TW12 F08)  *the black fish met a red fish* and the red fish eat him
(IT02 S16)  *a a mouse is . running* . because a cat is chasing it
(IT05 S11)  *the woman is sitting there* and the man is kissing her
(CL01 S16)  *a mouse running* because a cat want to catch it
(CE09 S01)  *the car got accident* . they took it go somewhere
(CE09 S10)  *a man . wants to go somewhere* . dog stop him
(CE08 S21)  *a man go down to the street* . the bike push him
(TW19 S12)  *a girl fall down because* a boy . push her
(TW19 S11)  *oh a girl she is in lovely* and the boy kiss her

Two-claused topicalisation has been reported in FLA studies as an attention capturing device and as a notable alternative strategy to passives by young children (Ochs Keenan & Schieffelin, 1983a; Marchman, et al., 1991). Topicalisation of this type is realised as a preamble to the intended proposition. The preamble or the first clause seeks to establish its subject as the central figure or the most prominent entity at hand, to which the ensuing clause then adds more information. This strategy fulfils the same discursive goal of attributing prominence to the cued entity while circumventing the processing-intensive passive construction by utilising 2 canonical SVO sentences linked overtly with cohesive devices (e.g. *A mouse running because*...
a cat want to catch it) or with tacit coherence across the two clauses (e.g. A man go
down to the street . the bike push him).

5.4.4 Intransitivity Strategy

A variant of the Patient-Active Strategy is the Intransitivity Strategy, where
informants engage in what I shall call “argument omission” in narrating transitive,
two-participant events. Informants omit the non-cued entity and make the patient of
an event the sentence subject of an unaccusative (e.g. fall, die) or an unergative verb
(e.g. run, come):

(74) (IT11 S01) the car's moving <was towed>
(NT01 S01) a car broke down <was towed>
(TW03 S16) a mouse . a mouse running <was chased>
(TW07 S16) a . a mouse was running <was chased>
(TW19 S01) a red car run out <was towed>
(CL05 S16) a mouse is running <was chased>
(CE02 S02) the bird is fell down <was shot>
(CE03 S10) the boy .. is . fighting <was licked>
(CE03 S39) the gun .. the man fell down <was shot>
(CE03 F02) the red fish .. it's gone <was eaten>
(CE04 S02) the bird . is flying . on the sky <was hit>
(CE04 S11) a girl . falling in love <is kissed>
(CE07 S36) the man is sit <was served some tea>
(CE08 S32) the monkey is laughing <was given some flowers>
(BE02 S02) bird . oh bird . after die <was shot>
(BE04 S12) girl fell down <was pushed>
(BE04 S16) mouse .. run <was chased>

The central pragmatic functions of passives are the co-occurring agent defocusing
and patient promotion (Shibatani, 1985; Keenan, 1985). In what follows, I will show
that intransitives and agentless passives are formal variants that serve the same
pragmatic functions of agent defocusing and patient promotion. The agent
defocusing and patient promotion functions of passives coincide with the functional
attributes of argument omission of the Intransitivity Strategy. In drawing a functional
parallel between intransitives and passives, I will refer to passives in general but will pay particular attention to *get*-passives, since agent defocusing as one of the central functions of passives is most evident in *get*-passives. I will also show that there is a processing advantage in intransitives over passives since passives are uni-argument as a matter of choice, whereas intransitives are uni-argument as a matter of course. Taken together, this means that in on-line speech processing, as passives and intransitives largely overlap in their pragmatic functions, intransitives will be available to learners as less costly processing alternatives to passives while still allowing learners to achieve largely the same pragmatic objective as they would with passives.

In passives, the dual pragmatic goal of agent defocusing and patient promotion is maximally achieved in *get*-passives, which shows a strong propensity to leave agents unstated and it restricts the inclusion of agent-oriented adverbials (Matthews, 1993; Collins, 1996; Carter & McCarthy, 1999). The *get*-passive is the best fit to the passive prototype in terms of its pragmatic function. Being the best prototype, it is the earliest emerged form of the passive in L1 speech (Harris & Flora, 1982; Johnson, 1985; Shibatani, 1985; Haegeman, 1985; Toyota, 2007). These are to a large extent due to the autoantonymic nature of *get*. The inchoative/ergative nature of *get* or *get* behaving as a type of middle voice tends to highlight itself as a “verb of being or becoming” (Keenan, 1985, p. 257; Toyota, 2007, p. 159), thereby suppressing any overt agent (Haegeman, 1985; Banks, 1986). At the same time, the causative/agent-like nature of *get* and *get* as a lexical “verb of reception” (Keenan, 1985, p. 258; Haegeman, 1985; Hübner, 1991; Alexiadou, 2005; Toyota, 2008b) licenses the subject of *get*-passives with quasi-agency, similar to that accomplished by exceptional verbs such as *receive* and *suffer* (see discussion under PAS in Section 5.4.2).

Bearing in mind the core discourse-pragmatic functions of agent defocusing and patient promotion inherent in passive constructions, let us now consider the similarities between intransitive predicates and passives, particularly agentless passives, in terms of their pragmatic functions. Researchers have noted the property of intransitivity in agentless passives (Yip, 1995; Ju, 2000; see also Berman, 1980; Berman, 1985). Passives and unaccusatives both have the patient as the subject;
however only unaccusatives legitimise the ultimate agent defocusing, i.e. the suppression or omission of agents in passives is a matter of choice, whereas the suppression or omission of agents in unaccusatives is a matter of course (e.g. compare with the review in Wanner, 2009, pp. 127ff., of the psycholinguistic evidence of the implicit agent reading for agentless verbal passives but not for unaccusatives in speech processing). In this regard, the unaccusative version of the Intransitivity Strategy mirrors the “verb of being or becoming” property of get and the copula be in agentless get/be-passives (Keenan, 1985; Haegeman, 1985).

Downing (1996, pp. 181-183) contended that agentless get-passives are in fact intransitives with the option of potentially taking elements that indicate the agentive circumstances of the proposition. She further suggested that get-passives are useful substitutes for when an unaccusative is not available as an option for describing certain one-participant events (Downing, 1996, p. 203). In some of the trials that my informants narrated, unaccusatives were available as a viable option and replaced passives as the more competitive candidate for realising the same ultimate pragmatic objective.

Unergatives on the other hand, unlike unaccusatives, involve the canonical agent-subject mapping. The unergative version of the Intransitivity Strategy therefore does not parallel the passive per se in terms of mapping, rather it is the intransitive version of Patient-Active Strategy, whereby speakers artificially endow agency to arguments that would otherwise assume the patient role. This is done by means of coupling subjectivalised patients with active unergative verbs, thus allowing the patients to morph into volitional agents. In this respect, I contend that there is an apparent measure of correspondence between the unergative version of the Intransitivity Strategy and the causative/”verb of reception” status of get-passives (Keenan, 1985; see also Toyota, 2007, pp. 151-152).

Let us now turn our attention from the pragmatic functions of intransitives to the processing of intransitives. In terms of neurocognitive processing, it has been found that there is a gradual increase in cost in processing verbs that subcategorise one, two and three arguments, corresponding to intransitive, transitive and ditransitive verbs. This is a phenomenon known as the argument structure complexity effect (Thompson, 2003). Essentially, the more argument or event participant there is in a given
proposition, the more difficult it will be for speakers to process. This effect of complex argument structure on off-line and on-line speech production has been well attested to in numerous psycholinguistic, eye-movement and neuroimaging studies cross-linguistically, as well as in L1 acquisition and in normal adults (De Bleser & Kauschke, 2003; Bonakdarpour, Thompson, & Fix, 2007; Thompson, Dickey, Cho, Lee, & Griffin, 2007). The effect of argument structure complexity is more conspicuous in patients with Broca’s aphasia than in age-matched older adults (Kegl, 1995; Thompson, Shapiro, Li, & Schendel, 1995; Thompson, Lange, Schneider, & Shapiro, 1997; Menn, et al., 1998; Menn, 2000; Kim & Thompson, 2000; Kiss, 2000; Gahl, et al., 2003; Bastiaanse & Thompson, 2003; Thompson, 2003; Lee & Thompson, 2004; also compare with Ho, 2004, which reported the late acquisition of the complex a-structure verb “give” in L1 Cantonese Chinese). Recent studies further reported a spill-over of argument structure complexity effect in processing verb-derived nouns (e.g. *sleeper* vs. *eater*; *destroy* → *destruction*) (Collina, Marangolo, & Tabossi, 2001; Collina, Garbin, & Tabossi, 2007; Fix & Thompson, 2007). These studies concluded that the degree of processing difficulty experienced by neurologically intact young adults, older adults and aphasic patients alike forms a hierarchical relationship, proceeding from the least difficult to the most difficult in the order shown in (75):

(75) Intransitives (Unergatives > Unaccusatives) > Transitives > Ditransitives

In a recent naming task study of verbs and verb-derived nouns done with patients with Broca’s aphasia, a main effect was found for the optionality of a verb’s subcategorisation status and ease of processing. Obligatorily transitive verbs and verb-derived nominals were more difficult to process than optionally transitive verbs and verb-derived nominals (e.g. *watch* and *watcher*, being obligatorily transitive, are more difficult than *eat* and *eater*, which are optional between intransitive and transitive) (Fix & Thompson, 2007).

The implications of the argument structure complexity effect for L2 learners are that the fewer the arguments, the lighter the processing load. Omitting non-essential arguments by producing intransitives in place of transitives or ditransitives allows learners to reduce the processing load associated with two or three valencies (see also
the “Intransitive Bias Hypothesis” proposed for speakers of SOV languages in Ueno & Polinsky, 2009).

In summary, I have shown the pragmatic and processing motivations which make the Intransitivity Strategy an ideal alternative to passives. In terms of the intended pragmatic objective, intransitives are functionally very similar to passives in that the unaccusative version follows the noncanonical patient-subject mapping, as do passives, and the unergative version achieves prominence assignment to patients by conferring agency to patient arguments to bypass the noncanonical patient-subject mapping. The same fashion of prominence assignment in unergatives is found in the Patient-Active Strategy. In terms of cognitive processing, both variants of the intransitive involve less complex argument structures and less marked morphological representations than passives.

Finally, evidence from neuropsycholinguistic studies suggests a possible further hierarchical relationship within the Intransitivity Strategy, namely unergatives prior to unaccusatives (Kim & Thompson, 2000; Finocchiaro, 2002; Thompson, 2003; Lee & Thompson, 2004; Friedmann, Taranto, Shapiro, & Swinney, 2008). Such distinction seems to be implied also by the Unmarked Alignment Hypothesis (Pienemann, Di Biase, & Kawaguchi, 2005). The present study did not attempt to address this issue. Further research in this direction may test and refine UAH in this respect.

5.4.5 Verb Avoidance

Some learners occasionally omitted lexical verbs in ditransitive predicates. In those instances, they relied on prepositions of directions, such as from, to, into, and for, to express the event structure.

(76) (IT13 S31) the present . is to the daughter from her father
(IT02 S37) oh there is a fish . in front of a cat
(NT09 S31) a banana . ah from a monkey
(CE04 S04) a present . is for the girl
(BE01 S03) the net card . in the doctor
(TW03 S04) a gift a gift for a girl
(TW10 S32) the present to the monkey
(TW10 S03) the credit card ... (and) to a person
(TW13 S31) the banana was for the doctor
(TW07 S33) the banana was down <was dropped or thrown down>

Verb avoidance may in a few situations be a viable option with transitive verbs:

(77) (CE03 F29) the grey fish is in white fish stomach
(CE05 S05) outside the church. lightning
(CE05 F20) blue fish. into pink fish
(IT13 S11) the girl is. in the date with her boyfriend <was kissed>
(NT01 S05) the church is in rainy day <was struck by lightning>
(NT06 S14) a cat. with a girl
(TW01 S01) the church.. flash on church <was struck by lightning>

Ditransitive predicates express the fundamental notion of “transfer between a volitional agent and a willing recipient” (Goldberg, 1995, p. 141). Since the ditransitive verb is an optional element in a ditransitive construction compared to the preposition (e.g. *The book was given Peter Mary is both grammatically ill-formed and uninterpretable, whereas *The book to Peter from Mary is only ill-formed), learners can express the very central sense of transfer by using only the bare minimum, i.e. prepositions of directions (e.g. to, into, from, for), and avoid/omit using lexical verbs altogether (cf. Pearson & Roeper, 2004).

Interestingly, there is evidence in the FLA literature to support my proposition of L2 learners’ use and reliance on prepositions of direction. It has been found that young children typically develop and master from prior to by as the preposition of causation (Clark & Carpenter, 1989a, 1989b), and they also rely heavily on the semantic property of from and with in interpreting passive sentences (Shorr & Dale, 1981). Clark and Carpenter (1989a, 1989b) found that 2-year-olds used from instead of the agentive by. As children got older, they began to use by in repairing ill-formed sentences presented to them, but continued using from regularly in their spontaneous speech. This, they claimed, was due to children first developing the notion of “source” as an encompassing conceptual category before they develop the more
specific linguistic category of agency (Clark & Carpenter, 1989a, p. 23). Shorr and Dale’s (1981) study found that in passive sentence frames such as the giraffe is tickled ... the camel, the preposition from elicited as many passive interpretations as by from the older children group (mean age 4;9), and to elicited primarily active interpretations. They further reported that from could elicit passive interpretations from the younger children group (mean age 3;4) more reliably than by. Therefore the learners in my studies also took advantage of the semantics of different prepositions and used them to express the source-goal relationship, leaving out the main verbs.

5.4.6 Low Relevance

In attempting to accommodate the pragmatic disposition of the trials, informants may at times have to exert much effort into directing their selective attention on the cued entity and become distracted from the mission to be carried out. This could result in narratives of non-event descriptions or descriptions of low relevance to the unfolding central event in the trial.

(78) (IT02 S14) a dog is standing near a girl <was patted by a girl>

(NT13 S38) it’s during the raining day <the church was hit by lightning>

(CL02 S21) I think one bicycle is falling down from the mountain <the man was hit by the bike>

(CE03 S14) the cat is comfortable <was patted>

(CE04 S29) a woman is happy <was given some flowers>

(CE04 S05) a church was dark <was hit>

(CE04 S31) banana it’s bigger than monkey <was given to the doctor>

(CE05 S36) a man is thirsty <was served some tea>

(CE05 S01) a car is dan dan dangerous <was towed away>

(CE09 S14) the dog is is a lovely dog <was patted>

(BE02 S10) look boy naughty boy <was licked by the dog>

(BE02 S25) oh glass is no good problem <the bottle was broken by the ball>

(TW02 S14) the cat is so cute <was patted>

(TW05 S31) monkey like eat bananas <banana was given to the doctor by the monkey>
(TW12 S04)  *oh the gift is must must be ah expensive* <was given to the girl>

(TW13 S11)  *the girl was . the girl with her girlfriend . the girl ah boyfriend . and very sweet*

(TW14 S31)  *the banana was yellow* <was given to the doctor by the monkey>

This phenomenon also occurs in English children in the form of “non-event descriptions” e.g. describing a dynamic event of a tiger being licked by a bear with a static non-event description such as *the tiger is just sitting there* (Marchman, et al., 1991, p. 80). In on-line spontaneous narratives, speakers need to attend to the incoming sensory stimulus, identify the propositional meaning of the stimulus, take into account the context and the pragmatics of the communication task at hand, and finally to formulate and encode a proposition which is compatible with the given set of circumstances. As the demand for one’s cognitive attention and processing resources exceeds one’s processing capacity, as can often be the case with less proficient users of a language, trade-offs are likely to occur. Under such circumstances, only the most competitive aspects of a communicative interaction to which the speaker dedicates adequate resources will be preserved, at the expense of others.

Learners’ data show that despite having been properly instructed to describe each event as they observed it, the equally emphasised need for learners to focus on the cued entity meant that they at times were overly conscious about focusing on and describing the various attributes of the cued entity at the expense of accomplishing the ultimate mission of describing the central event of the trial. Often the narratives were either non-event descriptions or of low relevance to the central event, e.g. saying *a woman . is happy* in describing a woman being given a bunch of flowers by her boyfriend.

### 5.4.7 Alternative Strategies by Learners and Native Speakers

Figure 5.3 and Figure 5.4 display the proportion of each alternative strategy out of all the non-passive responses to the patient/theme-cued condition. The same set of data is presented in two different ways in Figure 5.3 and Figure 5.4; they are graphed by
proficiency group and by informant source respectively.

![Bar chart showing distribution of alternative strategies used in the Slideshow task in percentage across proficiency groups.](image)

**Figure 5.3.** Distribution of alternative strategies used in the Slideshow task in percentage across proficiency groups.
While canonical mapping, i.e. the Agent-Active Strategy, appears to be the dominating non-target response type, noncanonical mapping in the forms of Patient-Active Strategy, Topicalised XP + SVO, Two-claused Topicalisation and the Intransitivity Strategy combined is in fact manageable and frequently adopted among advanced learners and native English speakers.

Figure 5.4. Distribution of alternative strategies used in the Slideshow task in percentage, graphed by informant sources.
The pattern that emerges from Figure 5.3 and Figure 5.4 is captured in Figure 5.5. The different strategies are collapsed into three categories in Figure 5.5, allowing us to isolate learners’ performance on noncanonical mapping. These three categories are: Canonical Mapping (Agent-Actives), Noncanonical Mapping (Patient-Active Strategy, Topicalisations, Intransitivity Strategy, Verb Avoidance) and Invalid Responses (Low Relevance, Abandoned, Incorrect, Other). A general pattern of inverse parallelism becomes evident with the assistance of the trend lines in Figure 5.5: there was a steady increase in the utilisation of noncanonical mapping strategies in tandem with increased L2 proficiency, as indicated by the ascending solid trend line from right to left. The descending dashed trend line and dotted trend line indicate a decrease in learners’ invalid response rate and decrease in their dependence on canonical mapping. Overall, the results illustrate that as L2 proficiency increases, informants’ reliance on the less pragmatic, context-incompatible canonical mapping lessens and is gradually replaced by a greater capacity to handle noncanonical mapping.

5.5 Agentless, Adversative and Ditransitive Passives

This section addresses Research Question (Q5) and reports on learners’ production of agentless passives, adversative passives and passives with ditransitive verbs in the
Slideshow task. (Q5) is repeated here:

(Q5) Is there a passive-specific developmental path?

5.5.1 Agentless Passives

Firstly, I report on informant data in relation to Hypothesis 5A, which is repeated here:

Hypothesis 5A: Mandarin L1 learners will acquire agentless passives before agentive passives.

I wish to point out at the outset that I follow Teng (1991) in deeming agentless passives with instrumental prepositional phrases such as (79) as verbal, which would otherwise be ambiguous between verbal and adjectival if standing alone without the instrumental prepositional phrases. A speaker’s inclusion of an instrumental prepositional phrase connects an implied agent to the event, hence leaving only the verbal reading as the viable one.

(79) (IT09 S37) a cat was feed fed with the fish

Several informants did not produce any agentive passive in the Slideshow task. Most of these informants did however produce some agentless passives. I will now report on the agentless passives produced by informants who did not otherwise produce any passive with an agentive by adjunct.

(80) (CE02 S01) the car is broken
    (CE03 S02) the bird is hurt
    (CE03 S35) the pencil is broken
    (CE05 S25) a bottle is broken
    (CE10 S06) some worker was hit
    (BE01 S35) the pencil is broked broken
    (BE03 S25) a white bottle is broken
    (BE04 S06) a boy was hitted
Two informants produced “aux + Ved + because + SVO”. The use of because in place of the agentive by-clause could be an indication that the informants used the aux + Ved preceding it as purely stative and adjectival, which they then supplemented with a canonical SVO sentence to account for how the subject came to be in the said state. This is further supported by findings in FLA showing that English children develop because as the precursor to the agentive preposition by (Clark & Carpenter, 1989a).

(81)  (TW13  S02) the bird was hurt because the hunting shoot shoot her something

(TW13  S06) the student was hurt because the basketball was hurt her hand

(TW13  S21) a man hurt because a bicycle bump to him

(TW19  S25) the bottle is broken because a ball hit it

Compare with:

(82)  (CE09  F21) a purple fish . is finished because white fish eat him

(CE09  F22) a white fish . is .. gone . is gone because the black fish eat him

There were few instances of Ved which were unequivocally predicatively or attributively adjectival:

(83)  (BE03  S01) a broken car

(CE09  S35) the a broken broken pen

(CE09  S25) a bla a broken . bottle

(TW32*  S34) very hurt . a boy very hurt because he liúxuě (bleed).

(*TW32 was high school educated and was excluded in the other analyses. I include this particular utterance here to illustrate his use of hurt as a predicative adjectival, very hurt)

5.5.1.1 Discussion

Data from low proficiency level learners thus indicate that learners develop agentless passives before agentive passives. This is not surprising, as it parallels strongly with
findings in L1 development and with reports of the performance of a number of atypical L1 populations. For example, in a corpus based study on children’s spontaneous speech, it was reported that the distinction of the passive participles emerged gradually in children’s speech and they were learned as motivated properties of a complex, polysemous construction (Israel, et al., 2000). Data showed that the children’s passive participles developed from adjectival uses to verbal uses. The authors of the study maintained that the progression from adjectival to verbal passive was an example of “constructional grounding” (Israel, et al., 2000, p. 106), which is a process where simpler constructions serve as the basis for the children’s cumulative development of more complex constructions (see also Horgan, 1976). Additionally, FLA evidence points to the earlier acquired predicate adjectival construction (e.g. Mary is happy) as the precursor of the agentless passives construction (e.g. Lee, 1974; Horgan, 1976; Israel, et al., 2000). English children’s development of passives then stems from agentless/adjectival to gradually extending to full verbal use.

Studies have established that children with grammatical SLI were significantly worse at interpreting and producing verbal passives (van der Lely, 1996; Pearson & Roeper, 2004). Children with SLI show a strong preference for interpreting ambiguous verbal passives as adjectival-stative, and they are sometimes prone to interpreting unequivocal verbal passives as adjectival passives.

In a meta-analysis of studies conducted on aphasic patients as well as neurologically intact participants, it was pointed out that in the context of aphasic patients’ processing of noncanonical structures, those structures that are themselves infrequent can ‘piggyback’ on high-frequency structures that share certain properties such as word order (Dick, et al., 2001, p. 772). This implies also that speakers could build agentless passives based on the predicate adjectival structure; agentive passives can in turn be built on top of agentless passives.

Some have suggested that the tendency of English L2 learners’ overpassivisation of unaccusative verbs could be the result of learners acquiring adjectival passives first, based on which they then overgeneralise and overpassivise unaccusative verbs (Hubbard & Hix, 1988; Hubbard, 1994). This analysis again echoes the nuclear and
foundational nature of adjectival passives as providing the basis for transitioning into agentive passives.

Finally, William and Evan (1998) reported that in their study of focus-on-form L2 classroom instruction, they found that explicit focus-on-form instruction was much more effective for adjectival passives than for verbal passives. This finding from a language paedagogy perspective confirms that the processing difficulty and late acquisition of verbal passives in comparison to agentless passives. The limited success with focus-on-form on agentive passives compared to agentless passives can be viewed in light of the Teachability Hypothesis (Pienemann, 1998), which states that the in-take of instructed L2 is modulated by learners’ developmental readiness for the structure being taught. Learners first become developmentally ready for agentless passives before they become developmentally ready for agentive passives.

Finally, from a universal typologico-prototypical perspective, agentless passives are considered “basic passives” (Keenan, 1985, p. 247). In Keenan’s generalisation concerning the distribution of passives in languages of the world, he stated the following (Keenan, 1985, pp. 247, 249):

\[
\text{G-2: If a language has any passives it has once characterised as basic above; moreover, it may have only basic passives.}
\]

\[
\text{G-2.1 If a language has passives with agent phrases then it has them without agent phrases.}
\]

Universally,\(^{13}\) agentless passives are more basic, more prevalent and occur more frequently than agentive passives. Shibatani took a prototype approach and claimed that the primary pragmatic function of passives is demotional rather than promotional, one of “agent defocusing” rather than patient promotion (Shibatani, 1985, p. 830). According to Shibatani, agent defocusing forms a continuum and is maximally

\(^{13}\)Keenan’s G-2 applied to Mandarin and English. I am in favour of his analysis of viewing agentless passives as more basic than agentive passives. However, I should still point out that G-2 is not true for at least some Sinitic varieties, namely bei\(^2\) (畀) in Cantonese (Tang, 2000) and hòu (互) in Southern Min (Huang, 1999). For the difference between the native word bei\(^2\) (畀) and the Mandarin loan word bei\(^4\) (被) in Cantonese, see Chang (1997).
realised syntactically on this continuum in passives that do not encode agents syntactically at all. This typologico-prototypical view casts agentive passives as more peripheral, more discretionary members of the passive family in relation to the basic, prototypical agentless passives.

Evidence reported in the literature on agentless passives from L1 acquisition, L1 development of SLI children, L1 attrition of aphasic patients and English L2 in TESOL focus-on-form are in line with my UAH motivated Hypothesis 5A. UAH predicts that the adjectival nature of agentless passives means that no agent suppression mechanism needs to be activated on the part of the learner. In the absence of the need for agent suppression, coupled with the fact that the c-structure of agentless passives is identical to that of the active and predicative adjectival constructions, the UAH based Hypothesis 5A contends that learners will develop agentless passives before agentive passives.

Unfortunately my learner data are somewhat impoverished in that the Slideshow task was designed to elicit only a small number of agentless passives. Consequently, any conclusion I draw from the data must be done with a caveat and should only be taken as indicative rather than conclusive. Notwithstanding, the data show a unidirectional relationship between agentless passives and agentive passive: learners who produced agentless “be+Ved” structures did not necessarily produce agentive passives; whereas learners who produced the agentive “be+Ved” structures did also produce agentless “be+Ved” structures. Based on this observation from my limited data, I therefore accept Hypothesis 5A with caution.

5.5.2 Adversative Passives

In terms of the semantic effects of adversity on learners’ production of passives, my hypothesis states:

Hypothesis 5B: Mandarin L1 learners will more likely produce a passive when an event is adversative to the semantic patient.

The null hypothesis would then be that learners will be equally likely to produce passives irrespective of the adversity status of the event. In order to investigate
whether informants performed differently in responding to trials which depicted a pejorative outcome for the patient (potentially forming adversative passives), and to trials which depicted a neutral outcome for the patient (potentially forming non-adversative passives) in the Slideshow task, 14 trials were selected for analysis. The 14 trials were classified into 7 adversative passives and 7 non-adversative passives, based on the adversity status of the target sentences they were designed to elicit. The target verbs for the adversative passive trials (Trial No. 2, 5, 6, 12, 16, 21, 39) include *shot, struck, hit, pushed, chased*; and the target verbs for the non-adversative passive trials (Trial No. 1, 10, 11, 14, 15, 24, 33) include *towed, licked, kissed, patted, held, painted, dropped*.

Informants were awarded a point if they mapped the patient to the subject and narrated the sentence in the target passive voice (e.g. *The girl was kissed by the boy*). No point was awarded if they only mapped the patient to the subject but did not narrate in the passive voice (e.g. *The girl was standing next to the boy*). Table 5.7 to Table 5.10 show the scores for adversative and non-adversative passive trials by informants of different proficiency groups.

Table 5.7

<table>
<thead>
<tr>
<th>Informant</th>
<th>Non-adversative (n = 7)</th>
<th>Adversative (n = 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU01</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>AU02</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>AU03</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>AU04</td>
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<td>6</td>
</tr>
<tr>
<td>AU05</td>
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<td>6</td>
</tr>
<tr>
<td>AU06</td>
<td>6</td>
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<td>AU07</td>
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<td>6</td>
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<td>AU08</td>
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<td>7</td>
</tr>
<tr>
<td>AU09</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Summary (n = 9) | *M = 6.444, SD = .534* | *M = 6.555, SD = .534*
Table 5.8
Scores for adversative/non-adversative passives by Advanced Level Learner Group.

<table>
<thead>
<tr>
<th></th>
<th>Non-adversative (n = 7)</th>
<th>Adversative (n = 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT02</td>
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<td>1</td>
</tr>
<tr>
<td>IT03</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>IT04</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>IT05</td>
<td>3</td>
<td>7</td>
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<tr>
<td>IT06</td>
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<td>7</td>
</tr>
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<td>IT07</td>
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<td>IT08</td>
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<td>6</td>
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<td>6</td>
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<td>4</td>
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<td>IT11</td>
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</tr>
<tr>
<td>NT13</td>
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<td>5</td>
</tr>
</tbody>
</table>

Summary (n = 25)  
M = 4.240, SD = 1.614  
M = 5.400, SD = 1.683

Table 5.9
Scores for adversative/non-adversative passive trials by Low Level Learner Group.

<table>
<thead>
<tr>
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<th>Non-adversative (n = 7)</th>
<th>Adversative (n = 7)</th>
</tr>
</thead>
<tbody>
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<td>CL01</td>
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<td>CL02</td>
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</tr>
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<td>CL05</td>
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<td>5</td>
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<tr>
<td>CE02</td>
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<td>0</td>
</tr>
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<tr>
<td>BE04</td>
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</tbody>
</table>

Summary (n = 16)  
M = 2.000, SD = 2.338  
M = 2.125, SD = 2.334
Table 5.10  
Scores for adversative/non-adversative passives by the EFL Group.

<table>
<thead>
<tr>
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<th>Non-adversative (n = 7)</th>
<th>Adversative (n = 7)</th>
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</thead>
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</table>

Summary (n = 33)  
$M = 2.909, SD = 1.974$  
$M = 4.181, SD = 1.827$
The Control group narrated the patient-cued trials in the passive voice reliably and equally well regardless of the adversity status depicted in the visual stimuli ($M = 6.111$, $SD = 0.781$, two-tailed $p = .681$).

For learners, a one-tailed paired $t$-test found that the adversity depicted in the visual stimuli facilitated the production of passive constructions in the Advanced Level Learner Group ($M = 1.16$, $SD = 1.434$, $t(24) = 4.04$, $p < .001$, Cohen’s $d = .703$) and in the EFL Group ($M = 1.272$, $SD = 1.398$, $t(32) = 5.23$, $p < .001$, Cohen’s $d = 1.036$). The difference between the performance of adversative and non-adversative passives for the Low Level Learner Group ($p = .354$) did not reach significance.

### 5.5.2.1 Discussion

My data showed that the university educated ESL/EFL learners were significantly more successful at producing adversative passives than non-adversative passives ($p < .001$). These data confirm the results reported in earlier studies. For example, in a study of 36 Mandarin speaking ESL learners in the United States, the participants were divided into two English proficiency levels and were shown a series of slides depicting either actions of an adversative or non-adversative nature to the patient of the event. The study found that native Mandarin speakers, regardless of their English proficiency level, showed a strong sensitivity to the adversity of the depicted events and were more likely to narrate in the passive voice for those slides. In contrast, the
18 native English speaking control group participants did not show sensitivity to the adversity condition to a significant level (Cowan, 1995).

In another study of 80 Mandarin speaking Year 9-12 high school ESL learners in Taiwan, informants were tested on their comprehension (grammaticality judgment) and production (written translation) of English passives. The sentences they were given were manipulated to vary among others the adversity status. The manipulation was done to the immediate context preceding each target sentence. The authors of the study reported that the semantic property of adversity was the easiest among other features of the passives, such as word order and verb inflection, to acquire in the sense that it elicited the highest number of accurate responses (Chen & Liu, 1998). My data for the Mandarin speaking EFL learners also confirmed their finding that the semantic property of adversity depicted in an event facilitates EFL learners’ processing of passive constructions.

As discussed in Section 2.3.3, while adversity is not a prominent semantic feature in English passive constructions, there is still a slight statistical predisposition for passives to occur with pejorative readings. This is evident from the finding of Xiao et al.’s corpus-based distribution of 15% negative versus 4.7% positive readings of be-passives (Xiao, et al., 2006). Patient affectedness is a dominant characteristic of the passive prototype (Shibatani, 1985; Meints, 1999; Sugimura, 2003; see also Suzman, 1987). When affectedness is strongly felt, it is most likely of an undesirable kind. In the SLA context, the Object Affected Condition proposed by Y. Wang (2002, 2009c) followed the Transitivity Hypothesis (Hopper & Thompson, 1980) and claimed that the higher the transitivity an event involves, the higher degree to which the patient argument of an event is affected, the easier it is for L2 learners to narrate it in the passive voice. This affectedness also interacts with the animacy level of the agent argument; the more animate the agent, the more conceivable in learners’ minds it is for the agent to affect the patient; thus when given the pragmatic focus, learners could more easily close in on the notion of affectedness and produce passives accordingly. Lastly, adversity functions implicitly as an endogenous pragmatic cue that underscores the patient argument as being in a predicament that is more “newsworthy” (Hopper & Thompson, 1993, p. 358; see also Song, 1988). The notions of patient affectedness, animacy and newsworthiness that adversative
passives entail are individual aspects that reflect the core notion of conceptual accessibility (Bock & Warren, 1985). Adversative passives are more prototypical by virtue of their being more conceptually accessible to speakers. Adverse outcomes are conceptually more prominent, accessible, concrete and more easily identified or delimited conceptually than neutral or non-adverse outcomes. Learners start with the most conceptually accessible and concrete linguistic form-function associations, and gradually develop in L2 by analogy to cover the less conceptually accessible associations.

The facilitative effect of semantic information in passive sentence processing was found in a recent ERP study of 20 Chinese college students (Chang, 2009). It was found that in comprehending English passives, semantic anomalies (e.g. #The article was washed by Jack) engendered a N400 negativity whereas syntactic anomalies (e.g. *The article was wrote by Jack) engendered an early left-anterior negativity (ELAN) around 150 ms. after the onset of the target stimuli, followed by a P600 positivity. This is in line with previous ERP studies on English children and adults (Hahne & Friederici, 1999; Hahne, et al., 2004; compare with Rossi, Gugler, Friederici, & Hahne, 2006 for similar findings with L2 learners of German and Italian). For sentences with double anomalies (e.g. #*The article was drived by Jack), the two anomalies elicited a N400 and then a P600; however the amplitude of these two deflections in double anomaly sentences were smaller compared to the ones engendered in single anomaly scenarios. Specifically, comparing the change in the amplitude of N400 and P600 elicited in the single and double anomaly scenarios, the attenuation in amplitude for P600 was greater than for N400. This suggested an asymmetrical interaction between syntax and semantics in sentence processing: learners rely more heavily on semantics in on-line processing.

The felicitous use of passive constructions is evidence of speakers’ efforts to be pragmatic interfacing with their syntactic competence. Such manipulation is triggered by the discourse-pragmatic condition to which one is exposed. This endogenous cue is spontaneous and inherent in adversative events by virtue of their adversity status and thus they are more conceptually accessible to speakers. The endogenous cue of conceptual accessibility is additional to the exogenous visuoperceptual colour/arrow cues manipulated in the stimuli, but this endogenous
cue is absent in non-adversative trials. Recasting the semantic property of adversity in the light of its enhancement effect on conceptual accessibility, it is logical to conclude that the more and the stronger the discourse-pragmatic cues a trial carries, the stronger facilitative effect it has on learners to take the perspective of the cued entity. My results show that advanced learners ($p < .001$), but not the low level learners ($p = .354$), produce significantly more adversative passives than non-adversative passives. Hence, Hypothesis 5B is supported.

The Developmentally Moderated Transfer Hypothesis (Pienemann, Di Biase, Kawaguchi, et al., 2005) predicts that any L1 transfer will be moderated or constrained by L2 development. Only those learners who are developmentally ready to or able to transfer can, but will not necessarily, transfer features in L1 into their L2. Adversity is a central characteristic in Chinese passives, a trait that my learners as native Mandarin speakers were presumably highly sensitive to. DMTH could potentially explain why adversity did not have a noticeable facilitative effect on less proficient learners in my study, but did for the university educated ESL and EFL groups. Interpreting my results in terms of DMTH would mean that less proficient learners had to struggle with processing the propositional contents using underdeveloped L2 procedures, so that their L1 could have very limited influence on their processing of L2. Advanced learners on the other hand were ready to use the necessary L2 procedures and their L1 could now influence the way they executed those L2 procedures. However, as I did not have another group of learners of an L1 with adversity as a strong characteristic of its passive voice, I am unable to draw any conclusion on any possible L1 transfer effect in the absence of the third contrastive group. My data nevertheless suggest further testing DMTH at the higher pragmatic-syntactic level as a promising line of research. Future research in this direction may expand the coverage of DMTH beyond its current scope of L2 morpho-syntax (Sayehli, 2001; Håkansson, et al., 2002; Pienemann, Di Biase, Kawaguchi, et al., 2005).

### 5.5.3 Passives with Ditransitive Verbs

With regards to learners’ performance of passives in narrating three-participant events, the following null hypothesis was tested:
Hypothesis 5C: Learners will not differ in their performance in producing theme-subject and goal-subject passives involving ditransitive verbs.

I predicted that learners would narrate in the passive voice equally reliably for theme-cued trials (e.g. The book was given to Tom by Anna) as they would in goal-cued (e.g. Tom was given the book by Anna) trials. To determine if learners, and in fact if native English speakers also, would readily narrate in the passive voice for theme/goal-cued trials, informants’ performances in ditransitive trials were examined by adopting a “Hit or Miss” point system. The “Hit or Miss” system simply tallies up all the passive responses as “Hits” and all the non-passive responses as “Misses”. An informant was awarded 1 point (“Hit”) for employing passive constructions, i.e. implementing the correct theme/goal-to-subject mapping and applying the necessary morpholexical operation to form a passive sentence; the informant was awarded 0 point (“Miss”) if he or she failed to achieve either. In other words, whereas a patient-active sentence such as the girl fell to the ground would have been awarded 2 points under my scoring scheme established in Section 4.4.2, it would be considered a “Miss” under the “Hit or Miss” system and gain no point.

Data from learners in the cross-sectional study were collected for a total of 312 goal-cued trials and 312 theme-cued trials. In addition, 36 responses of each type of ditransitive passive were collected from the Control group.

Figure 5.7 shows the mean percentages of tallied scores for passives produced for the two trial types by proficiency group.
Figure 5.7. Percentage of passives produced for Goal-cued and Theme-cued trials by proficiency groups.

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Advanced Level Learner Group</th>
<th>EFL Learner Group</th>
<th>Low Level Learner Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal-cued</td>
<td>39</td>
<td>25</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Theme-cued</td>
<td>86</td>
<td>68</td>
<td>36</td>
<td>19</td>
</tr>
</tbody>
</table>

Figure 5.8. Mean Hit scores of Goal-cued and Theme-cued trials by proficiency groups.

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Advanced Level Learners</th>
<th>EFL Learners</th>
<th>Low Level Learners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal-cued</td>
<td>1.556</td>
<td>1.000</td>
<td>0.121</td>
<td>0.400</td>
</tr>
<tr>
<td>Theme-cued</td>
<td>3.444</td>
<td>2.720</td>
<td>1.455</td>
<td>0.750</td>
</tr>
</tbody>
</table>
Table 5.11
Two-tailed paired t-test of Hit scores of Goal-cued and Theme-cued trials by proficiency groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>SD</th>
<th>t statistics</th>
<th>p</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.888</td>
<td>1.166</td>
<td>t(8) = 4.86</td>
<td>.001**</td>
<td>2.143</td>
</tr>
<tr>
<td>Adv. Level</td>
<td>1.720</td>
<td>1.429</td>
<td>t(24) = 6.02</td>
<td>&lt;.001**</td>
<td>1.455</td>
</tr>
<tr>
<td>EFL Group</td>
<td>1.333</td>
<td>1.493</td>
<td>t(32) = 4.54</td>
<td>&lt;.001**</td>
<td>1.226</td>
</tr>
<tr>
<td>Low Level</td>
<td>.350</td>
<td>.812</td>
<td>t(19) = 1.93</td>
<td>.069</td>
<td>.303</td>
</tr>
</tbody>
</table>

* Significance ≤ .05 ** Significance ≤ .01

A two-tailed paired t-test showed that informants were more likely to produce passives in theme-cued trials than in goal-cued trials (Table 5.11). The difference between the two trial types was significant for every proficiency group (p < .001) except the Low Level Learner Group (p = .069). Moreover, the contrast between the theme-cued condition and the goal-cued condition as measured by the effect size estimate, was most pronounced in the Control Group (d = 2.143), followed by the Advanced Level Learner Group (d = 1.455) and the EFL group (d = 1.226), and was least pronounced in the Low Level Learner Group (d = .303).

5.5.3.1 Discussion

Although as it appears in Figure 5.7, informants across the groups fared worse with Goal-cued trials, if I focused just on informants mapping the cued entity to the subject in line with the pragmatics of the discourse context, a very different picture emerged. I re-evaluated the data using a broadened “Hit or Miss” criterion that rated all responses with the cued entity in the subject position as Hits (Figure 5.9 below). The results from this recast yielded a strong tendency in native speakers and learners responding in a similar fashion to the Patient-Active Strategy for goal-cued trials. The natives and learners alike tended to map the cued goal arguments to the subject, followed by verbs of inherent noncanonical mapping (e.g. to receive, accept), or predicates that effectively turned the goal argument into a volitional, agent-like argument (e.g. wait for, order, enjoy, buy):

Natives:

(84) (AU01 S32) the monkey accepted the flowers

(AU03 S36) a man’s getting coffee brought to him (causative construction)

(AU04 S32) the monkey is receiving some flowers

(AU07 S36) the man is waiting for his dinner
Learners:

(IT03 S32)  a monkey is receiving a bunch of flowers
(IT14 S32)  a gorilla accept a bunch of flowers
(NT08 S37)  a cat was enjoy her fish
(NT09 S37)  a cat want to eat a fish
(TW03 S36)  a customer order a coffee
(CE02 S32)  the monkey buy the flower
(CE04 S32)  monkey is happy to get flowers
(BE05 S37)  cat. have lunch fish

In fact, in comparing Figure 5.7 with Figure 5.9 below, we see a reverse in the trend in terms of pragmatically mapping the cued entities to the subject.

Table 5.12
Two-tailed paired $t$-test of cued-entity-to-subject mappings produced for Goal-cued and Theme-cued trials by proficiency groups.

<table>
<thead>
<tr>
<th></th>
<th>$M$</th>
<th>$SD$</th>
<th>$t$ statistics</th>
<th>$p$</th>
<th>Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>.111</td>
<td>.601</td>
<td>$t(8) = .55$</td>
<td>.594</td>
<td>-</td>
</tr>
<tr>
<td>Adv. Level</td>
<td>.760</td>
<td>1.267</td>
<td>$t(24) = 3.00$</td>
<td>.006**</td>
<td>.0699</td>
</tr>
<tr>
<td>EFL Group</td>
<td>1.333</td>
<td>1.493</td>
<td>$t(32) = 4.54$</td>
<td>&lt;.001**</td>
<td>.963</td>
</tr>
<tr>
<td>Low Level</td>
<td>1.350</td>
<td>1.348</td>
<td>$t(19) = 4.48$</td>
<td>&lt;.001**</td>
<td>1.125</td>
</tr>
</tbody>
</table>

* Significance $\leq .05$   ** Significance $\leq .01$
A two-tailed paired *t*-test (Table 5.12) showed that learners were more successful at goal-subject mapping than theme-subject mapping. The native controls equally and reliably mapped the cued entity (goal and theme) to the subject (*p* = .594). The difference between the goal- and theme-cued trials was significant for all of the learner groups (*p* < .01).

Turning our attention firstly to the goal-cued condition, native control and learners showed low Hit rate (below 50%) in producing ditransitive passives when the argument cued in the trials was goal. This does not mean however that informants failed to map the cued goal argument to the subject. Figure 5.9 reveals that if concerned solely with the Hit rate of the appropriate argument-function mapping, informants in fact more readily mapped the cued argument to the subject under the goal-cued than the theme-cued condition; where they failed to achieve high Hit rates was due to the fact that informants on many occasions did not follow through the noncanonical mapping with passive predicates. Informants were much more likely to proceed with active predicates such as *buy* or *order* or predicates of exceptional verbs such as *receive* than to proceed with completing the sentence with passive predicates. The goal-cued condition was characterised by less successful use of passives and more successful argument-function mapping for native speakers and learners alike.

I argue the dominant factor that explains the similar mapping pattern observed in the informants with regards to goal/theme-cued ditransitives is the animacy status. I pointed out in Section 2.4.5 the universal nature of animacy as a discourse principle. Psycholinguistic studies have repeatedly demonstrated the importance of animacy combination in speech processing. In the revised Levelt’s model, Bock and Levelt (1994) argued that animacy determines the conceptual accessibility of NPs and is an influential factor in the functional processing subprocess of the Grammatical Encoder. In other words, animacy is a processing factor, as the more animate entity tends to be processed first and be functionally assigned to be the subject (Bock & Levelt, 1994; Rosenbach, 2005, 2008). In terms of language acquisition, animacy plays an important role in English children’s L1 development of dative alternation constructions (Snyder, 2003; de Marneffe, Grimm, Arnon, Kirby, & Bresnan, 2009).
Animacy as a major significant factor in English dative alternations has been established using a recently proposed statistical model (Bresnan, Cueni, Nikitina, & Baayen, 2007; Bresnan & Nikitina, 2009), and the robustness of this model has subsequently been confirmed in a series of computational corpus linguistic studies of dative alternations in L1 development (de Marneffe, et al., 2009) and in major varieties of English (Theijssen, 2008; Bresnan & Hay, 2008; de Marneffe, et al., 2009; Bresnan & Ford, 2009; see also Grice & Stefanowitsch, 2004). For example, animate goal arguments have been found to be over five times more likely than inanimate goal arguments to appear as NP2 in the prepositional dative version of the ditransitive construction (Bresnan, et al., 2007).

Since all the goal arguments in the ditransitive trials were animate and all the theme arguments were inanimate, when goal arguments were cued, their intrinsic animate status disposed learners and natives to take them as the loci of viewpoint in narrating the event (Osgood & Bock, 1977; Qi, 1996; Liu, 2003a; Gao & Xia, 2005). In terms of speech processing, inanimacy correlates with increase in level of difficulty in processing; the incremental nature of speech processing means that the less resource-intensive information, i.e. the animate argument, is produced first (Tanaka, et al., 2005; Tanaka, 2006; Branigan, et al., 2008). This accounts for the high success rate of context-compatible goal-to-subject mapping in the goal-cued condition.

Once the goal argument is mapped to the subject, speakers need to choose between producing an active or a passive predicate, the choice of which would treat the goal argument as either a dynamic quasi-agent or a static undergoer respectively. Recent electrophysiological studies suggest a Mandarin and possibly universal preference for processing animate agents (Philipp, et al., 2008). When the animacy status of an NP preceding a critical verb is incompatible with what the verb orients the listener to anticipate (e.g. For the breakfast, the egg eats… The violation is the inanimate egg can be eaten but does not eat), it elicits a robust P600 effect, indicating a relatively greater difficulty in processing the conflicting status of inanimacy and agency (Kuperberg, Sitnikova, Caplan, & Holcomb, 2003; Kuperberg, Caplan, Sitnikova, Eddy, & Holcomb, 2006; Kuperberg, Kreher, Sitnikova, Caplan, & Holcomb, 2007). This explains the strong tendency that was observed in both natives and learners for applying the Patient-Active Strategy following the animate-goal-to-subject mapping;
it also accounts for the low success rate of passive predicates in goal-subject ditransitives.

The opposite is true for theme-subject ditransitives. Therefore in the theme-cued condition, since inanimate entities are harder to process and less easily accessible, the inanimacy status of themes makes them more resistant to being mapped to the subject position, hence a theme-cued condition is characterised by a significantly lower success rate of theme-to-subject mapping, as seen in Figure 5.9. With regards to the robust disposition of selecting passive predicates once theme-to-subject mapping is executed, I argue that the motivation lies still in the contrastive animacy status of the goal-theme arguments. As mentioned earlier, the two crucial determinants of the passivisability of the event are (i) the higher the degree to which a patient is affected, and (ii) the lower the degree of control it has over an eventuality (Shibatani, 1985; Klaiman, 1988; Meints, 1999; Y. Wang, 2002). In the case of transfer of possession involved in my ditransitive trials, the theme arguments were inert and by definition more affected than the goal arguments, since the themes were being disposed of in some way whereas the goal arguments were recipients or static destinations in the triadic events. The affectedness principle therefore suggests that for my ditransitive trials in the Slideshow task, once a cued theme argument is mapped to the subject, by virtue of being inanimate and inert, it is best construed as being disposed of and therefore the most controlled and affected entity in the triadic events, consequently most easily passivisable.

In summary, I have proposed the universal factor of animacy as the underlying motivation and processing factor for the opposite patterns of behaviour observed in learners and natives. The animacy status of goal and theme, along with the associated advantages in processing animate and inanimate entities in specific manners account for the relatively low rates of passives yet high rates of pragmatic mapping under the goal-cued condition, as well as the opposite pattern under the theme-cued condition.

The final note I wish to make here is the use of animacy as a compensatory heuristics in speech processing. English L1 studies have revealed that animacy plays a crucial role in the L1 development of dative alternation constructions. As children get older and more proficient in the language, they rely less on animacy and more on other
cues to help them make word order choices (Snyder, 2003). Moreover, research has also shown that less skilful L1 speakers, such as children with SLI, and aphasic patients rely more heavily on the semantic information of animacy to compensate for their syntactic inadequacies and help alleviate processing load (Saffran, et al., 1980; MacWhinney, Osmán-Sági, & Slobin, 1991; Saffran, et al., 1998; Wong, Leonard, Fletcher, & Stokes, 2004). These are relevant to my results here; as we can see from Figure 5.9, the higher success rate in mapping animate goals to SUBJ relative to mapping inanimate themes to SUBJ was much more noticeable in less proficient learners than in advanced learners (i.e. the difference between the blue and maroon bars, which is negligible in native speakers). Just as children’s reliance on animacy lessens as their L1 develops, adult L2 learners’ reliance on animacy also gradually diminishes as their L2 proficiencies increase and progress towards native-like attainment.

The issue of passivised dative constructions is an important one that requires more careful investigations. L1 studies on the dative alternation in actives provide useful backgroup information, but inquiries into the issue in the SLA context in a more methodical manner and from a more theoretically grounded approach are essential. It will be the task for future research to take this matter further.

5.6 Pretest / Posttest Study

This section reports on the results of the pretest/posttest study.

5.6.1 Results for Control Group

In terms of scores for argument-function mapping, following the scoring scheme outlined in Section 4.4.2, the total possible score that could be awarded for 15 patient-cued trials and 4 theme-cued trials is 57. As pointed out in the preceding section, since predicates hurt and broken when appearing without an agentive by-clause show a strong propensity to behaving in an adjectival manner, Trial No. 34, 35 & 40 involving these two predicates were excluded from this analysis. Additionally, goal-cued trials were also excluded from this analysis, as the higher degree of animacy of the goal arguments meant that even the native English speakers preferred against employing the passive in such conditions (e.g. The lady received some flowers. See Section 5.5.3).
Table 5.13
Argument-function mapping scores for patient/theme-cued trials of the Slideshow task by the Control group.

<table>
<thead>
<tr>
<th>Informant No.</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mapping Scores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AU01</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AU02</td>
<td>53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AU03</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AU04</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AU05</td>
<td>53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AU06</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AU07</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AU08</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AU09</td>
<td>56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary \((n = 9)\)

\[
M = 54.555, \ SD = 2.242
\]

Table 5.14
Argument-function mapping scores for patient/theme-cued trials of the Slideshow task by informants in the I&T group.

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT02</td>
<td>23</td>
<td>49</td>
</tr>
<tr>
<td>IT03</td>
<td>51</td>
<td>56</td>
</tr>
<tr>
<td>IT04</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>IT05</td>
<td>53</td>
<td>55</td>
</tr>
<tr>
<td>IT06</td>
<td>50</td>
<td>51</td>
</tr>
<tr>
<td>IT07</td>
<td>40</td>
<td>43</td>
</tr>
<tr>
<td>IT08</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td>IT09</td>
<td>53</td>
<td>52</td>
</tr>
<tr>
<td>IT10</td>
<td>40</td>
<td>56</td>
</tr>
<tr>
<td>IT11</td>
<td>56</td>
<td>56</td>
</tr>
<tr>
<td>IT12</td>
<td>46</td>
<td>47</td>
</tr>
<tr>
<td>IT13</td>
<td>50</td>
<td>51</td>
</tr>
<tr>
<td>IT14</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td>IT15</td>
<td>54</td>
<td>54</td>
</tr>
</tbody>
</table>

Summary \((n = 14)\)

\[
M = 47.571, \ SD = 8.644
\]

Table 5.15
Argument-function mapping scores for patient/theme-cued trials of Slideshow task by informants in Non-I&T group.

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT01</td>
<td>41</td>
<td>42</td>
</tr>
<tr>
<td>NT02</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td>NT03</td>
<td>23</td>
<td>49</td>
</tr>
<tr>
<td>NT04</td>
<td>56</td>
<td>53</td>
</tr>
<tr>
<td>NT06</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>NT07</td>
<td>51</td>
<td>53</td>
</tr>
<tr>
<td>NT08</td>
<td>51</td>
<td>45</td>
</tr>
<tr>
<td>NT09</td>
<td>50</td>
<td>53</td>
</tr>
<tr>
<td>NT10</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>NT12</td>
<td>47</td>
<td>54</td>
</tr>
<tr>
<td>NT13</td>
<td>50</td>
<td>55</td>
</tr>
</tbody>
</table>

Summary \((n = 11)\)

\[
M = 47.272, \ SD = 9.034
\]

\[
M = 49.727, \ SD = 5.349
\]

\[
M = 53.181, \ SD = 2.676
\]
Table 5.13 to Table 5.15 show the raw argument-function mapping scores (based on the scoring scheme of Section 4.4.2) for patient/theme-cued trials of the Slideshow task by members of the Control group ($M = 54.555, SD = 2.242, Mdn = 56, n = 9$), I&T group and Non-I&T group respectively. As the scores awarded for the responses are ordinal data following the scoring scheme stated in Section 4.4.2, nonparametric statistical analyses were applied to the data.

### 5.6.2 Results for I&T Group

The I&T group improved with the reception of each semester’s academic training. The group performance for the I&T group ($n = 14$) improved from T1 ($M = 47.571, SD = 8.644, Mdn = 50.500$) to T2 ($M = 51.857, SD = 3.958, Mdn = 52.500$), to T3 ($M = 54.142, SD = 1.747, Mdn = 54.000$).

A Friedman’s two-way ANOVA by rank test was performed for the I&T group ($k = 3, n = 14$) to determine whether there was a significant difference in the mean ranks of informants’ performance over the three time periods. The difference between the mean ranks of the three sessions was found to be significant (Friedman’s $\chi^2 = 9.69, df = 2, p = .008$). Table 5.16 shows the rank sums and mean ranks of the three sessions for the I&T group.
Table 5.16
Rank sums and mean ranks of T1-T3 for I&T group.

<table>
<thead>
<tr>
<th></th>
<th>Rank Sum</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>19.500</td>
<td>1.393</td>
</tr>
<tr>
<td>T2</td>
<td>29.500</td>
<td>2.107</td>
</tr>
<tr>
<td>T3</td>
<td>35.000</td>
<td>2.500</td>
</tr>
</tbody>
</table>

A *post hoc* analysis using the nonparametric version of Fisher’s protected LSD procedure was performed (see Meilgaard, Civille, & Carr, 2007, p. 343 for a discussion on applying this *post hoc* procedure with Friedman’s test). The *post hoc* found that the difference between T1 and T2 was marginally significant (*p* = .059), and significant (*p* = .003) between T1 and T3, as shown in Table 5.17.

Table 5.17
*p*-value matrix of Fisher’s protected LSD *post hoc* analysis for I&T group following Friedman’s test.

<table>
<thead>
<tr>
<th></th>
<th>T2</th>
<th>T1</th>
</tr>
</thead>
<tbody>
<tr>
<td>T3</td>
<td>.299</td>
<td>.003**</td>
</tr>
<tr>
<td>T2</td>
<td>-</td>
<td>.059</td>
</tr>
</tbody>
</table>

* Significance ≤ .05  ** Significance ≤ .01

A one-tailed Wilcoxon sign-ranked test was performed to confirm the finding of significance for the difference between the mean ranks of T1 (*M* = 50.500) and T3 (*M* = 54.100), as well as to estimate the effectiveness of 2 semesters of I&T training on the informants’ communicative and pragmatically appropriate use of passive constructions. The significance finding was confirmed (*p* = .004, *T* = 10, *z* = 2.671). The effect size estimate *r* score was then calculated from the *z* score obtained (see Rosenthal, 1991, p. 19), *r* = .504, which is considered a large effect size (Cohen, 1988).

### 5.6.3 Results for Non-I&T Group

The Non-I&T group also improved with each semester’s academic training. The group performance for the Non-I&T group (*n* = 11) improved from T1 (*M* = 47.272, *SD* = 9.034, *Mdn* = 50.000) to T2 (*M* = 49.727, *SD* = 5.349, *Mdn* = 53.000) to T3 (*M* = 53.181, *SD* = 2.676, *Mdn* = 55.000).

A Friedman’s two-way ANOVA by rank test was performed for the Non-I&T group (*k* = 3, *n* = 11) to determine whether there was a significant difference in the mean
ranks of informants’ performance over the three time periods. The difference between the mean ranks of the three sessions was significant (Friedman’s $\chi^2 = 10.15$, $df = 2$, $p = .007$). Table 5.18 shows the rank sums and mean ranks of the three sessions for the Non-I&T group.

Table 5.18
The rank sums and mean ranks of the three sessions for the Non-I&T group.

<table>
<thead>
<tr>
<th></th>
<th>Rank Sum</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>16</td>
<td>1.455</td>
</tr>
<tr>
<td>T2</td>
<td>20</td>
<td>1.818</td>
</tr>
<tr>
<td>T3</td>
<td>30</td>
<td>2.727</td>
</tr>
</tbody>
</table>

A post hoc analysis using the nonparametric Fisher’s protected LSD procedure was performed. The post hoc test found that the difference between T1 and T2 was not significant ($p = .394$), but the difference was significant between T1 and T3 ($p = .003$) and significant between T2 and T3 ($p = .033$), as shown in Table 5.19.

Table 5.19
$p$-value matrix of Fisher’s protected LSD post hoc analysis for the Non-I&T group following the Friedman’s test.

<table>
<thead>
<tr>
<th></th>
<th>T2</th>
<th>T1</th>
</tr>
</thead>
<tbody>
<tr>
<td>T3</td>
<td>.033*</td>
<td>.003**</td>
</tr>
<tr>
<td>T2</td>
<td>-</td>
<td>.394</td>
</tr>
</tbody>
</table>

* Significance $\leq .05$  ** Significance $\leq .01$

A one-tailed Wilcoxon sign-ranked test was performed to confirm the finding of significance for the difference between the mean ranks of T1 ($M = 47.2$) and T3 ($M = 53.1$), as well as to estimate the effectiveness of 2 semesters of Non-I&T academic training in English on the informants’ communicative and pragmatically appropriate use of passive constructions. The significance finding was confirmed ($p = .005$, $T = 2$, $z = 2.606$). The effect size estimate $r$ score was then calculated from the $z$ score obtained, $r = .555$, which is considered a large effect size (Cohen, 1988) and is slightly larger than the $r$ score of .504 for the I&T group.

5.6.4 Evaluation of Performance using “Hit or Miss”

To confirm the results which I obtained from following the scoring scheme stated in Section 4.4.2 and subsequently applying the nonparametric statistical tests, I re-evaluated the informants’ performance of the Slideshow task, this time adopting the
“Hit or Miss” system. The results of this reanalysis using the “Hit or Miss” tally system served as a comparison with the results that were derived from the Friedman’s tests and the Wilcoxon’s tests.

Informants’ performance on 19 trials was examined; the total possible score an informant could gain was 19. Table 5.20 to Table 5.22 show the tallied numbers of passives produced by the Control group, the I&T and the Non-I&T group against the 19 trials respectively. Figure 5.11 summarises these tallies in the form of a bar graph.

**Table 5.20**  
Tallied numbers of passives produced for patient/theme-cued trials of the Slideshow task by the Control group.

<table>
<thead>
<tr>
<th>Informant No.</th>
<th>Mapping Scores (out of 19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU01</td>
<td>18</td>
</tr>
<tr>
<td>AU02</td>
<td>16</td>
</tr>
<tr>
<td>AU03</td>
<td>18</td>
</tr>
<tr>
<td>AU04</td>
<td>15</td>
</tr>
<tr>
<td>AU05</td>
<td>17</td>
</tr>
<tr>
<td>AU06</td>
<td>18</td>
</tr>
<tr>
<td>AU07</td>
<td>16</td>
</tr>
<tr>
<td>AU08</td>
<td>19</td>
</tr>
<tr>
<td>AU09</td>
<td>18</td>
</tr>
</tbody>
</table>

Summary \((n = 9)\)  
\(M = 17.222, SD = 1.302\)

**Table 5.21**  
Tallied numbers of passives produced for patient/theme-cued trials of the Slideshow task by the I&T group over the three time periods.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT02</td>
<td>3</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>IT03</td>
<td>15</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>IT04</td>
<td>16</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>IT05</td>
<td>15</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>IT06</td>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>IT07</td>
<td>12</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>IT08</td>
<td>15</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>IT09</td>
<td>17</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>IT10</td>
<td>8</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>IT11</td>
<td>18</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>IT12</td>
<td>13</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>IT13</td>
<td>15</td>
<td>15</td>
<td>16</td>
</tr>
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<td>17</td>
<td>16</td>
</tr>
<tr>
<td>IT15</td>
<td>18</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

Summary \((n = 14)\)  
\(M = 13.714, SD = 4.140\)  
\(M = 15.643, SD = 2.061\)  
\(M = 16.500, SD = 1.345\)
Table 5.22
Tallied numbers of passives produced for patient/theme-cued trials of the Slideshow task by the Non-I&T group over the three time periods.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT01</td>
<td>10</td>
<td>9</td>
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<td>NT02</td>
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<td>NT03</td>
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<td>14</td>
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<tr>
<td>NT13</td>
<td>14</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

Summary (n = 11)

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>12.818</td>
<td>4.262</td>
</tr>
<tr>
<td>T2</td>
<td>14.364</td>
<td>2.767</td>
</tr>
<tr>
<td>T3</td>
<td>15.909</td>
<td>2.119</td>
</tr>
</tbody>
</table>

Figure 5.11. Summary by informant groups of the means of tallies on number of passives produced for patient/theme-cued trials T1-T3.

Results from a one-way repeated measures ANOVA confirmed a significant difference in the mean number of passives produced over the three sessions by the I&T group ($F(2, 26) = 4.66, p = .019$) and by the Non-I&T group ($F(2, 20) = 3.56, p = .047$). A post hoc Tukey’s HSD (α = .05) test found that both I&T and Non-I&T informants showed a significant improvement in producing passives in T3 compared to T1. The effect size estimate $r$ score obtained for the T1-T3 pairwise comparison yielded a large effect size estimate for both the I&T group ($r = .412$) and the Non-I&T group ($r = .417$).
5.6.5 Performance on Adversative Passives T1-T3

In terms of I&T and Non-I&T group members’ improvement on adversative and non-adversative passives, Table 5.23 and Table 5.24 show the tallied scores for the two passive types organised into the I&T and Non-I&T group respectively.

Table 5.23
Tallied scores for adversative/non-adversative passives over three time periods by I&T group.

<table>
<thead>
<tr>
<th></th>
<th>Non-Adversative (n = 7)</th>
<th>Adversative (n = 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
</tr>
<tr>
<td>IT02</td>
<td>1</td>
<td>2</td>
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<tr>
<td>IT03</td>
<td>5</td>
<td>6</td>
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<tr>
<td>IT04</td>
<td>5</td>
<td>4</td>
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<tr>
<td>IT05</td>
<td>3</td>
<td>5</td>
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<tr>
<td>IT06</td>
<td>5</td>
<td>6</td>
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<tr>
<td>IT07</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>IT08</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>IT09</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>IT10</td>
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<td>6</td>
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<tr>
<td>IT11</td>
<td>7</td>
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<tr>
<td>IT12</td>
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<tr>
<td>IT13</td>
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<td>4</td>
</tr>
<tr>
<td>IT14</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>IT15</td>
<td>7</td>
<td>6</td>
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</tbody>
</table>

Summary (n = 14)
M = 4.642, SD = 1.772
M = 4.642, SD = 1.446
M = 4.857, SD = 1.099
M = 5.714, SD = 1.683
M = 6.357, SD = .497
M = 6.785, SD = .425

Table 5.24
Tallied scores for adversative/non-adversative passives over three time periods by Non-I&T group.

<table>
<thead>
<tr>
<th></th>
<th>Non-Adversative (n = 7)</th>
<th>Adversative (n = 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
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<tr>
<td>NT01</td>
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<tr>
<td>NT02</td>
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<td>4</td>
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<tr>
<td>NT03</td>
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<td>NT04</td>
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<td>NT06</td>
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<td>NT08</td>
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<td>NT09</td>
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<tr>
<td>NT10</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>NT11</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Summary (n = 11)
M = 4.181, SD = 1.470
M = 4.383, SD = 1.120
M = 4.818, SD = 1.537
M = 5.000, SD = 1.673
M = 5.818, SD = 1.167
M = 6.363, SD = .924
Results from the one-way repeated measures ANOVA showed that in producing non-adversative passives, the I&T group did not behave significantly differently over the three sessions \( (p = .397) \). This is also true for the Non-I&T group \( (p = .500) \). On the other hand, the effects of adversity on producing passives was significant in the I&T group \( (F(2, 26) = 3.71, p = .038) \) and also in the Non-I&T group \( (F(2, 20) = 3.84, p = .039) \). A post hoc Tukey’s HSD \( (\alpha = .05) \) test found that both I&T and Non-I&T informants showed a significant improvement in producing adversative passives in
T3 compared to T1. The effect size estimate $r$ score obtained for the T1/T3 pairwise comparison yielded a large effect size estimate for both the I&T group ($r = .399$) and the Non-I&T group ($r = .450$).

5.6.5.1 Discussion

The research question and the empirical hypothesis for this study are repeated here:

(Q6) Does tertiary level Interpreting and Translation training facilitate learners’ appropriate use of noncanonical mapping of English passive constructions compared to other tertiary level non-interpreting and translation trainings?

*Hypothesis 6: Two semesters of tertiary level I&T training will accelerate the development of noncanonical mapping of L2 passives compared to 2 semesters of tertiary level non-I&T training delivered in English.*

Both learner groups improved steadily over the 3 sessions. This indicates that the two groups differed only quantitatively, not qualitatively. The I&T group performed similarly to the native controls, the Non-I&T group followed closely behind. In terms of the pattern of improvement of the two groups, we noticed that the I&T group surged after one semester’s training (T1 to T2: $p = .059$, marginally significant), and then plateaued from T2 to T3. The pattern was reversed for the Non-I&T group, plateauing at first, but showing significant improvement after the second semester (T2 to T3: $p = .033$).

It should be pointed out at the outset that the fact that both groups were very close to native-like performance by T3 shows that in terms of applying the correct discourse-pragmatic mapping, there was a ceiling effect or saturation with the Slideshow task in the learners after 2 semesters of postgraduate study in Australia. The ceiling effect is also likely to explain the non-significant improvement span for the I&T group from T2 to T3.

The T1/T3 pairwise comparison was significant for both groups by both measures.
(parametric and nonparametric data). The effect size estimate quantifies the effect of the treatment as revealed in the difference between the two measurements. Hence, I take the effect size estimate of the T1/T3 pairwise comparison as the improvement index for within-subject comparison. The effect size estimates based on both the nonparametric and parametric tests place the Non-I&T group and the I&T group in very similar ranges; nonparametric test: $r = .504 \& .555$, parametric test: $r = .417 \& .412$ for the two groups respectively.

However, in considering Hypothesis 6, comparing the effect of one semester of more focus-on-function academic training (I&T) with the effect of one semester of less focus-on-function academic training (Non-I&T), the parametric test shows that the I&T group made significant improvement in T1-T2 (one-tailed $p = .049, t(13) = 1.77, r = .282$); the improvement in the Non-I&T group was smaller ($r = .210$) and not significant (one-tailed $p = .133, t(10) = 1.18$). Likewise, the nonparametric test indicates a significant finding (one-tailed $p = .018, z = 2.100, T = 9.500$) and a larger effect ($r = .397$) for the I&T group, but a smaller effect ($r = .152$) and a non-significant finding for the Non-I&T group (one-tailed $p = .236, z = .714, T = 20.500$). These support the hypothesis that I&T training, as a form of language training that more explicitly focuses on the pragmatic force of L2, accelerates advanced learners’ acquisition of noncanonical mapping of passives. Hypothesis 6 is supported.

The accelerated learning effects that the I&T learners obtained from their postgraduate training in Semester 1 likely stemmed from the I&T curriculum placing greater emphasis on striving for L1 <- L2 (or Source Language <- Target Language) pragmatic equivalence (Hale, 2007). In general, trainee I&T practitioners are trained to discern the pragmatic thrusts of the source language messages and then to strive to recreate the same pragmatic dynamism for the audience in the target language. This training strengthens learners’ awareness of the syntax-pragmatics interface in L1 and L2 and helps learners to execute noncanonical mapping in appropriate discourse-pragmatic contexts.

Turning our attention finally to advanced learners’ performance of adversative passives over the three sessions, a similar picture emerged in terms of the pattern and pace of improvement of the two groups relative to each other. The I&T group
reached native-like proficiency for adversative passives at T2, the Non-I&T group achieved the same native-like level at T3. In contrast to adversatives, both groups improved very little with non-adversative passives in two semesters. The adversity status, as pointed out in Section 5.5.2.1, was an extremely captivating cue that the I&T group even outperformed the native Control group slightly in T3 despite having potentially reached saturation, although due to the small sample sizes this small difference would have been barely noticeable and would potentially have had no impact. The results with non-adversative passives suggest that this is an area to which Mandarin L1 learners of English L2 at all levels need to pay heed; an area in which L2 instruction could step up their targeted training and focus on it.

5.6.6 Shifts in Advanced Learners’ Use of Alternative Strategies

Turning our attention now to trends in shifts of alternatives strategies by the advanced learners, Figure 5.14 below shows the distribution of alternative strategies by the two groups of advanced learners:

![Distribution of alternative strategies by I&T and Non-I&T Group (T1-T3)](image)

*Figure 5.14. Distribution of alternative strategies by I&T and Non-I&T Group (T1-T3)*
T3).

Figure 5.15. Trends of shifts in alternative strategies by I&T Group (T1-T3).

Figure 5.16. Trends of shifts in alternative strategies by Non-I&T Group (T1-T3).

A clear pattern of development emerges in Figure 5.14 - Figure 5.16, illustrating
advanced learners’ shifts from the predominant use of context-incompatible agent-actives to a preponderance of the relatively more pragmatic strategies involving noncanonical mapping in the pretest/posttest study. The sharp decline in the proportion of the blue bars from T1 to T3 in both groups as indicated by the dashed trend line demonstrates learners’ relinquishing of the agent as the default subject irrespective of the context conditions. Learners transitioned from being largely dependent on canonical mapping to using strategies that involve the more pragmatic, context-compatible noncanonical mapping. While topicalisations and intransitives may not necessarily be more idiomatic than actives in English, I argue that they are of a transitional nature and suggest that learners are in the process of becoming more sensitive to invoking non-default syntactic structures to convey the pragmatic thrust of a given proposition in L2. Lastly, it is also interesting to note that as indicated by the dotted trend line in Figure 5.15 and Figure 5.16, both groups produced a higher proportion of invalid and irrelevant responses in T2, which then dropped again in T3. This appears to further support my contention that the advanced learners experienced a transitioning period. As learners became more aware of the need to select appropriate structures other than the default agent-actives, their attempts to depart from canonical mapping at T2 meant having to prioritise cognitive resource allocations. Once they decided against employing the default agent-subject mapping, they then had to allocate attention and processing resources between producing the correct message content and the correct form of passive constructions. Any detour from canonical mapping while having yet to automatise processing passives would have meant that learners’ responses at T2 overall would have been under more stress and time pressure. Responses at T2 produced under less ideal conditions would have been more prone to errors and more likely to be irrelevant to the target propositions. By T3, the learners’ skills of assigning prominence to non-agents by means of noncanonical mapping had become more stabilised and more proceduralised. They could prioritise cognitive resource allocations more efficiently and be more poised in performing the tasks.

5.7 Passive Morphology

This section discusses some of the characteristics of learners’ use of the passive morphology.
5.7.1 Get-passives

I have discussed extensively the typological proximity between the English get-passives and the Chinese bèi-passives (and also its variants jiào, ràng, gěi) in Sections 2.3 and 5.4.4. One could therefore expect that Mandarin speakers would produce more get-passives than be-passives, or if not more, at least a substantial proportion. However, only three native speakers, two advanced learners and two EFL learners produced any agentive get-passives in the cross-sectional study:

(86) (AU02 S39) the doctor is getting shot at
    (AU06 S05) the church got hit by lightning
    (AU08 F04) the green fish got eaten by the pink fish
    (IT08 S02) a bird got shoot by an arrow
    (IT08 S06) a worker got hurt got hit by a ball
    (IT12 F06) the pink one got swallowed by the black one (11 in total)
    (TW31 S06) the boy is . get hurt . by a ball
    (TW31 S21) the . the man get hurt . by a car

The remaining instances of get-passives were agentless and only in conjunction with hurt, hence they were possibly produced as a formulaic chunk:

(87) (TW05 S34) the boy got hurt
    (TW07 S34) the boy was got hurt
    (TW08 S34) the boy got hurt . so he’s yelling at
    (TW08 S40) oh his . the arm is . get got hurt
    (TW14 S34) oh he gets hurt
    (TW18 S34) the little boy get hurt in her in his knee
    (TW25 S06) the boy is hurt . gets hurt
    (TW25 S34) the boy . get hurt
    (TW25 S40) he get hurt
    (TW28 S34) the boy get hurt

It is well established in FLA that English children produce get-passives much earlier than they start producing be-passives and with much higher frequency (Harris &
Flora, 1982; Johnson, 1985). It has also been noted that English speaking patients with Alzheimer’s disease produced significantly more get-passives than their age-matched neurologically intact peers (Bates, et al., 1995). By contrast, only 8% of the passives produced by adults in Marchman et al.’s (1991) study were get-passives.

In attempting to explain the apparent paradox of get-passives being an infrequent passive prototype and the qualitatively distinct pattern of passives observed in English speaking young children and AD patients (Bates, et al., 1995), Marchman and colleagues (1991) proposed an alternative view on get- and be- passives based on the semantic structures of get and be. According to this alternative, the verb get is a change-of-state verb (e.g. John gets mad), therefore the emphasis of a get-passive (e.g. John gets hit) is on the change that takes place in the patient argument upon an action by the agent. By contrast, be is mostly used to discuss constant or static states (e.g. John is tall). Marchman et al. claimed that the expression is hit to most speakers is more distant from the semantic core of concrete transitive events than gets hit. Thus when get and is compete with each other in the given scenario, get would be more attractive to speakers as a semantically more fitting candidate (see Suzman, 1985, 1987). Marchman et al. claimed this to be the reason why we see more get and get-passives in substandard dialects, in speech of very low registers and in the language of small children. This could also be the reason for the relatively more frequent get-passives observed among AD patients. Presumably, the interactions with written language and deliberate training, as well as the sheer force of convention, i.e. formal L1 instruction on language use, have driven get out of formal registers and much of adult speech.

In adult L2 acquisition, given the fact that the L2 learners investigated in my studies learned the language mostly through formal classroom instruction, the artificially created linguistic environment in classrooms, coupled with the typical classroom foci on reading, writing and speaking “proper” English, most probably resulted in very limited exposure to and coverage of get in general and get-passives in particular.

5.7.2 “Be” + V-ed

Another example of the strong influence of the formal classroom instruction type of L2 acquisition is the use of “be”+Ved employed by a few learners:
and the boy be shooten by the baseball
the red fish be eaten by the blue fish
the green fish be eatened by the pink fish
a old man is be hit by a bicycle
a wall is be paint paint
wow the girls is be push away
and there’s a bottle and the be broken
the red fish be eaten by grey fish
a cat be touch by girl
the woman be kiss by another person
a doctor was shot be shot

This appears to have resulted from learners’ direct and indiscriminate insertion of the metalinguistic formula of ‘passive voice = “be”+Ved’ as taught in language classes. The formula appeared to have been directly inserted rather than thoughtfully applied to the sentences. The fact that it was produced in the infinitive form “be”, which would not agree with any number-feature of the subject also indicates that it was directly inserted as an unprocessed, metalinguistic unitary chunk.

5.7.3 Infinitive + By-ADJ

Similar to the Verb Avoidance strategy, another example of learners’ overwhelming dependence on the semantic property of the preposition in indicating the active/passive voices comes from several informants who often produced infinitive verbs followed by the preposition by as the key indicator of passivity, as in (89):

a man was service by . service a coffee
a black fish has been eat by . grey fish
a grey fish has been eat by . a white fish
red fish was eat by yellow f blue fish
blue fish was eat by grey fish
the doctor is shoot by a man
the green fish was eat by pink fish
white fish was eat by black fish
This was most notable in TW10, who employed this strategy consistently throughout the entire data collection session. TW10 later revealed that she felt “infinitive verbs + by” was the most efficient and the safest thing to do; it eliminated the need to switch from active to passive and it avoided the passive form altogether, which often required irregular inflections, while still ensuring that the grammatical voice of each sentence could be unambiguously expressed.

According to the Competition Model, the more dominant and reliable a particular cue is, the more influential it is to the interlocutor in speech processing. The study by Li and colleagues of Mandarin adult speakers’ sentence comprehension in an agent identification task reported that for Mandarin speakers, bèi is the overriding cue (Li, Bates, & MacWhinney, 1993). Considering the similar semantic function of bèi and by, and by extension other English prepositions of direction, Mandarin learners of English L2 may project their strong reliance on bèi in Mandarin across to by in English as a coping strategy.

5.7.4 Ving + By-ADJ

Finally, a very common mistake in learners’ data was the incorrect use of the -ing instead of the -ed inflection on verbs:

(90)  (IT04 S10)  the boy is licking by a dog
      (IT11 S14)  a cat is pampering by a little girl
      (NT06 S24)  the wall was painting by a woman
      (NT10 S16)  a a mouse was catching by a cat
      (TW16 S16)  a mouse is ... is catching by cat
      (CE06 F17)  red fish was eating by grey fish
      (CE04 S01)  a car was towing by a . truck
      (CE08 S06)  the the worker is sh . is sh shooting by a ball
      (CL04 S15)  a cat was . holding by a girl
      (CL05 S21)  a man was crashing by a bicycle
I reiterate the proposal I put forth in Section 3.3.2 that this type of mistakes result from the differential activation threshold of the two competing lemmas *Ved* and *Ving*. In lemma access (Levelt, et al., 1999), the target passive lemma *Ved* receives spreading activation from the conceptualisation stratum and its subcategorisation information becomes activated. During the processing of activating the target *Ved*, some spill-over activation spreads to the closely related and competing active lemma *Ving*. The non-target active lemma *Ving*, which has a low activation threshold by virtue of its high frequency and absolute regularity, occasionally reaches the activation threshold ahead of the target *Ved* lemma and is unintentionally selected. Nevertheless, the subcategorisation information or semantic role assignment information in the combinatorial nodes (Pickering & Branigan, 1998; Hare & Goldberg, 1999) of the other co-activated, target passive lemma *Ved* encroaches on the active lemma *Ving* and disposes it to adopt the passive *Ved* lemma’s combinatorial node, leading to the speaker producing the selected *Ving* lemma but followed by an agentive *by*-clause adjunct of the non-selected *Ved* lemma (see O’Séaghdha, 2002).

5.8 Summary of Chapter 5

This chapter provided results from the cross-section study of ESL and ELF learners and the pretest/posttest study of advanced ESL learners. I firstly established that passives are more difficult to process than actives due to the noncanonical mapping required in producing them. Results from the cross-sectional and pretest/posttest studies showed that learners’ development of passives and other alternative structures in spontaneous speech proceeds in the following implicational order of syntactic structures: canonical mapping > noncanonical mapping requiring less processing > noncanonical mapping requiring more intense processing. This implicational order reflects learners’ processing capacities in online, dynamic and time constrained conditions.

The pretest/posttest study also looked at the effectiveness of postgraduate level I&T and Non-I&T training in helping advanced learners to be more pragmatic in their choice of passives as an optional syntactic structure in online speech. An initial advantage was found in I&T training over non-I&T training after one semester. The
advantage dissipated at the end of the second semester possibly due to a ceiling effect; the two groups were comparable in terms of the extent to which they improved in the use of passives after two semesters of training.
This chapter concludes my thesis on the development of English L2 passives by Mandarin speakers from a processability-developmental perspective (Pienemann, Di Biase, & Kawaguchi, 2005; Pienemann, 2007). Section 6.1 summarises the major findings on the development of English passives in conjunction with the research questions. Section 6.2 outlines the implications of this study in regards to its theoretical contribution to PT, as well as some practical applications to TESOL and I&T training. Finally, Section 6.3 points out some of the limitations of this thesis and provides some suggestions for further research.

6.1 Summary of Major Findings

I summarise my main findings in this section in relation to my Research Questions.

(Q1) Are passive constructions more difficult for English L2 learners to process than active constructions?

Speech onset latency results from the FishFilm task established that passives are more difficult to process than actives, requiring more time to initiate than actives. They also highlight the fact that passive constructions serve as an indicator to learners’ overall L2 proficiencies. The SOL in producing passives decreased as L2 proficiencies increased. The shift in the SOL patterns from lower level learners to close to native-like in advanced learners suggest that learners’ processing of L2 passive constructions develops in parallel to their L2 morpho-syntax. Learners’ development of L2 passives and morpho-syntax interact in that the more automatised their L2 morpho-syntax, the more processing resources there are available for learners to process discourse-pragmatic information.

(Q2) Is there a relationship between learners’ L2 morpho-syntactic development and their acquisition of L2 passives?
There is limited evidence from the present study that the inter-phrasal procedure is the prerequisite, but not an absolute indicator of learners’ acquisition of English passives. This echoes previous findings from Japanese L2 (Kawaguchi, 2005) and English L2 (Kawaguchi & Zhang, 2007; Zhang, 2007a; Keatinge & Keßler, 2009). Due to data limitation, my data at hand does not allow me to make any conclusive claim with regards to the direct implicational relationship between a learner’s PT stage of L2 morpho-syntax and their development of L2 passives. Future research with a more focused methodological design can pursue this issue further.

(Q3) Among learners who have acquired the inter-phrasal procedure, do they show differential performance in passive-eliciting tasks of different degrees of cognitive demand?

Further to the off-line/on-line distinction in processing passives reported by Kawaguchi and Zhang (2007), results from my cross-sectional study showed that learners who have acquired the inter-phrasal procedure will show differential between-subject and within-subject performance in tasks of different levels of cognitive demands; those who could handle the high-demand task could handle the low-demand task, but not vice-versa. Investigations into discriminatory tasks and L2 performance under different conditions of cognitive loads will contribute to developing and refining PT as a theory of SLA from L2 emergence to automatisation (Kawaguchi & Di Biase, forthcoming; Bettoni & Di Biase, forthcoming).

(Q4) When learners do not produce the passive construction contrary to the contextual orientations, what alternative strategies, if any, do they adopt to process the same discourse-pragmatic information?

The cross-linguistic study of learners of varying proficiencies painted a picture of gradual development of English L2 passives from a qualitative and quantitative perspective. Quantitatively, less proficient learners produced less passives, more invalid responses and produced more actives instead compared to advanced learners. More proficient learners also produced more responses using alternative strategies that involve noncanonical mapping. Qualitatively, the alternative strategies that
learners adopted could be explained by the different level of processing intensity involved in processing alternatives as opposed to passives. There was no qualitative difference observed in the EFL group compared to the ESL groups.

(Q5) Is there a passive-specific developmental path?

Learners’ non-native like, asymmetric distribution of different types of passives was again due to the level of processing intensity involved in producing certain types of passives over other types. In short, the more complex the event structure, the more distant an event is from the passive prototype as determined by the conceptual accessibility of the event, then the more effortful and processing-intensive such an event will be for learners to narrate using a passive construction. Hence the relative order of development for the specific types of passives examined in this thesis as suggested by my results are as follows:

- agentless > agentive
- adversative > non-adversative

Preliminary evidence on subjectivised double objects or prepositional datives suggests:

- goal-subject non-passives > theme-subject non-passives
- theme-subject passives > goal-subject passives

(Q6) Does tertiary level Interpreting and Translation training accelerate development of noncanonical mapping of L2 passives compared to other tertiary level non-interpreting and translation training?

The pretest/posttest study with the I&T and the Non-I&T learner groups revealed that these advanced learners differed in their acceleration of L2 learning of processing English passives. As professional I&T training focused more on the strategic use of language and the pragmatic force of interlocution compared to non-I&T training, I&T as focus on function training accelerated L2 development. The
acceleration effect of professional language training dissipated at the end of the first semester, possibly due to the advanced learners having reached the ceiling. The two groups in the end were comparable in terms of the extent to which they improved in the use of passives after two semesters of training. In terms of general L2 development, the pretest/posttest study also offered a longitudinal and more developmental perspective than did the cross-sectional study on advanced learners’ access to optional structures involving noncanonical mapping, including passives and other alternative structures of noncanonical mapping to passives.

6.2 Implications of the Study

6.2.1 Implications for Processability Theory

The language constellation of the present inquiry is Mandarin L1, an isolating language whose word order for passives is $S_{\text{PATIENT}}\text{-ADJ}_{\text{AGENT}}\text{-V}$, and English L2, which marks passivity with morphology and orders passives in $S_{\text{PATIENT}}\text{-V-ADJ}_{\text{AGENT}}$.

This thesis therefore contributes to the growing body of literature attesting to the current PT as a typologically robust theory of SLA (Kawaguchi, 2007; Kawaguchi & Zhang, 2007; Zhang, 2007a, 2007b; Conroy, 2007; Keatinge & Keßler, 2009; K. Wang, 2009a). In particular, evidence from the present thesis supports the proposition that structures involving the lexical mapping of a non-agent role to the subject function will be more costly to process irrespective of linguistic typology and the difference in L1-L2 word order.

Secondly, while the emergence criterion is a crucial construct in determining the point of acquisition of a particular L2 construction, the recent research direction of PT investigating the transition from L2 emergence to automatisation will add a valuable dimension and further strengthen the explanatory power of PT.

Thirdly, this thesis also points to the costs of processing optional structures as resulting from an interaction of lexical mapping and other factors which are both internal of and external to the lexicon. Learners’ production of agentless passives, their use of the Intransitivity Strategy, as well as electrophysiological evidence point to factors at the discourse, lexico-syntactic and lexico-semantic levels as exerting varying degrees of influence on the processing difficulty of a given structure. These
factors include information flow, biases of individual lexical items, contrasts in animacy, the adversity status of events, and the complexity of argument structures.

By extension, results from learners’ performance of ditransitive passives also suggested that since the Lexical Mapping Hypothesis limits its own field of enquiry to lexical mapping, as it stands at present, it is unable to adequately predict the acquisition of structures involving noncanonical mappings of thematic roles other than the agent and the patient (e.g. theme, goal).

Finally, the Thematic Hierarchy as a construct is crucial in numerous linguistic theories, yet there is a lack of consensus in the literature on the exact nature, structure and constituents of this construct (Dowty, 1991; Rappaport Hovav & Levin, 2007). While PT’s Lexical Mapping Hypothesis follows LFG’s Lexical Mapping Hypothesis, neither stated their theoretical position explicitly on the similarities and/or dissimilarities between structures involving verbs of canonical agent-first argument realisation (e.g. *Peter kicked Mary*) and “psych-verbs” or “experiencer verbs” (e.g. *Peter loved Mary*) (Bellitti & Rizzi, 1988; Pesetsky, 1995). Furthermore, theoretical issues relating to the canonicity of the two classes of psych-verbs, namely subject-experiencer verbs (e.g. *Peter admired Mary*) and object-experiencer verbs (e.g. *Peter amused Mary*), as well as the canonicity status of the passive version of the two classes of psych-verbs (e.g. *Mary was admired by Peter* and *Mary was amused by Peter*) remain to be dealt with explicitly by PT.

6.2.2 Practical Recommendations

The present thesis found that canonical mapping precedes noncanonical mapping. Within noncanonical mapping, various factors at discourse, syntax and semantic levels interact to lessen or increase the degree of processing intensity required of learners for a given construction. The Teachability Hypothesis (Pienemann, 1984, 1989, 1998) suggests that formal language instruction should work with and facilitate the natural acquisition sequence. L2 language educators should adopt a processability-oriented pedagogical approach in order to maximise the effectiveness of formal second language instruction. This thesis has contributed to a clearer understanding of the recently proposed PT extension and its place in L2 learners’ developmental trajectories. The pedagogical implications arising from the results of
this thesis will have applicability in syllabus design and focus on form in TESOL and L2 teaching in general. In particular the implicational order of development for the passive constructions examined should be taken into account. Educators can design syllabuses such that the less processing intensive passives are taught first. Language instructors should take full advantage of the “constructional grounding” nature of predicative adjectives for agentless passives, which then in turn provides grounding for agentive passives. For advanced level English teaching or I&T training where learners are highly proficient and developmentally ready to handle the full spectrum of passives, instructors should draw learners’ attention to the more peripheral, less prototypical passives such as goal-subject passives and non-adversative passives. Instructors should also highlight to advanced learners the context and register-appropriate use of get-passives.

Additionally, in terms of English L2 language testing and assessment, incorporating items that target learners’ spontaneous production of optional structures such as passives allows one to gain further insight into learners’ L2 psycholinguistic processing skills. Insights of high-level L2 skills can be particularly valuable information for special purposes such as student admission to specialised courses of high language demands (e.g. the Master of Interpreting and Translation or Master of Conference Interpreting programs offered at the University of Western Sydney). Finally, this thesis provides further theoretical and empirical motivations for the employment of high level structure-specific online speech elicitation tasks in language assessment or language profiling schemes such as the Rapid Profile (Keßler, 2007; Keßler & Keatinge, 2008).

### 6.3 Limitations and Suggestions for Further Research

There are a number of limitations in my thesis. One such limitation is the relatively small sample size with which to compute significance testings. Another one is the small discrimination between ESL and EFL learners. The Mandarin speakers recruited in Australia all learned English in EFL contexts prior to coming to Australia; many had not been in Australia for a substantial period of time at the time of data elicitation. The only clear contrast between the two informant types was the informants in the EFL group had never lived in any English speaking country,
making their English acquisition exclusively EFL. It will be interesting to compare EFL learners with ESL learners who acquired English purely through immersion in an English speaking country.

In terms of the research design, unfortunately the FishFilm task was only semi-randomised. A fully randomised version of it would further add to the reliability of the reaction time data gained from it. My results would have been validated further if a delayed posttest had also been administered to the learners some time after T3.

The present thesis has also spawned a number of issues for further research. Firstly, an issue that is relevant to Lexical Mapping Hypothesis is the bias towards passives inherent in certain verbs (e.g. angered, thrilled), possibly making the passive version the default for those verbs (Menn, 2000; Gahl, 2002; Gahl, et al., 2003). Canonicity in lexical mapping, therefore, may perhaps in some cases be only relative, as it would then have to compete with the lexical bias of specific verbs in question. It will be interesting to see the interaction of canonical mapping and lexical bias in the processing and development of passives and other optional structures.

One way to combat animacy as a confounder in goal-subject and theme-subject passives is to control the animacy level of goal and theme. However, as Snyder (2003, p. 54) pointed out, it is difficult to control for animacy with 3-argument events due to the fact that it is rare to find realistic contexts that allow for animate themes or more importantly inanimate goals (cf. Roeper, et al., 1981). Further research can consider controlling this and other potential confounders to better isolate the effects of lexical mapping on goal- and theme-subject passives. Some other semantic properties of interest to control in future research are the contrast between actional versus psychological verbs as mentioned above (see Manouilidou, et al., 2009), and the different degrees of patient affectedness and verb transitivity within the class of actional verbs (e.g. The sheet of paper was torn up vs. The sheet of paper was blown away). These factors will affect the likelihood of learners producing passives (see Maratsos, et al., 1985). The latter semantic aspect was not controlled in Slideshow. The FishFilm task did provide control for it by showing repeated instances of only one action type, i.e. eat. Should further research provide a way to control the degree of affectedness and transitivity while using more than one verb, any effect found
could then be attributed to the canonicity status of the lexical mappings with greater confidence.

The passive voice is only one of many optional structures of a discourse-pragmatic significance. Another area for further research on the Lexical Mapping Hypothesis is the unaccusative (e.g. Jane fell) and unergative (e.g. Jane jumped) constructions, and constructions of lexical causative verbs that alternate between transitives and unaccusatives (e.g. The woman drowned Peter and Peter drowned) (see Geyer & Grossman, 1994; Grossman & White-Devine, 1998). Moreover, LMH predicts that L2 learners learn to apply noncanonical mapping firstly “in single clauses such as in Passive constructions, and later in complex predicates such as Causative constructions” (Kawaguchi & Di Biase, 2005; see Kawaguchi, 2007; Kawaguchi, 2009 for acquisition of the causative construction in Japanese L2). The causative reflexive and non-reflexive get-passives (e.g. Jane got herself fired and Jane got Peter fired) provide another testing ground to further test LMH in English and to potentially examine the effects in SLA of double markedness from mapping.

The standard treatment of agentless passives is ambiguous between adjectival and verbal in the absence of other disambiguating adverbial or contextual cues (Cook, 1990). However, a gradient view of the semantics of passives has been proposed (Toyota, 2002) and it further distinguishes adjectival passives into purely statives and resultatives. According to this classification, statives describe the natural state of an entity and do not imply any agency (e.g. The house is surrounded by oak trees), while resultatives describe the state of an experiencer, the state in which the experiencer is in was caused by an implied agent or a source/stimulus (e.g. I was surprised at the noise). The implication of this fine-grained view of adjectival passives for L2 development and LMH is unknown; further research may consider probing into this issue.

A final suggestion for further research was pointed out earlier in Section 5.5.2.1, Mandarin L1 learners of English L2 showed an acute sensitivity to adversity in producing passives. The results point to this phenomenon as possibly stemming from an L1 transfer effect. Hence, a promising line of further research is to test PT’s Developmentally Moderated Transfer Hypothesis at the higher level skills of
pragmatic-syntactic interface with optional structures such as passives. This line of research will provide a valuable contribution to further testing DMTH from a fresh perspective, in addition to existing supporting evidence coming from investigations of L2 morpho-syntax (Sayehli, 2001; Håkansson, et al., 2002; Pienemann, Di Biase, Kawaguchi, et al., 2005).

Since its original version, PT has broadened its scope of investigation and explanation from L2 morpho-syntax into the domains of pragmatics-syntax interface and the relationship between L2 development and L1 transfer while at the same time maintaining its typological validity. This thesis makes a contribution to the refinement and furthering of those aspects of PT.
References


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14 Reference works in Chinese are documented in their original Chinese bibliographical information, followed by the official English translation of the article/publication title in square brackets if available. Where no official English translation of the article/publication title is provided in the original work, or in the event that the English translation is inaccurate, may potentially be obscure or misleading, my version of the English translation of the article/publication title is provided instead. In regards to the Romanisation of Chinese authors’ names, every endeavour was made to determine the Romanised form of authors’ names either as officially provided in the original works or as used by the respective authors themselves elsewhere. In the event that the Romanised form of a Chinese author’s name could not be ascertained, the Hanyu Pinyin Romanisation was adopted. The names of Japanese authors of Chinese works are provided in the Japanese Romanisation followed by the names in Kanji Chinese characters in brackets.


Håkansson, G. (2005). Similarities and differences in L1 and L2 development: Opening up the perspective: Including SLI. In M. Pienemann (Ed.), *Cross-
linguistic aspects of Processability Theory (pp. 179-198). Amsterdam: John Benjamins.


Hatcher, A. G. (1949). To get/be invited. Modern Language Notes, 64(7), 433-446.


Huang, H.-M. (2009). 黃恆銘著：漢語失語症病人有關句法位移及論旨角色指派之語句表達與理解 *Syntactic displacement and asyntactic thematic role*


Kaiser, E., & Trueswell, J. C. (2002). A new 'look' in the processing of non-canonical word orders: Anticipating upcoming referents on the basis of


representation of spatial thinking and speaking. *Journal of Memory and Language, 48*(1), 16-32.


Liu, L.-J. (2003a). 刘礼进 著：生命性对英汉语 NP 用法的作用 - 一项语料考察 [A corpus-based investigation into the role of animacy in the use of NPs in English and Chinese discourse]. 外语教学与研究(外国语文双月刊) [Foreign Language Teaching and Research (Bimonthly)], 35(2), 110-119.


comprehension of complement clauses by patients with Parkinson’s disease. 
*Neuropsychologia, 31*(9), 951-964.


Pienemann, M. (2002). The procedural skill hypothesis for SLA. In P. Burmeister, T. Piske & A. Rohde (Eds.), *An integrated view of language development*:
Papers of honor of Henning Wode (pp. 43-56). Trier: Wissenschaftlicher Verlag.


psycholinguistics: Major thrusts of research and theory (pp. 329-392).
Hillsdale, NJ: Lawrence Erlbaum.


Tomlin, R. (2002). FishFilm [Digital Animation]: Retrieved on 30/5/2006, from http://logos.uoregon.edu/tomlin/FishFilmResources/FishFilm.MOV.


Ullman, M. T., Corkin, S., Coppola, M., Hickok, G., Growdon, J. H., Koroshetz, W. J., et al. (1997). A neural dissociation within language: Evidence that the mental dictionary is part of declarative memory, and that grammatical rules are processed by the procedural system. *Journal of Cognitive Neuroscience, 9*(2), 266.


Appendix A

Pictures Used in Speech Elicitation

(1) Pictures from the speech elicitation task used to elicit the 3rd person singular -s inflection

*A day in the Life of Amy* task
(2) Pictures from the speech elicitation task used to elicit WH + AUX-second questions.

*Bob and his Customers* task
Appendix B

Screenshots of *Slideshow* and *FishFilm*

(1) Sample of slides used in the *Slideshow* task displayed using DMDX.
Sources of Appendix A-B:


2. Visual stimuli from Hartsuiker, Pickering & Veltkamp (2004) and Bernolet (2008). I wish to thank the authors for giving me permission to modify and use the images for this thesis.

3. Images in the public domain downloaded from WPClipart. The images were downloaded, modified and used in accordance with the WPClipart Terms of Use as retrieved on 15/10/2007 [http://www.wpclipart.com/legal.html](http://www.wpclipart.com/legal.html).
(2) Sample screenshots of the animation clip *FishFilm*.

Source: *FishFilm*, Copyrighted © 2002-04 Russell S. Tomlin. Retrieved on 30/5/2006 from: http://logos.uoregon.edu/tomlin/FishFilmResources/Fish Film.MOV
Appendix C

Beep+VP Narratives

C.1 Results of Beep+VP Narratives

Table C.1 shows the statistics for SOL of Beep+VP narratives in *FishFilm* by informant groups. Figure C.1 is the graphical representation of the average SOL shown in Table C.1.

Table C.1

<table>
<thead>
<tr>
<th>Informant Group</th>
<th>Active (ms.)</th>
<th>Passive (ms.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (n = 3)</td>
<td>$M = 429$, $SD = 64$</td>
<td>$M = 359$, $SD = 82$</td>
</tr>
<tr>
<td>Adv. Level (n = 13)</td>
<td>$M = 610$, $SD = 248$</td>
<td>$M = 455$, $SD = 135$</td>
</tr>
<tr>
<td>Low Level (n = 4)</td>
<td>$M = 523$, $SD = 152$</td>
<td>$M = 401$, $SD = 103$</td>
</tr>
<tr>
<td>EFL Group (n = 13)</td>
<td>$M = 611$, $SD = 225$</td>
<td>$M = 560$, $SD = 233$</td>
</tr>
</tbody>
</table>

A one-tailed paired $t$-test was performed for all the informant groups to determine if there was a significant difference between the latencies of active and passive trials narrated in the Beep+VP manner. The $t$-test showed that the latencies for the active and passive trials differed significantly for the Advanced Level Learner Group,
however this time in the opposite direction. The Advance Level Learner Group on average was slower in agent-cued trials in initiating utterances constituting the VP following the dynamic event ($M = 155.692$, $SD = 163.758$, $t(12) = 3.43$, $p = .002$, Cohen’s $d = 0.778$) than in patient-cued trials. The results of the paired $t$-test for the Control group ($p = .105$), the Low Level Learner Group ($p = .261$) and for the EFL Group ($p = .139$) did not reach significance.

C.2 Discussion

Figure C.1 and the subsequent $t$-test show that at least for the Advanced Level Learner Group, the trend in SOL for Beep+VP narratives was opposite to that of the Beep+S narratives. In Beep+VP narratives, the mean SOL for passive sentences was shorter than for active sentences, i.e. relative to the beep, learners retrieved $\textit{was}$ in (93a) faster than $\textit{ate}$ in (93b):

(93)   (a) the red fish $[\textit{beep}]$ $\textit{was}$ eaten by the blue fish  
      (b) the red fish $[\textit{beep}]$ $\textit{ate}$ the yellow fish

This observation cannot be fully explained at the moment. I do however speculate that the difference in SOL for Beep+VP narratives does not primarily reflect a reduced cost in processing passive constructions in this manner. A possible explanation to account for the shorter SOL for passive trials in Beep+VP is the open/closed-class distinction between the lemmas $\textit{was}$ and $\textit{ate}$. In Beep+VP narratives, the first lemma an informant had to produce subsequent to the beep or the dynamic event would have been either an auxiliary (e.g. $\textit{was}$) in the case of a passive, or a full verb (e.g. $\textit{ate}$) in the case of an active. The passive and active voice versions differed in the lexical-categorical membership of the key words in question. This difference could potentially influence reaction time in two ways: by virtue of frequency or by word-class type.

Firstly, in terms of frequency, the sheer high frequency and the ubiquitous use of the auxiliary $\textit{was}$ and its variants mean that they have a much higher baseline activation level for lemma access than full verbs and can be produced faster (Oldfield & Wingfield, 1965; Glaser, 1992; Bock, Konopka, & Middleton, 2006). Moreover, any
lexical access attempt for an auxiliary would be carried out within a restricted and constant number of items is also likely to contribute to their high baseline of activation.

Secondly, ERP studies have revealed that while both open- and closed-class words are capable of eliciting qualitatively similar N400 responses, they differ markedly in that closed-class words elicit significantly attenuated measures of N400 compared to the ones elicited by the frequency-matched open-class words (Van Petten & Kutas, 1991; Neville, Mills, & Lawson, 1992; Nobre & McCarthy, 1994; Osterhout, Bersick, & McKinnon, 1997; Münte, et al., 2001; see also Van Petten & Kutas, 1990). Moreover, the low frequency of open-class words enlarges the amplitude of N400 responses they recruit. Such enlargement in amplitude as a low-frequency effect, however, is minimal in closed-class words, possibly due to frequency saturation and floor effects (Brown, Hagoort, & ter Keurs, 1999). The quantitative difference, i.e. reduced amplitude in closed-class words, indicates participants’ less effortful processing of closed-class words.

![Figure C.2](image.jpg)

**Figure C.2.** Mean speech onset latencies of Beep+VP with auxiliary used for actives and passives.

Speech onset latency time data from two learners and one native speaker furnish
more corroborating evidence in favour of the speculation that a shorter SOL for passives in Beep+VP reflects more prominently the ease in accessing auxiliaries rather than a less effortful implementation of noncanonical argument-function mapping. If the speculation is true, once the advantage in fast lexical access of auxiliaries is neutralised or removed, I would expect to see a SOL pattern that reflects the greater processing costs of implementing noncanonical argument-function mapping, as I have established in Section 5.1.1. The lexical access advantage would be neutralised if an auxiliary is used for active and passive trials, as in (94a-b) and (95a-b).

The native speaker AU03 narrated both actives and passives in the present continuous tense and the present perfect tense:

(94)  
(a) *purple fish [beep] has eaten a white fish*  
(b) *a purple fish [beep] has been eaten by a white fish*

(95)  
(a) *a red fish [beep] is eating another fish*  
(b) *a blue fish [beep] is being eaten by a green fish*

This way, the advantage of fast lexical access of the auxiliary for passive trials dissipates. Where the lexical category of the keyword subsequent to the beep remains the same for both voices, any difference in SOL could logically be attributed to the speaker’s mental manipulation of argument-function mapping. The mean SOL for AU03 and two other learners who behaved in the same way are given below:
Finally, informants TW29 and TW33 produced a combination of Beep+S and Beep+VP. Their SOL data show a longer mean SOL for the passive in Beep+S narratives and a shorter SOL for Beep+VP narratives, thereby further narrowing down the difference in the SOL pattern of the two narrative types to the presence and absence of advantages specific to the lexical access of closed-class words.

In sum, SOL data from Beep+VP narratives appeared at a first glance inconsistent with Hypothesis 1B, i.e. SOL for passives were shorter than that for actives. Without making any conclusive claims, I speculated that the shorter SOL for passives in Beep+VP narratives were due to the ease of accessing the auxiliary rather than any gain in processing argument-function mappings. SOL data from informants who used auxiliary verbs for both actives and passives, therefore effectively neutralising the advantage of fast auxiliary lexical access, could be interpreted as evidence in favour of my speculation and consequently in favour of supporting Hypothesis 1B.