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Task Complexity and Grammatical Development in ESL

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To my Mum and Dad

林忠梅，马东坡

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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.

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Abbreviations

Aux	auxiliary
IL	interlanguage
I&T	Interpreting and Translation
L1	first language
L2	second language
LREs	language-related episodes
EAP	English for Academic Purpose
EFTs	error-free T-units
ESL	English as a second language
EFL	English as a foreign language
IELTS	International English Language Testing System
NP	noun phrase
NS	native speaker
NNS	non-native speaker
OBJ	object
PRED	predicate
PT	Processability Theory
SLA	second language acquisition
SUBJ	subject
SVO	subject verb object
TCF	Triadic Componential Framework
VP	verb phrase
WSU	Western Sydney University
ZISA	Zweitspracherwerb Italienischer und Spanischer Arbeiter
3sg *-s*	the third person singular form

Abstract

This study investigates whether second language learners' interlanguage (IL) systems change according to the tasks they perform. This is a long-debated issue in the fields of SLA and language learning pedagogy, as it may have implications for language assessment and syllabus design. Pienemann's (1998) Steadiness Hypothesis states that the basic nature of an IL system does not change across different communication tasks, provided they involve the same skill type. Pienemann claims that it is the learner's L2 developmental stage rather than the nature of different tasks, which influences linguistic competence. Tarone (1985, 1988, 2014) and Bayley and Tarone (2012), on the other hand, claim that IL is systematically and predictably variable across tasks as a result of style shifting due to shifts in social and contextual variables such as the topic of the interaction. One important element missing in the debate is the definition of 'different tasks'. In recent years, however, Robinson's Cognition Hypothesis (2003) has provided some clear criteria for classifying tasks according to their cognitive complexity. The present study, therefore, tests the two competing positions on IL variability by applying the Cognition Hypothesis for task evaluation. The main research question in the study is whether learners' IL systems vary with tasks of different degrees of cognitive complexity. In order to answer the question, tasks were designed by manipulating the task complexity variable of ± *few elements,* ± *here-and-now* and ± *planning time.* Tasks used in studies which apply Pienemann's Processability Theory (PT, 1998) are used in this research.

In this study, 30 adult Chinese L1-English L2 learners in Australia were recruited based on their IELTS scores: 10 were from IELTS band 7.0 or above; 10 were from IELTS bands 5.0–5.5 and 10 were from IELTS band 4.5. First, the issue of competence in relation to tasks was approached by assessing the competence of learners by using traditional PT profiling tasks, such as 'spot the difference' tasks. The second step was to use Robinson's (2007) cognitive complexity criteria to assess learners in each group while they performed a set of picture description tasks. Each learner's performance was measured in terms of its accuracy and syntactic complexity based on the learner's PT developmental stage to check whether the IL system across tasks was invariant. The results of this experimental study showed that each learner was quite stable across tasks in terms of morphological and syntactic complexity. The results of the accuracy analysis showed some, but not significant, differences between

variables. This suggests that a learner's IL system remains steady across tasks and within tasks of different degrees of cognitive complexity. The results of this study thus support Pienemann's Steadiness Hypothesis (1998).

Chapter 1 Introduction

In the field of second language acquisition (SLA), the issue of whether a learner's second language (L2) competence or interlanguage system varies according to the task being performed has long been debated (Chomsky, 1986a; Long, 2007, 2009, 2010; Long & Doughty, 2011; Pienemann, 1998; Robinson, 2001; Shohamy, 1996). The answer to this question may have implications for language assessment and syllabus design (Norris, Brown, Hudson & Yoshioka, 2015; Robinson, 2009; Skehan, 2001). Tasks are an important means of connecting learners with language use, particularly in the modern language classroom, and they play a central role in learning (Bygate, Swain & Skehan, 2013; Richards & Rodgers, 2001; Williams & Burden, 1997). The setting of tasks in L2 classrooms is a good way for learners to practise, and it may help improve their language skills (Ferris & Tagg, 1996; Gutiérrez, 2005; Oxford, 1994; Pica, 1994a, 1994b; Swain, 2006) or reveal the gaps in their language knowledge (Leow, 2002; Schmidt, 1993, 2001). The pedagogic potential of tasks has been the focus of task-based language teaching and learning since the mid-1980s (Nunan, 2006; R. Ellis, 2000; Samuda & Bygate, 2016; Vanpatten, 1996). Various tasks have been assigned to language learners to achieve pedagogic outcomes, and scholars and researchers have noticed that variations occur when individual learners perform different tasks, or even the same task on different occasions (e.g., Bayley & Tarone, 2012; Tarone, 1983, 1988; Ellis, 1987, 2009). However, it is not clear whether these variations are due to changes in performance or changes in acquired knowledge (competence). The present thesis aims to investigate whether these inevitable variations are attributable to variations in competence or to variations in performance. It will do so by using tasks as the main elicitation procedure, designed in light of particular cognitive variables (Robinson, 1995, 2007, 2011a).

Scholars in the field of SLA hold different views regarding the relationship between learners' task performances and their L2 competence. For Chomsky (1965, 1986b) language knowledge (competence) and language skills (performance) are two different concepts. De Saussure, Baskin and Meisel (2011) also point out the difference between language as a 'system' and specific instantiations of language in a discourse. Scholars such as Tarone (1983, 1985, 1988) believe that learner language represents a capability continuum of speech styles (Tarone, 1983, p.152). Ellis (1985a, 1985b, 1987) considers learners' performance as variable competence and concludes that 'variability is seen as a feature of the learner's competence,

not just of his/her performance' (1987, p. 14). Tarone's and Ellis's models of the interlanguage continuum assume that linguistic rules can be placed along a continuum, and that the learner gradually moves forward over the continuum by adding new structures. The learner can still go up and down the continuum from one moment to the next, due to the amount of attention they pay to speech. The amount of attention is influenced by the different styles elicited by various tasks, topics or situations. Tarone (2000) argues that given the different inputs provided to learners in different social situations, the IL grammars that learners acquire in those situations are different. Tarone (1985, 1988) claims that learners use different interlanguage grammars when performing different tasks. In other words, a learner's performance varies in different contexts, such as when they perform different tasks. The findings from her study made Tarone (1985) question 'the possibility of measuring a learner's grammatical competence' (p.386). However, variations in usage when performing a range of different tasks, or even the same task at different times, do not occur only for learners; they can be easily observed in native speakers. Yet one would hardly suggest that such variations were due to changes in the native speaker's competence. So the question remains wide open as to whether non-native speakers' variations reflect variations in competence, and if not, what exactly these variations do reflect. Are they competence shifts, or are they just within performance ranges?

On the other hand, Pienemann (1998, 2011a, 2011b) views the possible range of interlanguage variation from processability perspective. He believes that a learner's competence or IL grammar system remains steady across tasks (Pienemann, 1998), as the learner has acquired the procedural skills needed for processing the language. The procedural skill hypothesis (Pienemann, 2002) regards the routines of acquisition of an L2 as a processing-based continuity, with processing procedures involving lower linguistic skills being acquired earlier than the processing procedures involving higher linguistic skills. Pienemann and Keßler (2012, p. 231) argue that 'IL variation is limited and regular, and this limitation and regularity is caused by the constraints inherent in the processability hierarchy'. Pienemann and Mackey (1993) use emergence criteria to differentiate between a learner's accuracy and their language competence. Fluctuations in accuracy across tasks do not reflect different levels of acquisition, but are due to the specific lexical requirements of the individual communication tasks. The use of well-defined emergence criteria in the area of morphology and syntax showed that L2 learners' competence remained steady at their current stage of development regardless of tasks they performed, as long as the tasks tested the same

skill (Mackey, Pienemann & Doughty, 1992; Pienemann & Mackey, 1993; Pienemann, Mackey & Thornton, 1991). Variations in a learners' performance can be explained from the hypothesis space construct, already elaborated within ZISA's Multidimensional Model (Clahsen, Meisel & Pienemann, 1983) which looks at two related but discrete dimensions: development and variation (Larsen-Freeman & Long, 1991), and which is still used in PT. The hypothesis space stipulates that a language learner's current stage of development constrains the use of a certain grammatical rule. In other words, if a learner is not developmentally ready to use a rule from higher stage, they will use the rule system available to them at their current level of processing. A range of solutions to a certain grammatical rule may be produced as a result of the developmental history of each individual learner. The different solutions used to solve developmental problems accounts for variations in performance (Pienemann, 1998; Pienemann & Keßler, 2012).

Both Pienemann's Processability Theory (PT) and variationists such as Tarone and Ellis utilise tasks to elicit performances which can be used to measure a learner's competence. PT tries to identify which linguistic structures may be optimally elicited using different tasks by describing the tasks and their application in detail, and calculating the number of times a particular target structure is produced using a given task. For instance, Mackey, Doughty and Pienemann (1996) count the occurrence of contexts for the third person singular form (3 sg-s) in three different tasks by six informants. The results show that informants produced the most cases of 3 sg-s in habitual action tasks (146 cases), followed by story completion tasks (101 cases) and interview tasks (34 cases). This shows that particular tasks were optimal for the elicitation of certain structures, and that there was variability in performance but this did not affect competence. Studies which apply the Interlanguage Hypothesis also use different kinds of tasks but consider differences in the tasks as a factor in accounting for IL variation. Tarone (1985), for instance, used a written grammaticality judgement task, an oral interview task and an oral narration task to investigate whether task-related style shifting occurs in the area of IL morphology and syntax. The results showed that learners' use of the 3 sg-s was more accurate in the grammaticality judgement task than in the two oral tasks because the grammaticality judgement task required a larger amount of attention to language form than the two oral tasks. Tarone thus relates learners' use of a language form (e.g., *3sg-s*) in different tasks to the notion of a capability continuum. Unlike Pienemann, Tarone uses both oral and written tasks. Pienemann argues that there is a condition of continuity – that is, the tasks must all address the same skill (Pienemann, 1998). Writing and oral production involve

different psychological mechanisms which require different skills. Tasks involving different skills will trigger differences in a learner's language performance. Moreover, Pienemann and Keßler (2012, p. 231) argue that 'task variation is constrained by the processability hierarchy'. One important issue in the two approaches is that neither defines the boundaries of different tasks or the tasks' components. Neither approach seems to pay much attention, for instance, to the specific cognitive demands of different tasks. This makes it difficult to evaluate possible causal connections between different types of variations in learner language. For example, neither approach is able to test for connections between cognitively different components of the tasks the learner performs.

Robinson's Cognition Hypothesis (2001, 2005, 2007, 2011a) provides some cognitive criteria for classifying tasks in terms of task complexity, task conditions and task difficulty. Robinson (2001) does not agree that attention to language forms caused by style-shifting explain much about a learner's development, and argues that development through task-based learning depends on other factors that influence the amount of attention paid to language forms, such as cognitive load. In his Cognition Hypothesis, he emphasises the importance of the cognitive load that tasks impose on learners. The more cognitive demands a task involves, the more conceptualising effort learners need to expend on it. Thus, learners will use more L2 linguistic resources to express complex conceptualisations. This will, according to Robinson, result in more complex and accurate performances by learners, and will eventually foster language development. In addition, Robinson (2003) suggests that besides the general descriptive measures (e.g., error free T-units, type token ratio), studies investigating accuracy and complexity can use 'interlanguage-sensitive measures of developmental change' (p. 81); that is, they can base complexity metrics on other L2 processing and development models, such as Pienemann's PT.

Since neither Pienemann nor Tarone considered cognitive complexity as a variable in their use of tasks, it may be useful to investigate the two competing positions they put forward by considering the nature of different tasks according to Robinson's Cognition Hypothesis framework to test whether using tasks of varying cognitive complexity will support one or the other position. That is, this approach will make it possible to test whether a learner's competence will vary when completing a range of tasks which involve different levels of cognitive complexity. In order to evaluate the two competing claims, three task complexity variables (i.e., ± *planning time,* ± *here-and-now,* ± *few elements*) have been selected from

among the many variables in Robinson's Triadic Componential Framework (2007, 2009, 2011a). Using all the variables would be well beyond the scope and purpose of this study, which aims to evaluate the competing claims of the Interlanguage Hypothesis and PT rather than evaluate Robinson's framework. These three variables from Robinson's framework were chosen for two reasons: Firstly, they have been widely researched, so the results from this study may be compared with previous studies. Secondly, to my knowledge only a limited number of studies (e.g., Wang, 2010; Yuan & Ellis, 2003) have asked adult Chinese L1-English L2 learners to perform tasks with different degrees of cognitive load, and none of these studies uses Robinson's variables explicitly on learners of different proficiency levels. Therefore, this approach might add our knowledge of how Chinese learners of English handle tasks of different degrees of complexity.

To that end, a range of tasks designed around the selected cognitive complexity variables is used in the present study, which investigates how 30 adult Chinese L1-English L2 learners handle tasks with different degrees of complexity in order to explore whether L2 competence, as measured by PT, varies according to Robinson's cognitive complexity variables. If it does, then the Interlanguage Hypothesis would be supported. However, if that sort of variation does not affect the stage of development achieved by the learner, then Pienemann's PT would be supported.

The 30 Chinese background learners of English as a second language (L2) were divided into three groups: lower-intermediate, intermediate and high, based on the results of their IELTS (the International English Language Testing System) scores. The IELTS provides a widely accepted external measure of achievement in English L2. Australian universities, for instance, use this metric to make decisions about the admission of overseas applicants. However, since the IELTS results are expressed as numerical scores, no linguistic information can be extracted from the scores in regards to the stage of development of the learners. Hence, in order to obtain more precise linguistic information on the learners in each of the groups, a lexical size (comprehension) test, a written translation task (written production) and two profiling tasks (oral production) were administered to each informant. This enabled the investigator to identify comprehension and production baselines for each individual learner, which enabled a fairly accurate interpretation of the results from the set of cognitive complexity tasks that were subsequently administered. The cognitive complexity tasks

designed for the purpose of the present investigation included two tasks being manipulated ± *planning time* variable, two tasks with ± *here-and-now*, and two tasks with ± *few elements*.

The present quasi-experimental study thus primarily makes methodological contributions to the SLA, but it also makes empirical, theoretical and practical contributions. Its methodological contribution consists of the explicit inclusion of cognitive complexity variables in the design of elicitation procedure instruments such as tasks in second language research. It makes an empirical contribution because it offers detailed cross sectional data from a cohort of 30 learners from the same L1 background, subdivided into linguistically-defined developmental groups, all performing the same set of tasks testing three cognitively relevant variables. From the theoretical viewpoint, the present study has the potential to demonstrate a possible area of integration between the Processability Theory and the Cognition Hypothesis, at least with reference to cognitively grounded elicitation tasks. In addition, by using some of Robinson's task classification criteria, this study might encourage further research into the Interlanguage Hypothesis as well as PT. As for its contribution to practice, this study may offer well-grounded indications for L2 educators, teachers, and task and syllabus designers of the possible cognitive effects of tasks and task types on learners' performance. It may also help Chinese ESL learners gain effective and targeted learning experiences through the use of particular types of tasks to facilitate their L2 learning.

The remainder of the thesis is organised as follows. Chapter 2 discusses the routes of First Language Acquisition compared to Second Language Acquisition. The chapter also highlights significant similarities and differences between the English and Chinese languages. It then reviews the SLA literature on: the relationship between learners' competence and performance; the use of tasks as elicitation procedures in L2; the relationship between language development and variation; the cognitive complexity of tasks; and empirical studies related to these areas. This review will describe the research gap tackled in the present study, locating it at the intersection between the three major frameworks considered here, that is: Processability Theory**,** the Interlanguage Hypothesis and the Cognition Hypothesis, leading naturally to the formulation of the research questions.

Chapter 3 is devoted to the method used to carry out this investigation of the interaction between language development, interlanguage variation and some cognitive aspects of language processing. This includes the overall design of the study, a presentation of the

profiling tasks and the lexical size tests used for further characterisation and ranking of the 30 adult Chinese L1-English L2 participants, leading to a detailed description of the quasi-experimental tasks related to the task complexity variables used to elicit oral production data. In addition, ways of measuring each informant's developmental stage, syntactic complexity and accuracy are explained.

Chapter 4 presents the results for each set of tasks (profiling and quasi-experimental) for each of the informants grouped according to their level of English L2. Both qualitative and quantitative measurements are used for analysing the informants' oral performances.

A discussion of those results will be presented in Chapter 5, guided by the research questions. Findings concerning specific research gaps will be identified and discussed in connection with the linguistic development, performance and variation of the informants within each proficiency level, and across different proficiency levels. The issue of task modality is also discussed in this chapter.

Chapter 6 concludes with a summary of major findings, and also proposes some contributions to elicitation procedures for L2 investigation and task design. Theoretical and practical implications, and possible applications of this study's findings, will also be discussed. The limitations of this investigation will be identified, and some suggestions for future research will be made.

Chapter 2 Literature Review

In this chapter I will firstly review the previous research done in the fields of first language (L1) and second language (L2) acquisition. The participants in this thesis are adult Chinese L1 learners learning English as an L2. Therefore, this chapter is also devoted to introducing the similarities and differences between the first and second languages of the informants of this study. In Section 2.2, issues, concepts and empirical studies concerning language competence and language performance are introduced. In Section 2.3 and Section 2.4, detailed descriptions of the important theoretical frameworks and hypotheses, such as Processability Theory, interlanguage variation and the Interlanguage Hypothesis are presented. The various L2 elicitation tasks used by the two competing theories are introduced in Section 2.5. Section 2.6 then discusses Robinson's (2011a) Cognition Hypothesis, particularly in relation to task complexity variables, which lay the foundations for the methodological design of the present study. Section 2.7 is devoted to the issue mentioned by Pienemann concerning different skills elicited by tasks. Finally, the chapter concludes by identifying the research gap addressed in the study, and it outlines the study's three research question areas.

2.1 Language Acquisition

L1 Acquisition

Children acquire their native languages in a staged process (see for example Brown, 1973a; Clark, 2009; Clark & Casillas, 2015; Gleason & Ratner, 2016; MacWhinney, 2008). For example, Brown examines speech data for three children as they progress from stage one (i.e., when they are two years and three months old) to stage five (when they are four years' old). Brown noticed that one speech sample produced by a child may contain one kind of knowledge and another speech sample produced by the same child may contain a different type of knowledge. Thus, the level of performance can vary widely across samples. In order to compare their levels of performance, Brown makes all of the children's speech samples comparable in size. He then adopts the same acquisition criterion that Cazden (1968) uses – that is, that the appropriate inflection is presented in at least 90% of the contexts in all the samples.

Brown (1973b) notices that there is a consistent sequence in the acquisition of grammatical morphemes by English L1 children. He notes that the lexical morpheme '*V–ing*' for lexical verbs (e.g., *playing*, *eating*) is the first morpheme to emerge in L1 children's speech data. Next, the children learn to provide the plural suffix *–s* to nouns (e.g., *cats*, *trees*) and then they learn to apply the irregular past-tense forms of frequently used verbs (e.g., *went*, *saw*). Gradually, in the following order, they acquire the noun possessive *'s* morpheme (e.g., *Mary's*, *mom's*), the verb *be* in questions (e.g., *is*, *was*), the regular past-tense suffix *–ed* (e.g., *played*, *jumped*), the regular third-person singular present tense suffix *–s* (e.g., *plays*, *eats*) and the irregular present-tense forms of frequently used verbs (e.g., has, does) (Brown, 1973a, p.271).

In regards to the acquisition of an understanding of the rules of syntax by L1 children, researchers of L1 acquisition (e.g., Meisel, 2011; Pierce, 1992; VanPatten, 2004) identify three stages in the acquisition of negative constructions. In the first stage children tend to put negative words (e.g., *no*, *not*) at the beginning or end of an utterance. They produce structures such as *No eat*, *I need no*. In the second stage, children place negative words between the subject and the verb, as in *I no like it*, *I not play*. The two negative expressions *don't* and *can't* emerge at this stage as well, so the children utter structures such as *I don't want*, *I can't play* and so forth. Children at the third stage can juxtapose negative words with auxiliary verbs (e.g., *is*, *will*, *have*) and produce *it isn't a cat*, *I won't go*.

As for interrogatives, three main stages have been identified from L1 children's speech data (Cazden 1972; McGregor, 2015). Initially, children will raise the intonation at the end of an utterance to signal a question. Next, after they learn WH-words, they can put these words at the initial position of a sentence (e.g., *what you eat? where mom go?*). Finally, they are able to put the auxiliary verbs (e.g., *be*, *have*, *do*) in the second position in utterances. They can produce structures such as *where do mom go?*, *what is your number?*) at this stage.

L2 Acquisition

The Full Transfer/Full Access hypothesis regarding L2 acquisition has been posited by Schwartz and Sprouse (1994, 1996). The hypothesis is that 'the initial state of L2 acquisition is the final state of LI acquisition' (1996, p.40-41). In other words, when an L2 learner starts to learn a target language, the principles of his/her L1 grammar become the initial state of the new grammar system of the target language. However, with the development of learning,

some failure of the transformation of grammatical representations will make the learner to restructure his/her grammar system (i.e., interlanguage). Schwartz and Sprouse (1996) further states that 'the final states of L2 acquisition do not systematically replicate the final state of L1 acquisition' (p.42).

Other scholars (Bialystok & Hakuta, 1994; Cook, 2001; Dulay & Burt, 1973; Gass & Selinker, 2008; McGregor, 2015; O'Grady et al., 1997; Pienemann, 1998) state that like English L1 acquisition, L2 acquisition is a staged process. In fact, order of acquisition of English morphology among L2 learners is remarkably similar to Brown's (1973a, 1973b) findings regarding the order of acquisition of L1 native speakers (Bialystok & Hakuta, 1994; Clahsen, 1986; Clahsen & Felser, 2006; Lardiere, 2009; McGregor, 2015; Truscott & Sharwood, 2004). Pienemann (2002) demonstrates that the procedural routines of non-native speakers are similar to those of native speakers once they automate the processing procedure. Clahsen and Felser (2006) observe that adult L2 learners have processed lexical-semantic cues in the same way as native speakers, but are less so by syntactic information. They explain the reason behind this observed L1 and L2 differences are that the syntactic representations adult L2 learners process are 'shallower and less detailed than those of native speakers' (p.3).

Regarding syntax, the error analysis of 145 English L2 children's data used by Dulay and Burt (1973) shows that most of their syntax errors were of the same types as the errors made by L1 children. Thus, they suggest that L2 children learn English syntax in a similar way to their L1 counterparts; that is, L2 children make use of universal language processing abilities in learning L2, just as L1 children do when learning their mother tongue. Hawkins and Hattori (2006) invited 19 adult Japanese L1 learners of English to participate in a judgement task which tested the learners' production of *wh*-questions. The results of their study show that these English L2 learners have the same underlying grammatical representations as the native English speakers. According to Izumi and Lakshmanan (1998), when acquiring English passive structures, Japanese L1 learners of English demonstrate a same acquisition route as native English speakers do.

To conclude, previous research on L1 and L2 children shows that their sequences of morphological and syntactic acquisition are similar, that is, L2 learners follow the same acquisition route as L1 children. The reason behind this similarity is that humans have innate

abilities, or innate universal language processing strategies, for organising speech (Chomsky, 1986b; De Bot, 1992; Kormos, 2011; Pienemann, 2002).

Mandarin Chinese and English

Following on from the discussion of L1 and L2 language acquisition above, it could be expected that when Mandarin Chinese L1 speakers acquire English L2, they will follow the same acquisition route as an English native speaker who acquires his/her L1. However, McGregor (2015), and Roberts, Gullberg and Indefrey (2008) contend that the learner's L1 can affect the length of time they stay at a stage of L2 acquisition. A contrastive analysis of the language pair in question is therefore warranted.

Both English and Chinese are isolating languages (Comrie, 1989), as they are languages with little inflectional morphology, unlike morphologically richer languages such as Hungarian, Spanish, Russian and Turkish (McGregor, 2015). Chinese is even more isolating than English, because it is a lexical typology language (Li and Thompson, 2009; Moravcsik, 2013) whereas English is a morphological typology language (Comrie, 1989; Finegan, 2009, 2014; Moravcsik, 2013).

English has eight productive inflectional suffixes (Finegan, 2014). For example, in English, there are two inflectional suffixes for nouns, namely, the noun possessive form (e.g., *Mary's, father's, the country's*) and the noun plural form (e.g., *apples, friends, girls*). There are four inflectional suffixes for English verbs, namely, the third person singular form (e.g., *eats, drives, sleeps*), the present participle (*-ing*), the past tense (*-ed*) and the past participle (e.g., *eaten, drove, slept*). There are two inflectional suffixes for English adjectives: comparative (*-er*) and superlative (*-est*).

On the other hand, Chinese lacks a grammatical inflectional morphology (Li and Thompson, 2009). Most Chinese words come in one form, and the form of the word does not change when there are changes to grammatical conditions such as number, case, gender, tense, mood and so forth. However, a morphological category of aspect does exist in Mandarin Chinese. In order to express the idea of 'aspect' in Mandarin Chinese, the perfective aspect marker *–le* and the durative aspect marker *–zhe* are used. For example, if we want to express the idea *Cheryl was watching TV when I spilled the tea* in Mandarin Chinese (Li & Thompson, 2009,

p. 713), we use the durative aspect marker *–zhe* to signal the ongoing event, which is, *was watching TV* in the English sentence, and we use the perfective aspect marker *–le* to signal the single incidental event, which is *spilled the tea*. The example of the equivalent Chinese is given in (1) below. Pinyin[1] is used for all Chinese examples throughout this thesis.

(1) dāng Cheryl zhèng kàn –zhe diàn shì wǒ bǎ chá sǎ-le
When Cheryl watch –dura TV I spill –perf tea
(Cheryl was watching TV when I spilled the tea)

To express the plural concept in English, there needs to be an agreement between the elements in the noun phrase. Specifically, the numeric quantifiers (e.g., one, two, three) or other quantifiers (e.g., some, a few, many) and the number of nouns (i.e., singular or plural) should be consistent (e.g., *three answers*, *many kids*). However, Chinese requires a classifier as the suffix of the numeral to go with a noun to form plurals. The format for expressing the idea of plural form in Chinese is 'a numeral + a classifier + a noun' as shown in the example (2) below.

(2) sān *–ge* dá àn
three *–classifier (cl)* answer
(three answers)

The above classifier *–ge* is a general classifier, which can go with most nouns. Specific classifiers (e.g., *-tiáo*, *-zhāng*, *-běn*, *-kē*) occur with particular nouns as shown in (3). The classifier for tree is *–kē*. The word *kē* is a classifier for trees, plants and so on.

(3) sì *–kē* shu
four *–cla* tree
(four trees)

As for syntax, both English and Chinese are subject-verb-object (SVO) word order languages. English and Chinese tend to put topics at the initial position in a sentence. A subject is often the topic, especially when the subject is the semantic agent. For instance, the subject *Lucy* is

[1] Pinyin is the official romanisation system for Standard Chinese in mainland China. Pinyin without tone marks is used to spell names and words in Standard Chinese.

the topic in the sentence *Lucy opened the door*. Moreover, if a subject is known to all, the subject is often omitted in the discourse in Chinese. However, it is not allowed to omit the subject in English. The 'topic-comment' constructions are used extensively in Chinese discourse, as shown in (4a and 4b) below. The subject is omitted in (4a), and the topic (i.e., *zhè –ge shāng diàn*) is placed at the initial position. In the example (4b), both the topic and the subject are there, but with the topic (i.e., *zhè –ge dì fāng*) being presented before the subject (i.e., *fēng jǐng*).

(4a) zhè –ge shāng diàn mǎi yī fu bíjiào pián yi
this –cl shop buy clothes more cheap
(At this shop, it is cheap to buy clothes.)

(4b) zhè –ge dìfāng fēng jǐng hěn měi
this –cl place view very beautiful
(At this place, the view is beautiful.)

To form constituent questions in English, question words (e.g., who, what, when, where) are placed at the initial position, and the auxiliary verb *do* is placed after the question pronoun, as in *What did you watch yesterday? Where does he live?* and *When do you need the report*? Likewise, in English the copula (e.g., *is, am, are, was, were*) appears at the initial position to form yes/no questions, such as *Is the bag on sale? Are you a student?* and *Were you at school yesterday?* In Chinese, to form constituent questions, the positions of question words, such as *shéi* (who), *shén me* (what), are flexible. Take the question word *shéi* as an example (Li & Thompson, 2009, p. 718). *Shéi* is placed in situ when the content question asks about the core grammatical function (e.g., SUBJ, OBJ) of the sentence – for example *Shéi* is placed at the subject position in (5a) and the object position in (5b).

(5a) shéi zhǎo tā?
Who look for he/she
(Who is looking for him/her?)

(5b) tā zhǎo shéi?
he/she look for who
(Who is he/she looking for?)

The question words *nǎ li* (*where*) and shénme shíhòu (*when*) can be placed at any position that is acceptable for a word indicating time or place in a sentence. Take the question word *nǎ li* as an example (Li & Thompson, 2009, p. 718), which is shown in (6) below.

(6) tā zài *nǎ li* yóuyǒng?
He at *where* swim
(Where does he swim?)

tā zài *hǎibiān* yóuyǒng.
He at *beach* swim
(He swims at the beach.)

The question phrase *dūo shǎo* (how many, how much) is used as a noun modifier and is always placed before the noun, as shown in example (7).

(7) nǐ yǒu *dūo shǎo* qián?
you have how much money?
(How much money do you have?)

Mandarin Chinese has three ways of forming yes/no questions (Li & Thompson, 2009, pp. 718-719). The first method for indicating an interrogative force is to raise the intonation at the end of a declarative clause, as is done in English. The second method is to use question particles (i.e., *ma*, *ne*) at the ends of sentences, as in (8). Thirdly, Mandarin Chinese uses the 'A +not A' format to form yes/no questions, as shown in (9); that is, an affirmative version (i.e., *xǐ huān*) and a negative version (i.e., bù *xǐ huān*) of the same proposition are combined (i.e., *xǐ huān* bù *xǐ huān*).

(8) nǐ xǐ huān Běijīng *ma*?
you like Běijīng –par.
(Do you like Běijīng?)

(9) nǐ *xǐ huān* bù *xǐ huān* Běijīng?
you like not like Běijīng
(Do you like Běijīng?)

Another typological feature of Chinese is that it is a topic-prominent language. Once the subject or object is known, whether or not it is repeated becomes optional. English on the other hand, demands that the subject of a sentence be supplied. English has a fixed word order for forming questions, but Chinese has a greater degree of freedom in its word order.

English and Mandarin Chinese are typological contrasts in forming passive structures. When we express a passive concept in English, the syntactic structure we use is "subject (patient) + be + verb (past participle form) + by + object (agent)", as shown in (10). In Chinese, the passive structure is expressed as "subject (patient) + bei (a particle expressing the passive concept) + object (agent) + verb", as shown in (11). The positions of the verb and object in the passive structure are different in the two languages. Mandarin Chinese requires the verb to be placed at the end of the passive structure, while the verb just follows the subject of the passive structure of English.

(10) The lamb was eaten by the wolf.

(11) yáng bèi láng chī le

lamb –par wolf eat -par

(The lamb was eaten by the wolf.)

In summary, there are morphological and syntactic differences between English and Mandarin Chinese. When adult learners learn an L2, the first process is language transfer (Selinker, 1972), or the Full Transfer/Full Access process (Schwartz & Sprouse, 1994, 1996). The typological contrasts between the two languages make it difficult for Chinese learners to learn English. Learners may drop the plural *–s* when the English contexts require them to use plural concept. They may fail to provide the third person singular *–s* when it is necessary. They may also utter grammatically inappropriate English questions and passive structures.

2.2 Learners' Competence and Performance

Chomsky (1965) differentiates between language competence and language performance. He describes the competence–performance distinction as follows:

> Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogeneous speech community, who knows its language perfectly

> and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts in attention and interest, and errors (random or characteristic) in applying his [sic] knowledge of the language in actual performance (p. 3).

According to this view, competence is the underlying linguistic system which is responsible for linguistic behaviour, while performance is the behaviour itself. In other words, language competence is about language knowledge, and language performance reflects the user's skills in performance. As long as learners have the relevant language knowledge or competence, they are able to apply the knowledge to performance. In other words, a learner's language competence or knowledge remains stable, and they will not be affected by grammatically irrelevant factors such as shifts in attention. Chomsky (1965) states that speech data are not a reliable measure of competence (i.e., mental representations of grammar) as they are affected by non-linguistic conditions. Thus, Chomsky recommends the use of judgement when measuring language competence.

Specifically, scholars (e.g., Coppieters, 1987; Cranshaw, 1997; Montrul & Slabakova, 2003) define language competence as underlying grammars and language performance as the speaker's use of the language. For example, Cranshaw (1997) examined whether the Chinese L1 learners and French L1 learners are able to achieve the similar competence as native English speakers when they use English to perform a variety of tasks. The results provide evidence that near-native speakers of English attain nativelike competence in the aspect of verb tense and aspect.

In the field of SLA, a number of scholars argue that a learner's L2 competence is variable. Selinker (1972) coins the word *interlanguage* (hereafter IL) in his study. IL refers to linguistic competence of L2 learners. Specifically, IL is an L2 learner's system that has "a structurally intermediate status between the native and target languages" (D. Brown, 2006, p.225). Selinker (1972, p.226) states that a learner's IL varies when he/she tries to convey meaning from when paying close attention to the form of the L2 utterances. Tarone (1985) argues that learners' differences in performance when performing different tasks are a reflection of variability in their competence. Tarone (1988) and R. Ellis (1985b) agree that L2 learners' IL capability underlies performance. For example, Tarone (1983) posits that interlanguage refers to a capability continuum of speech styles, and that different speech

styles can be elicited via different tasks. She explains that new L2 linguistic forms enter a learner's interlanguage through careful speech style, and then the new forms extend to vernacular styles that require less attention to form. The new forms can also develop by first applying universal principles in the vernacular style and then in the careful speech style. Tarone's capability continuum of speech styles can be regarded as a continuous scale of variable competence for speech styles (Atkinson, 2013). According to Jordan (2013 p. 638), Tarone's description of capability

> consists of heterogeneous knowledge which varies according to different factors. Thus, there is no homogenous competence underlying performance but a variable capacity that underlies specific instances of language performance.

On the other hand, Pienemann (1998) states that performance is the product of competence. Pienemann (1998a, 2011a, 2011b) and his colleagues use various communicative tasks to elicit a range of morpho-syntactic structures. The results show that the interlanguage competence of the L2 learner is determined by their current developmental stage (i.e., his/her current processing capacity), not by the nature of different tasks. According to Pienemann the reason that differences in language performance (e.g., fluctuations in accuracy) across tasks (e.g., reading, oral productions) are observed is that different tasks require different processing skills, and these skills involve different systems for language production and comprehension. Thus, Pienemann posits that tasks are comparable if they utilise the same skill type (e.g., spontaneous verbal responses). When using the same skill type, despite the differences in the learner's performance, 'the basic rule system underlying variable IL performance does not change within one learner between tasks' (Pienemann, 1998, p. 278). The stability of interlanguage is at odds with the claim that the nature of an IL grammar system may change from situation to situation (e.g. Tarone, 1983). Other researchers (e.g., Kawaguchi, 2005; Di Biase, Kawaguchi & Yamaguchi, 2015) in the domain of PT frameworks have also provided empirical evidence in support of the claim that the learner's competence or IL grammar system remains steady across tasks regardless of fluctuations in the accuracy level. Pienemann and Keßler (2012) further argue that 'IL variation is limited and regular, and this limitation and regularity is caused by the constraints inherent in the processability hierarchy' (p. 231), but not by the nature of different tasks.

In summary, language competence should be distinguished from language performance (Chomsky, 1965). Tarone (1983, 1985, 1988) and Bayley and Tarone (2012) state that a

learner's capability underlies performance. The different speech styles generated from various tasks can influence a learner's IL competence. Pienemann (1998a, 2011a, 2011b) and his colleagues state the interlanguage competence of the L2 learner is determined by their current developmental stage. The L2 learner's performance is the product of competence. Furthermore, Pienemann (1998a) points out that different modalities (e.g., reading, speaking, writing) involve different psychological mechanisms, thus, using different modalities will be associated with differences in competence or performance. In order to make reliable comparisons, tasks of the same skill type should be used. For example, the speech data of language learners rather than grammaticality judgement tests are used in Pienemann's studies, and in the studies of other scholars who investigate language competence as defined by Pienemann's Processability Theory. The traditional PT method, using spontaneous communicative tasks, is adopted to investigate language competence and language performance in the current study.

In the sections which follow, I provide a review of the literature on the two competing theories central to this study, namely Processability Theory, and Interlanguage Variation and the Interlanguage Hypothesis.

2.3 Processability Theory

The origins of Processability Theory may be traced to its precursor, the ZISA project of Meisel, Clahsen and Pienemann (1981). In the earliest ZISA studies, it was found that each German L2 learner developed along the same sequence of acquisition of German word order when learning German. It was also thought that this acquisition sequence was controlled by processing strategies related to saliency and other processing constraints, such as cognitive strategies, and the accumulation of rules determining the learner's grammatical progress (Clahsen, 1984). Pienemann and Johnston further developed and reconceptualised this acquisition sequence in English L2 by expanding it to morphology and syntax (Pienemann & Johnston, 1986, 1987). Later, a universal proposal based on processing procedures was put forward which came to be known as Processability Theory (Pienemann, 1998).

Processability Theory (Pienemann, 1998) and its extension (Pienemann, Di Biase & Kawaguchi, 2005; Bettoni & Di Biase, 2015) explore second language development from a psycholinguistic perspective. Processability Theory aims at 'providing a principled way approach to predicting and delineating transitions in developing grammatical systems'

(Pienemann, 1998, p. 279). Its basic theoretical claim is that 'at any stage of development the learner can produce and comprehend only those L2 linguistic forms which the current state of the language processor can handle' (Pienemann, 2008, p. 9).

The theoretical underpinning of PT is based on two formal models, Levelt's Speech Production Model (1989), and Lexical-Functional Grammar (LFG) (Kaplan & Bresnan, 1982; Bresnan, 2001). These two models allow 'PT to make language specific predictions about L2 development' (Bettoni & Di Biase, 2015, p.21). Levelt's Speech Production Model explains language processing procedures from intention to articulating, and the treatment of grammatical encoding within it is of particular relevance to PT. Grammatical encoding unfolds in a hieratical order, which specifies PT's universal hierarchy of processing procedures. PT is interested in how learners gradually build up their store of lexical knowledge, how their lemmas are activated and encoded, and how learners automatise encoding procedures. LFG, as a theoretical formalism of grammar, is characterised by lexical feature unification (Kaplan & Bresnan, 1982; Bresnan, 2001). Feature unification or grammatical information transfer provided the theoretical framework for the original PT. In addition, Bresnan in 2001 posited the Lexical Mapping Theory, which looks into the rules of discourse grammar from an LFG perspective. This theory specifically discusses the mapping of thematic roles onto grammatical functions. The development of LFG in 2001 provided the theoretical motivation to further expand PT (Pienemann et al., 2005).

The Speech Production Model

In adult L1 production, a message can be encoded and accessed in an automatised fashion (Levelt, 1989). Adopting Kempen and Hoenkamp's (1987) incremental procedure, Levelt proposes that grammatical encoding unfolds in a hierarchical order:

1. lemma access
2. category procedure
3. phrasal procedure
4. S-procedure (or Inter-phrasal procedure)
5. subordinate clause procedure (if applicable).

Pienemann (1998, p. 7) illustrates this hierarchical order in the following 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 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.

The speaker first accesses the lemma, and then the category procedure, the phrasal procedure, and then the sentence procedure. Within each processing procedure, the lexical information of lemmas has to be matched, which is called feature unification, the prominent driving force behind Lexical Functional Grammar.

To illustrate the concepts of incremental procedures and feature unification, let us use the sentence *Lucy has three apples* as an example. The lemma access procedure retrieves the lemma information stored in the speaker's mental lexicon, (e.g., *apple*). The lemma of *apple* suggests that the lexical category of *apple* is a noun. The noun category procedure then activates a higher level of procedure, that is, the noun phrase (NP) procedure. The lemma *three* is the modifier to the noun *apple*. *Three* is a numeric quantifier, which takes the plural form. In order to unify the elements within the NP, the number value of the head noun *apple* should also be in the plural form. This matching is called feature unification. The phrase *three apples*, has been temporarily stored in the category procedure memory buffer. In order to assign this NP into its appropriate position under the Sentence-procedure (S-procedure), the phrasal procedure has to be attached to the sentence-node (S-node), where the S-procedure makes the decision about whether *three apples* should be labelled as an NP with a subject function (NP_{SUBJ}) or an NP with an object function (NP_{OBJ}). After the value of each phrasal structure has been decided, information concerning each phrasal structure will be stored in the memory buffer of the S-procedure for feature unification. For instance, the number and person values of the NP_{SUBJ} *Lucy* have to be unified with the number and person values of the VP *have*. Thus, the expression *Lucy has* is produced.

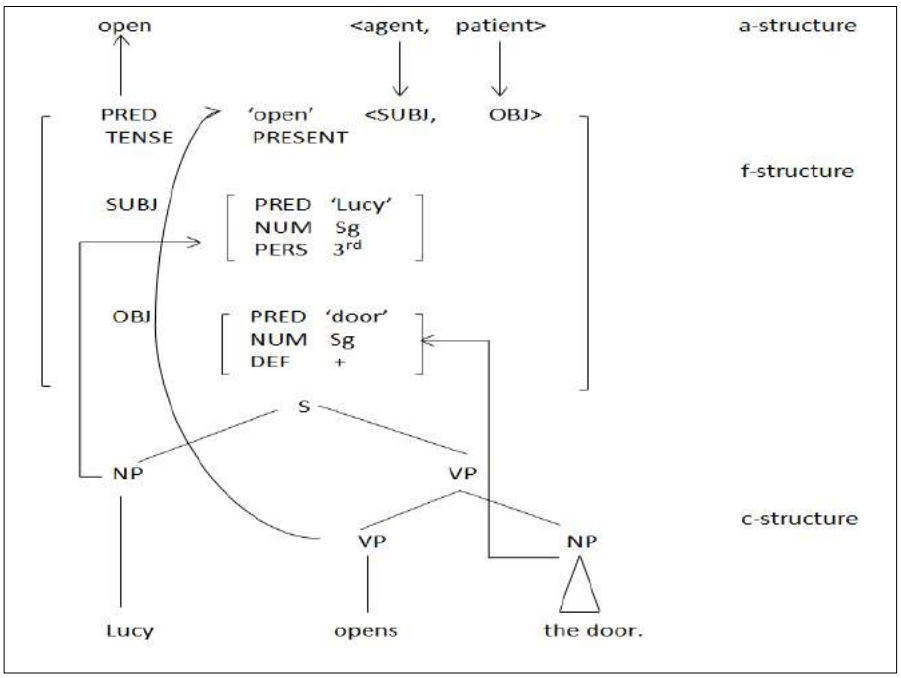
Whilst Levelt's Speech Production Model is applied principally to native speakers, evidence shows that L2 learners also encode messages in the same hierarchical order (De Bot, 1992; Kormos, 2011). The difference is that L2 learners learn to build up their lexical storage, including the meaning, sound and syntactic information for each word, much more gradually

than native speakers. They also learn to encode lemmas in grammatical procedures, and then automatise them. To this end, they need to access L2 declarative rules stored in their long-term, declarative memories (Francis, 2005; Kormos, 2011).

Lexical Functional Grammar

Lexical Functional Grammar is a lexically-driven feature unification-based grammar formalism (Bresnan, 1982; Kaplan & Bresnan, 1982; Bresnan, 2001). Lexical Functional Grammar contends that sentences contain three related but parallel and independent levels of representations: the constituent structural, functional and thematic levels. These three levels of representation are termed the constituent structure (c-structure), functional structure (f-structure), and argument structure (a-structure) respectively. The three parallel structures need to be mapped onto each other, as illustrated in the sentence *Lucy opens the door* (Figure 2.1).

Figure 2.1 Three levels of representation



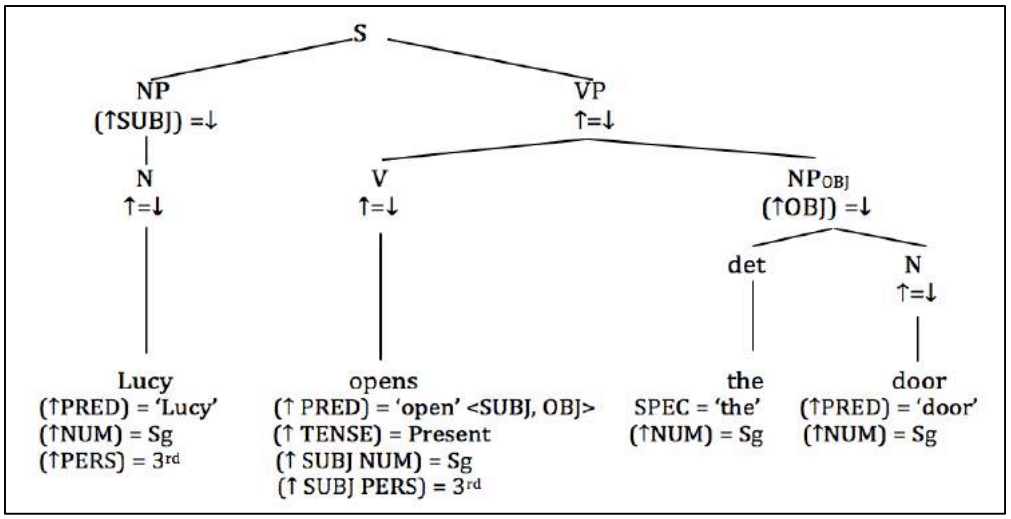
As shown in Figure 2.6, the c-structure encodes properties such as word/ constituent order and phrasal structures. The c-structure varies across languages. Thus, language-specific phrasal structure rules guide the syntactic positioning of grammatical functions.

The f-structure encodes functional information, including grammatical functions (e.g., subject, object) and discourse functions (e.g., topic, focus). Moreover, the grammatical properties (e.g., number, person) of words and phrases are also encoded in this level of representation. The predicate (PRED) of this sentence is *open*. The PRED for the SUBJ is *Lucy*, and it takes the diacritic values of number (NUM) and person (PERS). Its NUM is singular (Sg) and its PERS is third person (3^{rd}). The PRED for the OBJ is *door*. It has the diacritic values of NUM = Sg and definiteness (DEF). Each attribute only has one value in the f-structure. For instance, the number (NUM) value of the noun *door* in this sentence can only have one value, that is, singular. The PRED 'open' requires a SUBJ and an OBJ, and both values are subcategorised by the PRED 'open' in this sentence.

The a-structure is the interface between the semantics and syntax of a predicator. It encodes lexical information about the number and syntactic type of arguments, and acts as an interface between the semantics and syntax of a predicator.

Transferring information from the c-structure to the f-structure requires the lexical items at the c-structure terminals to be inserted into the f-structure (Kaplan & Bresnan, 1982). In order to guarantee that a sentence is grammatically acceptable, the exchange of grammatical information should be processed and feature unification should be achieved. Figure 2.2 illustrates the transfer of information from c-structure to f-structure via feature unification.

Figure 2.2 Transferring information from c-structure to f-structure



When the lexical items occupy the terminal nodes of the c-structure, the information contained in each lexical entry is retrieved from the mental lexicon and inserted into the f-structure. In this way, the lexical information is linked with the structural information available from the c-structure tree. In order to form syntactic nodes in the c-structure, the lexical information associated with each entry must be unified with the other entry under the same node. As Figure 2.2 shows, under the S mother node, both the NUM and PERS features of the NP (i.e., Lucy) and the head of the VP (i.e., open) are singular and third person, so the two sibling nodes are compatible with each other and can be well unified under the mother node. However, if the NUM and PERS of the NP conflict with the features of the VP, the unification at the S-node will turn out to be ungrammatical.

Apart from feature unification, LFG also looks into the rules of discourse grammar from a lexical grammar perspective, which is known as Lexical Mapping Theory (Bresnan, 2001). Lexical Mapping Theory focuses on the mapping of the a-structure onto the f-structure. According to Bresnan, bundles of features of the a-structure regulate the mapping of thematic roles onto grammatical functions. She summarises that the a-structure serves as 'an interface between the semantic and syntax of a predicator' (Bresnan, 2001, p. 304).

To sum up, LFG contends that sentences contain three parallel levels of representations, namely, c-structure, f-structure and a-structure. Each structure can be mapped onto the others through a bundle of features. For instance, we transfer information from the c-structure to the f-structure via the rules of feature unification. When we map the a-structure onto the f-structure, the principles of Lexical Mapping Theory regulate the mapping of thematic roles onto grammatical functions.

1) The Original Processability Theory

The original Processability Theory (Pienemann, 1998) is based on Levelt's (1989) Speech Production Model and LFG (Kaplan & Bresnan, 1982; Bresnan, 2001). PT hypothesises that in second language acquisition, the acquisition of processing procedures will occur in a hierarchical fashion. Table 2.1 summarises the universal form of the hypothesised hierarchy of processing procedures for all languages.

Table 2.1 Hypothesised hierarchy of processing procedures (Pienemann, 1998, p. 79)

Stage	t1	t2	t3	t4	t5
S-bar procedure	-	-	-	-	interclausal information exchange
Sentence procedure	-	-	-	interphrasal information exchange	+
Phrasal procedure	-	-	phrasal information exchange	+	+
Category procedure	-	lexical form variation (no information exchange)	+	+	+
Lemma access	invariant forms and formulas	+	+	+	+

As Table 2.1 shows, each processing procedure allows certain structures to emerge. Each procedure at a lower level is a prerequisite for the next procedure in the hierarchy (Pienemann, 1998). For example, L2 learners will initially be able to produce invariant forms and formulas of a target L2 before they are able to use variants of lexical forms; these variations do not require information exchange. Next, they can exchange information within phrases, and then across phrases. Finally, they are able to handle interclausal information exchange. The processing procedure hierarchy means that learners develop through a sequence of stages rather than acquisition being continuous or instantaneous. In other words, the fact that L2 development in stages is due to the increasing greater hierarchical levels between 'the linguistic elements requiring exchange of information for their appropriate grammatical production' (Bettoni & Di Biase, 2015, p.55). Tables 2.2 and 2.3 below (Pienemann, 2005) illustrate the hierarchical order of English L2 morphology and syntax processing procedures respectively.

Table 2.2 Processing procedures applied to English L2 morphology (Pienemann, 2005)

Stages	Processing procedures	Information exchange	L2 morphology process	Examples
5	S-procedure	Info exchange within sentence	Subject-Verb agreement	Lucy likes noodles. My mum takes train every day.
4	VP procedure	Info exchange within VP	VP agreement	He will go to school. She is singing.
3	NP procedure	Info exchange within NP	NP agreement	Mum hold two books. I have many friends.
2	Category Procedure	No info exchange	Form variation	Cats under chair Driver looking newspaper.
1	Word/Lemma	Word access no info exchange	Single words, formula	Fish Hello! What's your name?

It can be seen from Table 2.2 that if a learner is at Stage Two of English L2 morphology, he/she can form plurals for nouns such as *cats*, *eggs*, *trees*. Due to processability hierarchy constraints, the learner cannot produce expressions such as *two cats*, *many trees*, and *some eggs* because these expressions belong to a higher level of processing procedure, which requires information exchange within the NP. On the other hand, the incremental nature of acquisition means that if there is enough evidence to show that NP agreement has emerged in the learner's speech data, we can conclude that the learner has reached the NP procedure stage of morphology development.

In PT, the emergence criterion rather than the accuracy criterion is used to identify the stage a learner has reached. Pienemann (1998), and Pienemann and Keβler (2012), argue that accuracy rates are arbitrary, and thus, they do not capture the true state of a learner's interlanguage. However, when there is sufficient evidence to show that a form or a structure has emerged for the first time in the learner's speech data, the emergence criterion is met, and the statement that the learner has acquired the L2 feature in question becomes non-arbitrary. According to Pienemann (1998), judgements regarding the emergence of a morphological form should be based on two criteria: lexical variation and structural variation (or morphological variation). Lexical variation means a learner is able to apply the same linguistic rule to different words. For instance, if the learner is able to apply the rule for the third person singular form to different verbs, such as *eats*, *walks* and *talks*, it can be stated that the rule has been acquired. The second criterion is morphological variation, which refers to a learner's ability to use the same verb in different morphological forms, such as *eats*, *ate*, *eaten* and *eating*. If the learner can show both lexical variation and morphological variation in his/her speech data, the possibility of the learner adopting a formulaic use of the rule or structure can be excluded, and the emergence criterion is met.

Table 2.3 Processing procedures applied to English L2 syntax (after Pienemann, 2005)

Stages	Processing procedures	Principles/rules	L2 syntax process	Examples
6	Subordinate clause procedure	Main and subordinate clause	Cancel inversion	I wonder when Lucy will arrive in Sydney.
5	S-procedure	Topicalisation of core argument	Do-2nd Aux-2nd	When does Lucy go to school? When will Lucy arrive in Sydney?
4	VP procedure	Copula + SV AUX + SVO	Copula inversion Y/N inversion	Is she a dancer? Can she swim?
3	NP procedure	WH + SVO Do + SVO Adv + SVO	WH-fronting Do-fronting Adv-fronting	Why you go home? Do he go home? Yesterday I play guitar.
2	Category Procedure	No info exchange	Canonical word order SVO	I play guitar. Lucy eat ice cream.
1	Word/Lemma	Word access no info exchange	Single words, formula	Fish Hello! What's your name?

Emergence criteria are also applied to determine the syntactic developmental stages of a learner. If a learner can show at least two cases of the use of a certain syntactic structure in lexically and structurally valid contexts, the structure is regarded as 'emerged' in the learner's speech data, and the learner can be considered to have acquired the structural rule (Di Biase & Kawaguchi, 2002).

As Table 2.3 shows, L2 learners can initially produce canonical word order structures (e.g., *she play guitar*). Next, learners learn how to differentiate between a topic and a subject (e.g., *yesterday I play guitar*). These learners are able to put WH-question words, the word *do* and adverbs at the beginning of a canonical word order structure (e.g., *do she play guitar*?). They are able to put copula and auxiliaries at the first position as well (e.g., *can she play guitar*?). Next, learners acquire the rule of topicalisation of the core argument and they learn how to insert the word *do* and auxiliaries at the second position (e.g., when does she play guitar?). Finally, L2 learners learn how to cancel the inversion when they produce a main and a subordinate clause (e.g., *I wonder when she can play guitar*).

Steadiness Hypothesis

PT proposes that L2 learners cannot go beyond their current stage of development to access a higher level of procedural skill, and so the learner's interlanguage should be steady at any one point in the development. This leads to one of the most important implications of PT: the Steadiness Hypothesis. The Steadiness Hypothesis states that 'the basic nature of the

grammatical system of an IL does not change in different communicative tasks as long as those are based on the same skill type in language production' (Pienemann, 1998, p. 273).

The claim about the steadiness of a learners' interlanguage is based on the Hypothesis Space framework, which aims to predict the possible range of IL variation. The Hypothesis Space framework states that:

> variation and development can be captured by one dynamic linguistic system. At any one time and within any one learner this system, though dynamic in nature, will have a degree of stability which derives from two facts implicit in the concept of Hypothesis Space: (1) a learner will not use grammatical rules which are beyond his or her current level of processability. (2) Variational solutions are biased by the developmental history of the individual IL (Pienemann, 1998, p. 279).

In other words, according to the Hypothesis Space concept, L2 acquisition can be considered from both a development and a variation perspective. Development and variation are related but separate. IL is considered to be a dynamic linguistic system, but this system is highly constrained by the learners' current developmental stage as defined by PT. For instance, when learners acquire the English rule 'Aux-2nd' for syntax processing, they learn to place the auxiliary at the second position in English WH-questions (e.g., *What are they doing*?). However, variation will occur if learners have not acquired this WH-question rule. Some learners omit the auxiliary (e.g., *What they doing?)*, and some omit one or more other constituents (e.g., *What are doing?*), while other learners might use a canonical word order after the WH-word (e.g., *What they are doing?*). These four intermediate solutions to the English rule Aux-2nd in WH-questions correlate with the particular developmental history of the individual IL type, but these solutions are all at the same developmental stage. The learner is not developmentally ready to proceed to a higher stage, so they can only use the processing procedures available to them at their current level of development. Thus, 'the rule system available to the learner at his or her current level also defines the range of solutions for developmental problems which are the basis for IL variation' (Pienemann, 1998, p. 243).

According to Pienemann (1998), the Steadiness Hypothesis was formed as an opposing hypothesis to the unconstrained models of interlanguage variation put forward by Tarone (1988) and Ellis (1985a, 1985b). Tarone and Ellis assume that the nature of the interlanguage

system may vary from situation to situation. Tasks are one of the factors that create various environments for style-shifting, such as shifts from the vernacular style (e.g., casual talking with friends) to the careful style (e.g., formal interviews). According to the latter view, learners' interlanguage variations are caused by their attention paid in the different style environments.

However, Pienemann states that IL variation is highly constrained within the predictable processing procedure, and it is not a 'capability continuum' as Tarone (1989) asserts. In order to test the Steadiness Hypothesis, six adult ESL learners were invited to perform six different communicative tasks (Pienemann, Mackey & Thornton, 1991; Pienemann & Mackey, 1993). The learners' morpho-syntactic structures were analysed using the emergence criterion. The results show that there was 99.1% developmental consistency in morphology and 100% developmental consistency in syntax across tasks. This analysis demonstrates that the developmental status of the interlanguage was not interrupted by various tasks involving the same grammatical rules (e.g., past tense *–ed*; the 3rd person singular *–s*); learners' interlanguage system remains steady across tasks.

Pienemann further points out that fluctuations in accuracy levels across tasks do not reflect different levels of acquisition. Fluctuations are due to the various focal points of different tasks. For example, the 'Habitual Actions' task may include more situations which require the use of the third person singular form than other tasks such as the 'meet the partner' task, or the 'interview' task. Thus, accuracy rates for this morphological marker may vary across tasks as tasks vary in their effectiveness in eliciting the correct morphological marker from learners. However, this does not mean that a learner's interlanguage competence changes when dealing with the third person singular marking.

2) The Extended Processability Theory

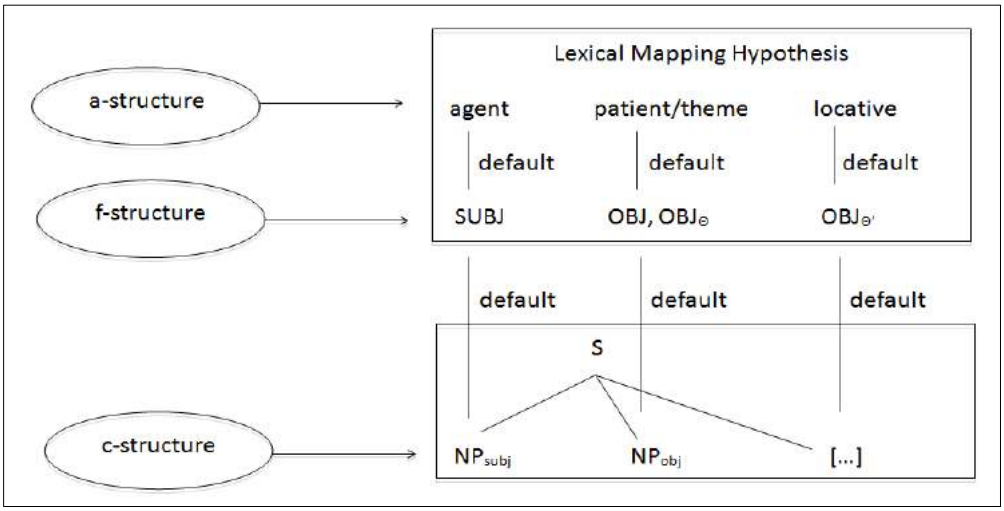
The basic claim of the original PT (Pienemann, 1998) is the processability hierarchy for L2 morphosyntactic processing procedures. It focuses on the exchange of grammatical information, which is realised through feature unification. The extended PT looks into L2 learners' development of syntax when interacting with discourse-pragmatic choices.

The extended PT (Pienemann, Di Biase & Kawaguchi, 2005) proposes three hypotheses: the Unmarked Alignment Hypothesis, the Lexical Mapping Hypothesis and the Topic Hypothesis.

The Unmarked Alignment Hypothesis relates to the initial state of L2 syntax, which is termed the canonical word order. L2 learners first learn the canonical word order before they can handle non-canonical word order structures, such as the passive structure, topicalisation, the causative structure and so forth. The Unmarked Alignment Hypothesis states:

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

Figure 2.3 Unmarked Alignment One-to-One Mapping (Pienemann, Di Biase & Kawaguchi, 2005, p. 230)



In PT the default mapping principle is unmarked alignment (Pienemann, 2007). Unmarked alignment is the one-to-one mapping of argument roles onto grammatical functions. As is shown in Figure 2.3, unmarked alignment involves mapping the agent argument on the a-structure onto the subject function on the f-structure. L2 learners at lower stages can only assign the first NP they identify as the agent and then put it in the initial position of the sentence as the subject. This unmarked alignment is the initial state of development, and the product of this alignment is canonical word order (Meisel, 1989; Pienemann et al, 2005; Pinker, 1984, 1989; Slobin, 1985). In English the canonical word order is SVO.

However, in real, dynamically unfolding speaking situations, in order to guide the interlocutor's attention in the discourse, the speaker uses various linguistic devices to realise

his/her purpose for speaking (Levelt, 1989), for example, by designating a specific topic for his/her utterance. Thus, more advanced procedural skills are needed to produce linguistic structures other than the canonical word order. L2 learners' developmental trajectories for more advanced L2 syntax can be explained through the Topic Hypothesis, which states:

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

Table 2.4 The Topic Hypothesis (Pienemann, Di Biase & Kawaguchi, 2005, p. 239)

Discourse principle	c- to f-mapping	Structural outcomes	Examples
Topicalisation of core arguments	TOP=OBJ	The TOP function is assigned to a core argument other than SUBJ	Game, they play.
↑	↑	↑	
XP adjunction	TOP=ADJ	Initial constituent is a circumstantial adjunct or a FOCUS WH-word. TOPIC is differentiate from SUBJECT	Now they play game. Where they play game?
↑	↑	↑	
Canonical Order	SUB=default TOP	TOPIC and SUBJECT are not differentiated.	They play game.

The Topic Hypothesis predicts three developmental stages in mapping c-structure onto f-structure. As Table 2.4 shows, L2 learners cannot distinguish between a subject and a topic at the very beginning stage; they simply assign any topic to the initial position of the sentence and identify it as the subject. As they develop the ability to differentiate TOPIC from SUBJECT, they will position TOPIC, such as an adjunct expressing a circumstance, or a FOCUS WH-word, to the initial position. For example, a circumstantial adjunct 'now' in the sentence *Now they play game* is added to the initial position, or a FOCUS WH-word 'where' is added to the initial position of the sentence *Where they play game*. As soon as learners can identify the grammatical functions of each category at the sentence node, they can place a grammatical object at the initial position of the sentence. For instance, the object 'game' has been topicalised in the sentence *Game, they play*.

Previous studies on PT have supported the Topic Hypothesis (e.g., Di Biase, 2005; Itani-Adams, 2007, 2011; Kawaguchi, 2005; Kawaguchi & Di Biase, 2005; Yamaguchi, 2008; Zhang, 2002, 2004, 2005). For instance, in order to investigate the validity of the Topic Hypothesis, Yamaguchi (2008) carried out a two-year longitudinal study which examined a child's syntactic development in English L2 in a Japanese L1 primary school. Yamaguchi finds that the child acquired English canonical order (SVO) at an early stage. The procedural skill of adding an adjunct to the initial position before the SVO order was acquired later than the SVO procedural skill. Moreover, object topicalisation did not emerge in the child's speech data.

The Topic Hypothesis deals with building syntactic structures from a discourse-pragmatic perspective, while passive or causative structures consider building syntactic structures from a lexical mapping perspective. This type of syntactic development requires L2 learners to acquire the procedural skills needed to change the relationship between argument roles and grammatical functions. L2 learners' developmental trajectories for acquiring these L2 syntactic structures, as shown in Table 2.5, can be explained through the Lexical Mapping Hypothesis. It states:

> 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).

Table 2.5 Developmental stages hypothesised for English syntax based on the Lexical Mapping Hypothesis (Pienemann, Di Biase & Kawaguchi, 2005, p. 246)

Stage	Structure	Examples
Nondefault mapping	passive, causative, etc.	*The lamb was eaten by the wolf* *The boss let the workers work from morning to night*
Lexically non-default mapping	exceptional verbs	*Lucy puzzled her mother*
Default mapping	e.g., agent-event-patient; experiencer-event-theme & canonical word order	*Lucy dancing* *Peter played game*
Lemma access	single words; formulas	*Fish* *Hello!* *What's your name?*

The Lexical Mapping Hypothesis predicts that L2 learners at the beginning stage will map the most prominent thematic role (i.e., agent) of the a-structure onto the most prominent syntactic function of the f-structure. The product of this alignment is the canonical word order or default mapping, and the resulting utterance will be in the active voice. The Lexical Mapping Hypothesis predicts that non-default mapping structures will be acquired later than default mapping structures, because non-default mapping structures interrupt the one-to-one mapping of the a-structure onto the f-structure (Pinker, 1984). For instance, a passive structure requires that the patient be presented as a prominent argument role mapped to the grammatical subject. Figures 2.4a and 2.4b illustrate the agent as the subject and the patient as the subject respectively.

Figure 2.4a Agent as the subject

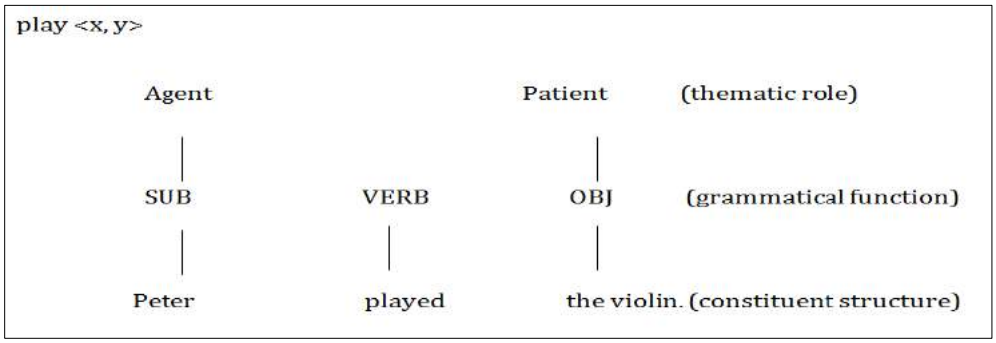
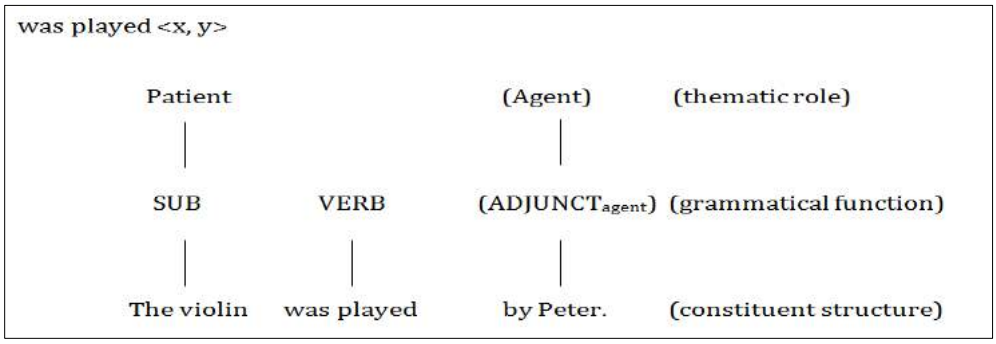


Figure 2.4b Patient as the subject



Previous studies have provided empirical support for the Lexical Mapping Hypothesis (Kawaguchi, 2005, 2009a, 2009b, 2011; Keatinge & Keßler, 2009; Wang, 2006, 2009, 2010; Yamaguchi, 2010). For instance, Wang (2006, 2009) investigates adult Chinese L1-English L2 learners' development of English passive structures. Wang invited six native Mandarin speakers of various English proficiency levels to perform Tomlin's (1995, 1997) Fishfilm task, which is an active-passive structure alternation task containing 30 animated

eventualities. Wang's results show that learners at lower PT stages failed to produce any passive structures. Late-intermediate learners were able to realise patient-cued eventualities and place the patient to the initial position of the sentence. However, their productions were often marked by errors, ranging from the omission or the incorrect use of the copula after the patient, and errors with the passive form of the verbs, and with the agentive *-by* adjunct. For example, one of the learners produced *pink fish come in black fish* instead of *the pink fish was eaten by the black fish*. Only the advanced learners could produce the non-default mapping passive structures.

3) The Current State of Processability Theory

The current PT (Bettoni & Di Biase, 2015) proposes two hypotheses: the Prominence Hypothesis and the Lexical Mapping Hypothesis. As has been established, learners' language use is initially limited to single words or formulas. They gradually develop their syntax along two paths: mapping c-structure onto f-structure (the Prominence Hypothesis) and mapping a-structure onto f-structure (the Lexical Mapping Hypothesis). The discourse function FOCUS, which was under-specified in the original Topic Hypothesis, is elaborated in the new Prominence Hypothesis. In order to paint a whole picture of the developmental trajectory of L2 learners, the original Topic Hypothesis was replaced by the comprehensive Prominence Hypothesis, which states:

> In second language acquisition learners will initially not differentiate between grammatical functions (GFs) and discourse functions (DFs), e.g., between SUBJ and TOP. Differentiation begins when an element such as an XP, or other lexical materials, is added to the canonical string in a position of prominence in the c-structure, that is, the first in the sentence. This element can be TOP in declaratives or FOC in interrogatives leaving, crucially, the canonical string unaltered. At the next stage, learners will be able to construct noncanonical strings assigning prominence to any constituent in an unequivocal way (Bettoni & Di Biase, 2015, p. 63).

Table 2.6 Syntactic development based on the Prominence Hypothesis (Bettoni & Di Biase, 2015, p. 63)

Stage	Structures	Examples
Noncanonical word order	TOP_{XP} marked orders FOC_{WH-} marked orders	*In corner near the fireplace stood an old clock* *What movie did Lucy watch yesterday?*
XP_{DF} canonical word order	TOP_{XP} SVO FOC_{WH-} SVO	*Yesterday Lucy watch movie* *Where Lucy watch movie?*
Canonical word order	SVO [QUE^{p} SVO]	*Lucy watch movie* *Who are you?*
Lemma access	single words; formulas; [QUE^{p} single words; formulas]	*Fish* *Where?* *What's your name?*

^{P}=the QUE feature is exclusively prosodic

As Table 2.6 shows, at the stage of lemma access, learners can produce single words and formulas including questions (QUE), single words and formulas. Then, learners reach the canonical word order stage. Next, learners start to assign additional constituents to the SVO order, for example by adding time and place information to the canonical order. Learners usually put the additional information at the end of the SVO order in order to keep the SUBJ as the TOP. Later on, learners have the procedural skills to assign a TOP or FOC to the initial position of the declaratives or interrogatives. At this point, they can distinguish the SUBJ from a TOP or a FOC. In other words, they can differentiate between grammatical functions and discourse functions. Finally, learners can unjumble the elements of the canonical word order. If a learner is able to scramble the canonical word order, this suggests that they will be able to assign a grammatical function to each element of the canonical word order. The grammatical functions are fully specified at this final stage. Table 2.7 below presents the syntactic stages based on the Prominence Hypothesis for constituent questions.

Table 2.7 Developmental stages hypothesised for L2 English syntax based on the Prominence Hypothesis: constituent questions (Di Biase, Kawaguchi & Yamaguchi, 2015, p. 109)

Stage	Structure	Examples taken from this study's dataset
XP_{FOC} non-canonical word order	WH_{QUE} AUX SV (O)	where have you studied? when did you do? what are you watching?
	WH_{QUE} MOD SV (O)	when will you go?
	WH_{QUE} COP S	what is that? where is she?
XP_{FOC} canonical word order	WH_{QUE} SVO	What she do? when you go?
Canonical word order	WH_{QUE} in-situ	you do what?
Lemma access	single words formulas	what? when? What is your name?

As the table shows, at the very beginning stage, English L2 learners can only use single words (e.g., *what? when?*) or formulaic sequences of words (e.g., *what is your name?*) to form their constituent question structures. When moving to the stage of canonical word order, learners produce in situ questions. They may use the WH-question words as the OBJ, and utter the words with a rising intonation (e.g., *she do what?*). Next, they may learn to put WH-question words in the initial position in the canonical word order structure. By doing so, they are able to produce utterances such as *when you go?* and *what she say?*. At the final stage, learners are able to produce XP_{FOC} non-canonical word order structures, including: the 'WH_{QUE} COP S' structure (e.g. *where is she?*), the 'WH_{QUE} MOD SV (O)' structure (e.g. *when will you go?*), and the 'WH_{QUE} AUX SV (O)' structure (e.g. *when did you do?*).

The syntactic development analysis based on the Prominence Hypothesis for yes/no questions is presented in Table 2.8.

Table 2.8 Developmental stages hypothesised for L2 English syntax based on the Prominence Hypothesis: Y/N questions (Di Biase, Kawaguchi & Yamaguchi, 2015, p. 105)

Stage	Structure	Examples taken from this study's dataset
Non-canonical word order	AUX_{QUE} SUBJ V (O)	does she cook? have you seen a girl?
	MOD_{QUE} SUBJ V (O)	can you cook?
	$HAVE_{QUE}$ SUBJ OBJ	have you a cat?
	COP_{QUE} SUBJ Predicate	is cat black? is a boy there?
QUE canonical word order	QUE [SVO]	do they eat bread? is your picture have a sofa? is Lucy is drinking coffee?
Canonical word order	[QUE^P SVO]	she is writing? boy eating noodles?
Lemma access	[QUE^P single words]	coffee? car?
	[QUE^P formulas]	he eating?
QUE^P= the feature is exclusively prosodic		

It can be seen from Table 2.8 that at the early stage learners can only use a single word (e.g., *coffee?*) and a formula (e.g., *he eating?*) with a rising intonation to ask questions. Then, they learn to use canonical word order to ask yes/no questions (e.g., *she is writing?*). Gradually, they can move up a level by adding copula question words (e.g., *is*) and auxiliary question words (e.g., *do*) at the initial position of a canonical word order structure, and produce utterances such as *is Lucy is writing?*, and *do they eat bread?*. Finally, learners are able to

show the use of 'AUX_{QUE} SUBJ V (O)' (e.g., *does she cook?*). This is the highest yes/no question structure in the XP_{FOC} non-canonical word order stage.

On the second path to syntactic development, learners gradually develop in their ability to map a-structure onto f-structure. This path is described in the Lexical Mapping Hypothesis in the extended version of PT. Recently, a more explicit and substantial Lexical Mapping Hypothesis (Bettoni & Di Biase, 2015, p. 68) has been put forward, which states:

> In second language acquisition learners will initially map the highest available role (e.g., agent and experiencer) in the thematic hierarchy onto a minimally specified SUBJ/TOP. We call this *default mapping*. Next, they learn to add further arguments mapped onto grammatical functions (GFs) differentiating them from SUBJ (and OBJ, if present). They may also learn some exceptional verbs at this second stage. Finally, they learn to impose their own perspective on events, that is, to direct the listener's attention to a particular thematic role lower in the hierarchy by promoting it to SUBJ, and defocus the highest role by mapping it onto a GF other than SUBJ, or suppress it altogether. at this last stage learners may add further role information regarding causality, benefit, or adversity. They may also add to their lexicon particular subsets of Vs, such as unaccusatives, as well as further intrinsically exceptional Vs requiring their own mapping schema. We call this *nondefault mapping*.

Table 2.9 Developmental stages hypothesised for English syntax based on the Lexical Mapping Hypothesis (Bettoni & Di Biase, 2015, p. 68)

Stage	Constructions	Examples
Nondefault mapping	passive, causative, benefactives, exceptional verb constructions, etc.	*The lamb was eaten by the wolf* *The boss makes the workers work from morning to night*
Default mapping and additional arguments	agent/experiencer mapped on SUBJ and/or patient/theme mapped on OBJ, and/or other members of the a-structure hierarchy, such as goals and locatives, mapped on GFs other than SUBJ and OBJ	*Lucy hided the box under the bed* *Mum gave Lily a book* *Peter went to school by train*
Default mapping	agent/experiencer mapped on SUBJ and/or patient/theme mapped on OBJ	*Lucy dancing* *Peter played game*
Lemma access	single words formulas	*Fish* *Hello!* *What's your name?*

As shown in Table 2.9, at the default mapping stage, learners have the procedural skills to map the agent or experiencer onto SUBJ, and to map the patient or theme onto OBJ. Next,

they learn to assign additional argument roles to the grammatical functions, for example by adding a goal or beneficiary, instrument and locative to the OBJ grammatical function. At this stage, learners can differentiate between a core argument and a noncore argument if two animate or human participants are involved. This stage was not listed in the first version of the Lexical Mapping Hypothesis of the extended PT (Pienemann, et al. 2005). A learner is deemed to have reached the final non-default mapping stage if he/she can assign a thematic role that is lower on the hierarchy to a prominent grammatical function. The list of constructions in this final stage is quite open, language-specific and undifferentiated.

Previous PT studies across languages and situations have provided support for the Prominence Hypothesis. Examples include Mansouri's (2005) study of Arabic, Dyson's (2004) study and Yamaguchi's (2008) study of English L2, Di Biase's (1999, 2002, 2007, 2011) study of Italian, Kawaguchi's (2005, 2010) studies of Japanese, and Zhang's (2007) study of Mandarin. In addition, most of the empirical evidence for the Lexical Mapping Hypothesis comes from Kawaguchi's studies of Japanese L2 (Kawaguchi, 2005, 2007, 2009a, 2009b, 2010). Other studies, such as Wang (2006, 2009, 2010), who investigates adult Mandarin L1-English L2 learners' acquisition of passive structures, and Bettoni, Di Biase and Nuzzo (2009), who look into the acquisition of post-verbal SUBJ in Italian L2, also support the current Lexical Mapping Hypothesis.

2.4 The Interlanguage Hypothesis and Interlanguage Variation

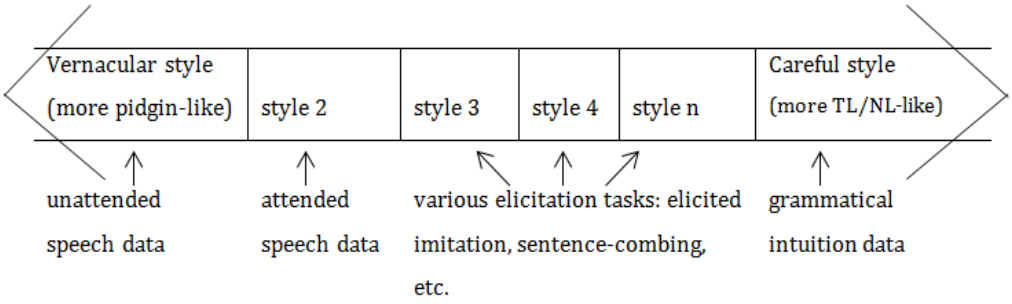
One of the earliest studies looking into language variation from a sociolinguistic perspective is Labov's (1970) study. He uses a variety of tasks to generate a range of speech styles (e.g., casual speech style, careful speech style), which can be placed along a linear continuum. The linear continuum is arranged by the amount of attention paid to each task-induced speech style. He regards attention as the mechanism for language variation, and its interaction with other factors, such as tasks, topics, interlocutors and so on, can affect the native speakers' performance. Variations in performance in different situations and linguistic contexts are described by Labov as being due to variable competence that underlies production.

Following Labov, scholars started to investigate whether learners' language variations were induced by variations in the tasks they were performing. The term *interlanguage* first appears in Selinker's (1972) study. Since then, the term *interlanguage*, has been widely accepted as

referring to the linguistic competence of L2 learners (White, 2007). Selinker (1972) proposes that only tasks in which a learner attempts to express meaning are appropriate to determine the learner's underlying interlanguage system. Specifically, Selinker points out that the performance of drills in an L2 classroom is not meaningful performance, as such performance is of minor interest from a long run (1972, p.210). LoCoco (1976) analyses the number of errors low proficiency adult L2 Spanish learners made in a translation task, a composition task and a picture description task. The results show that learners focused on different aspects of production in different tasks. For example, they focused on accuracy in the translation task and on conveying meaning clearly in the picture description task. LoCoco suggests learners' perceptions of tasks could be a factor that influences their performance. Selinker and Douglas (1985) argue that social contexts or factors should be considered or included in interlanguage theory.

Adopting Labov's notion of a linear continuum of different speech styles, Tarone (1983, 1985, 1988) developed an interlanguage continuum represented by a continuum of styles, ranging from the vernacular style to the careful style, as shown in Figure 2.5. According to the interlanguage continuum, learners shift their styles systematically in different situations. For example, the careful style of language is observed from learners in formal situations, while the vernacular speech style is observed in informal situations. Each style has its own linguistic norms, and all of the linguistic norms form part of the learners' overall language capability.

Figure 2.5 Interlanguage Continuum (Tarone, 1983, p. 152)



Tarone (1983, 1985, 1988, 2012) also argues that the psycholinguistic mechanism operating behind the style-shifting is the attention paid to speech. Different degrees of attention, functioning as causative factors of style-shifting, can be manipulated through tasks. For instance, Tarone (1985) uses three different tasks to investigate task-related IL variation; the

tasks employed are (1) a written grammaticality judgement task, (2) an oral interview with a native English speaker task, and (3) an oral narration task. The grammaticality judgement test calls for a more careful style when learners need to pay close attention to the linguistic form, while the oral narration task is of a vernacular style which requires the least amount of attention to form on the part of the learners. According to Tarone, 'the results of this study are consistent with the claim that second language learners treat different sets of IL forms differently under style shifting conditions' (p. 390). Specifically, learners' uses of the third person singular *–s* in different tasks were in accordance with the pattern of style-shifting; they were more accurate in their use of the third person singular *–s* in the grammaticality judgement task. As for the use of articles and direct object pronouns, the results show that learners were more accurate in the vernacular style oral narration task than in the careful style grammaticality judgement task. In regards to plural morphology, the accuracy rates did not shift between tasks involving greater and lesser degrees of attention to language form. Tarone points out that these findings concerning variation raise important questions about 'the possibility of measuring a learner's grammatical competence' (p. 385-386). Aside from attention to speech being a cause of IL variation, Tarone and Parrish (1988) suggest that other factors such as discourse functions and communicative purposes also trigger interlanguage variations.

In addition, Tarone (1988) reviews previous research and points out that linguistic systems of IL, such as phonology, morphology and syntax, can change greatly with the social context. These changes occur in aspects such as shifts in interlocutors, tasks or topics. Later studies have confirmed the effects of style-shifting on learners' choices of linguistic forms (see Barley & Preston, 1996; Berdan, 1996). Tarone (2000, p.187) claims that 'the IL grammar stays the same but is in fact variable, sensitive to the social setting at any given point in time.' In other words, if two learners acquire English from two different social settings, these two learners may internalise two different sets of IL grammars.

More recently, Tarone has developed the Interlanguage Hypothesis based on previous studies and research. The hypothesis addresses a foundational question, namely, 'What if learner language is a linguistic system?' (Tarone, 2014, p. 9). Tarone states that the Interlanguage Hypothesis, taking the form of a question-asking model, has provided researchers and teachers with the most productive approach to investigating the nature of a possible IL linguistic system.

Ellis (2008) notes that the style-shifting continuum is more likely to be a psycholinguistic construct than a sociolinguistic one because it involves the learner's attention to speech, which is a psycholinguistic process. Ellis suggests that psycholinguistic sources of variation should also be examined. Planning conditions (e.g. Ellis, 1987; Foster & Skehan, 1996; Yuan & Ellis, 2003), a focus on monitoring (e.g., Kormos, 1999; 2000) and learners' perceptions are all factors that may influence learners' language variations. Learners need to choose which variety of language to use in order to cope with different communicative intentions, or different situational factors in the conceptualisation stage. For instance, Ellis (2005) distinguishes between pre-task planning and online task planning. He states that these two types of tasks will have different effects on a learner's language. The pre-task planning condition has a greater effect on a learner's overall performance, but it comes with a trade-off. Learners either choose to pay attention to fluency and complexity at the cost of accuracy, or they choose to focus on accuracy at the cost of fluency and complexity. Under online planning conditions, learners perform tasks at a pressured pace, and so their performance is less accurate. In relation to learners' self-repairs, Kormos's (2000) study shows that learners in the advanced proficiency group focus more on appropriacy than the other two proficiency groups. L2 learners are found to pay more attention to repairing lexical and grammatical errors than repairing informational content.

Besides investigating IL variation from a psychological perspective, a large body of research also looks into IL variation from a sociolinguistic perspective (e.g., Tarone, 2000; Tarone & Liu, 1995; Tarone & Swain, 1995; Bayley & Langman, 2004). Sociolinguistic models point out three factors that affect IL variations and changes (Preston, 2000, 2002; Tarone, 2007). The first factor is social context, which is influenced by elements such as interlocutors, social settings, tasks, communicative purposes, learner intention, roles, and identities (e.g., Bayley & Langman, 2004; Liu, 2000; Lyster & Mori, 2006; Selinker & Douglas, 1985). For instance, Selinker and Douglas (1985) find in their study that a Polish L1-English L2 learner's use of some linguistic features varied dramatically when dealing with different topics, such as daily life topic or specialised technical topics. Other researchers (e.g., Broeders, 1982; Lin, 2003) find that gender is also a factor that influences language variation.

The second factor is linguistic context, which is influenced by elements such as lexical, phonological, and discourse constraints (see for example Langman & Bayley (2002) on past

tense marking, Young (1996) on English articles, and Young (1991) on plural *–s* marking). For example, Wolfram (1989) finds that a learner's use of past-tense markings is influenced by the phonetic form of a word, such that if the phonetic form of a verb's past tense is considerably different to its present tense form (e.g., *go*, *do*, *see*), learners are more likely to mark the past tense. Bardovi-Harlig (1998) reports that the inherent meaning of a word, or its lexical aspect, will influence a learner's morphological variations. Ellis (1988) investigates three ESL children's acquisition of the *third person singular –s form* and *copula -s* based on a two-year longitudinal study in a classroom setting. He aims to find out whether or not learners' use of the two morphological forms is sensitive to the linguistic context. The results show that the learners produced and acquired target-like variants of the two morphological forms, first in a pronoun-as-subject situation, and then in a noun-as-subject situation. The acquisition of target-like linguistic forms suggests that learners' language variability may be connected with specific linguistic environments. Tarone (2007, p. 843) concludes that certain language forms presented in the surrounding linguistic context may 'cause the speaker to favour one variant of a language form over another'.

The third factor is time, which affects variation in two ways. Firstly, the time of acquisition will affect the choice of L2 use. For example, the earlier learnt forms leave a deeper impression and can be handled more automatically, while the later learnt forms require more attention and control. Secondly, the learner's L2 acquisition route can be changed over time in different situations. One such situation may be the top-down approach, or the explicit learning of a new form from classroom instructions, which is then applied to other informal situations. The change may also be driven from the bottom up, when learners acquire new forms implicitly through informal social settings, and then develop or use the forms in other formal settings (e.g., Tarone & Liu, 1995). Tarone and Liu argue that social settings will change the way learners acquire their L2, for example by changing their L2 developmental sequence. Contrary to the developmental sequence stages that Pienemann and Johnston (1987) posit, the informant in Tarone and Liu's study acquired the later-staged question formation (e.g., Do-2nd, Aux-2nd) before earlier-staged questions (e.g., WH + SVO) across time and across different social contexts. Almost all the later-staged questions in this learner's IL emerged earlier at home, while the earlier-staged questions in this learner's IL emerged later in peer interactions at school.

Unconvinced by Tarone and Liu's claim, Dyson (2008) argues that a methodological problem exists in Tarone and Liu's study, in which the higher stage questions uttered by their participant can be treated as formulaic uses of a common collocation of lexical items (p.18). Furthermore, other scholars suggest that there is a multi-factorial effect on learner IL variation; that is, linguistic factors interact with social factors (e.g., Adamson & Regan, 1991; Young, 1991, 1996). For example, Young (1991) investigates English plural marking by 12 Chinese L1 learners of English. The results show that four factors influenced the learners' language variability, namely the context of the situation, learners' English proficiency levels, the linguistic contexts, and redundancy in plural marking.

Results from most of the studies above (e.g., Tarone, 1985; Barley & Preston, 1996) show that learners' language variability is systematic: that is, variation is often related to situations or other sets of factors. However, this is not the consensus, as some researchers state that such systematic variations were not observed in their studies. For example, Ellis (1985) points out that in some cases, variation is attributed to individual learners rather than being systematic across all learners. Young's (1996) study analyses the effects of a number of factors on learners' use of the definite article *the* in two groups of English L2 learners. Young did not find any form-function relationship in the use of the article *the* among learners. Thus, he suggests that learners' interlanguage may be free of variation.

In summary, from a sociolinguistic perspective, variations in learners' IL are constrained by factors such as the linguistic environment for the target-language form, time and style-shifting, which is caused by social factors such as interlocutors, topics, or tasks. From the psycholinguistic and information processing perspectives, IL variation is caused by factors such as learners' attention to the meaning or the form, the effects of planning conditions on learners' performance, monitoring capability, and the perception of tasks. The above scholars who investigate learners' IL variation from sociolinguistic and psycholinguistic perspectives are sometimes referred to as variationists.

However, in the field of SLA, some scholars hold different views to those proposed by variationists (e.g., Beebe, 1982; Bell, 1984; Gregg, 1990; Long, 1998; Pienemann, 1998). For example, Beebe (1982) claims that attention to speech is not an adequate explanation for learners' style-shifting. Bell (1984) questions the effects of the addressee's role on the learners' attention to speech. Variations in grammatical production caused by different social

contexts might be a characteristic of language performance, but these variations do not affect the learners' language knowledge or competence, and Gregg (1990) points out that the two must be clearly distinguished. Long (1998) argues that the social context has little to do with the learner's cognitive processes.

Pienemann's Steadiness Hypothesis (1998) states that the basic nature of the interlanguage system does not change across different communicative tasks, provided they are testing the same skill type. It is the learner's L2 developmental stage, and not the nature of different tasks, that influences linguistic performance. IL variation is constrained by the processability hierarchy (Pienemann & Keßler, 2012).

One important element missing in the debate about whether the nature of an IL system varies according to tasks is the definition of 'different tasks'. Without a solid definition of what is referred to by 'different tasks', it is difficult to evaluate claims regarding the nature of the variation in a learner's interlanguage according to the different tasks the learner performs. In order to test the two competing positions towards IL variation, it seems that the same sets of 'different' tasks need to be used for testing the two positions. In recent years, Robinson's Cognition Hypothesis (2003, 2005, 2007, 2009, 2011a) has provided clear criteria for classifying tasks in terms of task complexity, task conditions and task difficulty. Task complexity refers to the design of tasks containing different degrees of cognitive load for learners to handle (Robinson, 2011a). The different degrees of cognitive load are termed cognitive complexity. Therefore, the present study adopts Robinson's task-classifying criteria to check whether in fact using tasks of varying levels of cognitive complexity might support one or the other position – that is, whether the learner's competence varies across a range of tasks incorporating cognitive complexity. The current study also tests whether there is any variation in performance in terms of grammatical constructions (e.g., plural *–s*, 3rd person singular form, question formations). The study does not look at different styles generated from a variety of tasks, because looking at the issue of different style is beyond the scope of current study.

2.5 The Use of Tasks as L2 Elicitation Procedures

This section defines the term 'task', presents a classification of tasks, and identifies particular tasks used within the PT and the variationists' frameworks. In addition, this section also

reviews studies that have involved manipulations of Robinson's (1995, 2001, 2005, 2007) task complexity variables.

2.5.1 Defining 'Task'

Within the reviewed literature, the term 'task' has been used by researchers in various ways. Broadly speaking, tasks can be divided into two types: real-life tasks and pedagogical tasks. For instance, Long (1985) defines a task from the real-life perspective:

> A task is a piece of work undertaken for oneself or for others, freely or for some reward … In other words, by 'task' is meant the hundred and one things people do in everyday life, at work, at play, and in-between (p. 89).

Nunan (1989, 2006) defines a task from a pedagogical viewpoint. He states that it is necessary to transfer real-life tasks into pedagogical tasks in order to create learning opportunities in the classroom.

> It is a piece of classroom work that involves learners in comprehending, manipulating, producing, or interacting in the target language while their attention is focused on mobilizing their grammatical knowledge in order to express meaning, and in which the intention is to convey meaning rather than to manipulate form (p. 10, 1989).

Other scholars also provide definitions of task from a pedagogical perspective, but they define it by focusing more specifically on one of its dimensions, such as the task's functions, cognitive demands, essential characteristics and so forth. For instance, from the aspect of cognitive process, Prabhu (1987) defines a task as 'an activity which require[s] learners to arrive at an outcome from giving information through some process of thought and which allows teachers to control and regulate that process' (p. 17). Skehan (1996b) defines a task based on its functions. He points out that:

> tasks … are activities which have meaning as their primary focus. Success in tasks is evaluated in terms of achievement of an outcome, and takes generally bear some resemblance to real-life language use (p. 20).

A more detailed description of a task is provided by R. Ellis (2003), who lists the essential features that a task must have. He points out that a task is a work plan for learner activity with a clearly defined communicative outcome. A task involves a primary focus on meaning and real-world processes of language use. A task can involve any of the four language skills –

that is, speaking, reading, listening and writing. Finally, a task requires learners to employ cognitive processes to complete it.

In clarifying what can be counted as a task, Bygate, Swain and Skehan (2013) provide a core definition: 'A task is an activity which requires learners to use language, with emphasis on meaning, to attain an objective' (p .11). Samuda and Bygate (2016) define a task as 'a holistic activity … with the overall aim of promoting language learning, through process or product or both' (p. 69).

More recently, Tavakoli and Foster (2011) defined tasks as 'anything that classroom language learners do when focusing their attention primarily on what they want to say to others or what others are trying to say to them' (p. 39).

In summary, within the examined literature, we see that a task must contain three core elements. Firstly, a task is an activity or a piece of work that is carried out by learners for the purposes of conveying meaning in the target language. Secondly, tasks are designed to promote learning. Thirdly, a task is an activity used to achieve some outcome, which can lead to the learners' language development and improve their language use in the real world.

2.5.2 Task Types and Classification

Tasks, as a key element in the learning cycle, provide opportunities for learners to achieve particular language aims and objectives. In order to help learners acquire the language skills essential to real-life situations, researchers and curriculum developers have proposed various methods for classifying task types (Nunan & Carter, 2001).

One of the earliest applications of a task-based approach to appear in the literature was the Bangalore Project (Beretta & Davies, 1985; Prabhu, 1987; Nunan, 2006), which was a task-based project designed for English L2 learners of primary school age. This project contained three problem-solving tasks. Each task addressed one of the following types of gaps: Information Gaps, Reasoning Gaps and Opinion Gaps. The information gap task asked learners to transfer given information from one person to another, or to convert information from one type to another. The reasoning gap task required learners to work out new information based on given information by processes of reasoning, deduction or inference, or through a perception of relationships or patterns. For instance, in a train timetable activity,

learners needed to select appropriate trains to meet the given requirements, rather than to simply transfer the given information printed on the timetable worksheet to another person. The third main task used in the Bangalore Project was the opinion gap task. Learners were asked to express their feelings, preferences, or attitudes in response to a given situation. Examples of this task were story completion, discussion of a social issue, and oral presentation. The Bangalore Project led learners to focus their attention on grammar constructions or language forms through an emphasis on meaning, but one study reports that the effectiveness of the method used in this project is quite limited for later stages of learning (Beretta & Davies, 1985). The Bangalore Project paved the way for other scholars to explore other possible task-based pedagogical applications of SLA (e.g., Long & Crookes, 1992; Nunan, 1989).

A large amount of research on L2 pedagogical tasks began to come to the fore after the Bangalore project. Pattison (1987) proposed seven task and activity types which aim at facilitating communicative approaches to teaching. The seven types are: questions and answers, dialogues and role plays, matching activities, communication strategies, pictures and picture stories, puzzles and problems, and discussions and decisions. Question-and-answer tasks ask learners to make personal choices from a list of language items. This type of task can be used to practise the use of almost any structure, function, or notion. The dialogues and role-play activities require learners to fully participate in a scenario in which learners use the target language in conversations with each other. Matching activities require learners to recognise matching items, or to complete pairs or sets. The purpose of using communication strategies, such as clarification, confirmation, comprehension and repetition, is to help learners focus on target language structures or vocabularies. Pictures and picture stories use pictures to facilitate learning. Activities include 'spot the differences', picture sequencing, picture depicting and so on. Puzzle and problem tasks require learners to make guesses and test their ability to reason logically. Discussion and decision tasks ask learners to collectively make a decision by sharing information.

Pica, Kanagy and Falodun (1993) classify task types from a step-by-step task achievement perspective, such that tasks are ordered sequentially from jigsaw tasks, to information-gap tasks, problem-solving tasks, decision-making tasks and finally opinion exchange tasks. Similarly, Willis (1996) suggests six task types for a flexible task-based learning framework: listing, ordering and sorting, role-play, problem solving, sharing and comparing personal

experiences and decision-making tasks. These tasks are ordered hierarchically, so learners can achieve their outcomes step by step.

In order to enable learners to use target language well in real-life situations, Richard and Rodgers (2001) propose five pedagogical task types that can reflect real-life situations. Jigsaw tasks require learners to organise different pieces of information into a whole. In information-gap tasks, one group of learners is given a set of information and another group is given a complementary set of information. Each group has to find out what the other group's information is about through negotiation. Problem-solving tasks require learners to work out the one and only solution to a problem based on the information given. Decision-making tasks, unlike the single solution problem solving tasks, allow for multiple solutions; learners have to work out one possible solution through negotiation or discussion. Opinion exchange tasks encourage learners to discuss and exchange ideas. Tasks of the five types presented to learners are made progressively more difficult in order to train learners to cope with difficult situations in the real world.

In addition, many researchers have proposed task classifications based on task functions. Nunan (1989) suggests two functions or purposes of tasks: pedagogical purposes and real-life purposes. Real-world tasks are designed to help address learners' needs in the real world, whereas pedagogic tasks aim to contribute to our understanding of SLA theories, and only reflect real-world situations to a minimal extent, if at all. Harmer (2007) also separates tasks into two types: pedagogic tasks, such as grammar drills, worksheets and dictations, and real-life tasks, such as information-giving map tasks, roleplays and discussions of topical issues.

Another classification that contrasts the broad classifications of pedagogic and real-life tasks is one based on the specific purposes of tasks. For example, Samuda (2001) distinguishes between language-activating tasks and knowledge-constructing tasks. Language-activating tasks are designed to include language features that learners already know but are not able to use well. Language-activating tasks aim to create opportunities for learners to carry out negotiations of meaning around topics. Knowledge-constructing tasks have the function of directing learners to develop new forms by noticing and focusing on forms. The common aim of these two types of tasks is to enhance L2 development through activating learners' interlanguage systems.

Apart from classifying tasks into categories according to their purposes, functions or features, scholars have also proposed a series of criteria to select or grade tasks (e.g., Candlin, 1987; Skehan, 1998; Robinson, 2007). For instance, Candlin (1987) proposes five selection criteria for tasks: cognitive load, communicative stress, particularity and generalisability, code complexity and interpretative density, and process continuity. Cognitive load is the complexity of the content of the task, such as task sequence, the number of elements in the task, or the number of participants involved in the task. Communicative stress refers to the pressures experienced by the interlocutors. Particularity and generalisability refer to whether the goal of a task, and the instructions given, are clear enough for learners. Code complexity measures the complexity of the linguistic code, and interpretative density is concerned with the complexity of the procedures needed to complete the task. Process continuity refers to whether learners can relate the current task to previous tasks with which they are familiar. These five criteria can help teachers or researchers to decide whether a task is difficult for a learner and then make decisions on how to select and grade tasks.

Skehan (1998) refines Candlin's (1987) categories by considering more factors that would affect task difficulty. Skehan argues, '(o)ne goal in researching tasks is to establish task characteristics which influence difficulty' (Skehan, 1998, p. 97). He identifies three characteristics of tasks to be considered in their analysis: code complexity, cognitive complexity and communicative pressure. Code complexity affects learners' performance due to the language or vocabulary required. Cognitive complexity deals with the cognitive load associated with a task. Factors that affect the cognitive load include the degree of familiarity of the task, the amount of 'computation', the information type, and the clarity and adequacy of the information given. Communicative stress is concerned with various conditions that could affect learners' performance, such as time pressure, the speed of presentation, and the number of participants. Based on this three-way analysis of tasks, Skehan (1998) proposes the Limited Capacity Hypothesis. The Limited Capacity Hypothesis states that increasing the task complexity along any of the dimensions he identifies will negatively and simultaneously affect learners' accuracy, complexity and fluency of production. Therefore, tasks should be selected and sequenced at an appropriate level of difficulty based on the above three criteria in order for learners to achieve fluency, accuracy and complexity. Skehan (2001, 2014) further points out that manipulating these characteristics will not only allow learners to focus on the meaning; more importantly, it will also give learners greater control over their language use and enable them to achieve development.

Robinson's Triadic Componential Framework (TCF, see Section 2.6.1) (2001a, 2005, 2007, 2009, 2011a) provides a clearer and more comprehensive set of criteria for classifying tasks. Robinson (2001a, 2001b) argues that some previous studies did not distinguish between task complexity and task conditions (e.g., Prabhu, 1987), while others did not distinguish between task complexity and task difficulty (e.g., Long, 1985, 1996; Skehan, 1996a, 1996b, 1998). The TCF aims to provide an operational taxonomy for task and syllabus designers 'across a wide variety of instructional settings, and with a wide variety of learner populations, to classify and sequence a "progression" of pedagogic tasks that increase in complexity across periods of instruction' (Robinson, 2011a, p.12). Robinson argues that when teachers or syllabus designers design tasks for language learners, three criteria need to be considered: task complexity, task difficulty and task conditions.

Under the Triadic Componential Framework, Task Complexity refers to the cognitive load a task imposes on language learners. It includes factors such as whether or not learners are provided with planning time, whether or not learners are required to use reasoning skills, and the amount of information or elements that needs to be dealt with. Task Difficulty is closely related to learners' abilities or learners' attitudes towards tasks. For instance, learners' working memory, field independence in language learning, or mind-reading are all related to learners' abilities, and their openness, motivations and anxieties regarding the learning of a second language are related to their attitudes. Task conditions affect the interactions that occur in L2 learning. They include, for example, the number of participants in a task, learners' proficiency levels, and their gender.

To conclude, tasks can be broadly classified into real-life tasks and pedagogic tasks. The purpose of real-life tasks is to replicate real-life situations in order to help learners to achieve objectives both inside and outside of the classroom setting. Pedagogic tasks, on the other hand, are targeted towards helping students acquire specific L2 linguistic structures. To realise this purpose, pedagogic tasks need to be classified and ordered hierarchically, from simple and easy to complex and difficult. The most comprehensive and complete set of task classification criteria to date is the Triadic Componential Framework put forward by Robinson, which lists 12 task complexity variables for the purposes of task design.

2.5.3 Tasks in Processability Theory

As we may recall, studies by both PT and variationists use the assessment of learners' performances of tasks to measure their competence. PT tries to identify what linguistic structures may be elicited from different tasks by calculating the number of times particular target structures are produced in the performance of a given task.

During the 1980s, natural conversation was the main instrument used in SLA research, but this approach tended to be too personal or too inefficient in eliciting specific structures such as questions (e.g., Johnston, 1985). Pienemann (1998) and colleagues (e.g., Pienemann, Mackey & Thornton, 1991; Pienemann & Mackey, 1993) use six communicative tasks to determine the effectiveness of tasks in eliciting various morpho-syntactic structures. The six tasks are: habitual actions, story completion, informal interview, picture sequencing, picture differences and 'meet the partner'.

Six adult ESL learners from various L1 backgrounds with different L2 proficiency levels participated in Pienemann and Mackey's study (1993). A linguistic profile for each learner was created. The results show that these tasks are able to reliably elicit morpho-syntactic structures. Some tasks are more effective than others in eliciting specific morpho-syntactic structures. For example, 'spot the differences' tasks can elicit more obligatory contexts for yes/no questions than interviews or 'meet the partner' tasks (Pienemann & Mackey, 1993). In addition, the morpho-syntactic structures found in learners' speech production were analysed by using a rigid set of emergence criteria.

Since then, the tasks used by Pienemann and colleagues have been widely used in PT research (e.g., Dyson, 2004; Mansouri, 2002; Kawaguchi, 2005). For example, in order to test the morphological and syntactic developmental stages of Japanese L2, Kawaguchi (2005) used a variety of picture tasks (e.g., picture sequence, picture difference, 'meet the partner') and an oral interview task in her longitudinal study. In her cross-sectional study, Kawaguchi created a picture-based storytelling task in order to elicit a range of syntactic structures, including passives, causative constructions and so forth.

More recently, in order to investigate the possible English morphological and syntactic developmental trajectory, Di Biase, Kawaguchi and Yamaguchi (2015) engaged in a two-year longitudinal study of a Japanese L1-English L2 learner who was a primary school-aged child.

A variety of communicative tasks, including storytelling, riddles and 'spot the differences' tasks, were used to elicit questions and declaratives. In addition, a 'pictures without words' storybook entitled *Frog where are you?* (Mayer, 1969) was used to elicit various morpho-syntactic structures. Speech data from fourteen sessions covering a period of 100 weeks was collected for analysis. The results of their longitudinal study provide strong evidence of the utility of the tasks adopted within the PT framework.

To summarise, tasks used in PT research are oral communication tasks focusing on eliciting various morpho-syntactic structures for language assessment and for profiling learners. These tasks can be broadly divided into two types: 1) natural conversation tasks such as interviews and 2) picture-based tasks such as 'spot the differences' tasks and story completion tasks. Well-designed picture-based tasks target specific linguistic structures and can reliably elicit target structures from learners.

2.5.4 Tasks in Variationists' Research

Whilst research within the PT framework has focused on the effectiveness of using tasks in eliciting various morpho-syntactic structures from L2 learners, research on interlanguage variation is more interested in explaining how social factors, such as tasks and topics, affect learners' IL variations. Specifically, various tasks are designed to elicit a range of different speech styles, which will in turn affect the attention learners pay to speech. The different levels of attention to speech can cause learners' IL variations.

For instance, Labov (1972) posits that in order to cope with different social situations, each speaker has at his/her disposal more than one speech style. The range of different speech styles can be placed on a continuum from informal (vernacular) to formal (careful). These different styles can be elicited by social factors, such as various tasks, topics and interlocutors. Labov uses topics such as childhood games, family, dreams and risk of death to elicit informal speech styles in interviews. More formal tasks, including reading passages, word lists and lists of minimal pairs, are used to elicit more formal styles.

Selinker (1972) compares learners' performances in classroom drills or exercises and grammaticality judgements, and finds that learners' interlanguage variation in utterances is influenced by the types of tasks in which the learners engage. Classroom drills or exercises do not elicit meaningful performance from learners. Grammaticality judgements encourage

learners to focus on forms. The nature of tasks results in variations in the learners' interlanguage.

In Tarone's (1985) study, three different tasks were used to investigate learners' performances in response to different IL styles. The three tasks were a grammaticality judgement test, an oral narrative task and an oral interview task. The grammaticality judgement test was a task with a more formal style that called for learners to pay close attention to linguistic forms, while the oral narrative task was the most informal task. It required the least attention to forms from learners. Tarone reports that the differing degrees of attention paid by learners to language forms are related to different task types, which leads to the variations observed in the learners' performances.

Bayley and Tarone (2012) used interview tasks, including everyday life topics such as talking about childhood, dreams, and family members, in their study. In order to elicit a wider range of speech styles, they also employed more formal tasks such as reading passages, word lists, and lists of minimal pairs. The results of their study further confirm that L2 learners' language variability is related to task types.

In order to investigate whether interlanguage variability caused by planning conditions in narrative discourse will affect learners' style-shifting in the use of past tense, Ellis (1987) recruited 17 adult low-to-intermediate-level EFL learners of various L1 backgrounds to perform three storytelling tasks. The first one was a written narrative and the other two were oral narratives. The written narrative task required learners to write a story based on a series of six-picture strips. After performing the written task, learners performed an oral version of the written narrative task. The learners' L2 data were analysed for accuracy in their use of the English past tense. The study reports that the learners' use of past tense varied significantly between the three tasks. The learners were more accurate in the written task, where they were given ample time to prepare, than in the oral task, where they were given a much less preparation time. Ellis concludes that planning variability in tasks led the learners to adopt different language styles, and the different styles contributed to the learners' fluctuations in accuracy, even for the same linguistic features (e.g., regular past tense). Ellis summarises the learners' performance as involving variable competence, and then concludes that the 'planning variability is seen as a feature of the learner's competence, not just of his/her performance' (Ellis, 1987, p. 14).

In summary, in variationists' research tasks have been used to elicit different speech styles. Tasks involving different language modalities can lead to learners producing different language styles. As was the case for the tasks used in Labov (1972) and Tarone (1985). Moreover, differences in styles can be elicited through planning conditions, as was the case in Ellis's (1987) study. Different styles require learners to pay different degrees of attention to linguistic forms.

2.6 The Cognition Hypothesis and Task Complexity Variables

PT uses various tasks to elicit a range of morpho-syntactic structures, whereas the variationists employ different tasks to elicit different speech styles that may affect learners' attention to speech. However, Robinson (2001a) contends that besides style shifting, other factors such as cognitive load will also cause learners to pay different degrees of attention to speech. In order to manipulate cognitive load in tasks, a variety of task complexity variables (e.g., ± *planning time*; ± *few elements*) have been adopted under the Triadic Componential Framework (TCF) (e.g., Robinson, 1995, 2005; Kuiken & Vedder, 2011).

This section first introduces the Cognition Hypothesis and its Triadic Componential Framework. Next, previous studies testing the Cognition Hypothesis are summarised.

2.6.1 The Cognition Hypothesis

Robinson's (2001a, b; 2007a, 2010) criteria for classifying and sequencing pedagogic tasks are both theoretically driven (e.g., Long, 1985, 1998; Merrill, 2006; Reigeluth, 1999; Spector, 2006; Spector & Anderson, 2000) and practically researched (e.g., Robinson, 1995; Robinson, Ting & Urwin, 1995; Robinson & Gilabert, 2007). Robinson proposes that it is necessary to distinguish task complexity from task difficulty and task conditions. Robinson (2001a, 2001b) defines task complexity as 'the result of the attentional, memory, reasoning, and other information processing demands imposed by the structure of the task on the language learner' (p.29, 2001b). Task complexity can help explain within-learner variations. Task conditions include participation and participant factors. For example, a learner's role or status will influence their cooperation and production during interactions. The direction of information flow (e.g., one way vs. two way) and the types of tasks (e.g., one solution vs. many solutions) may affect learners' task performances. Task difficulty refers to the same task potentially

leading to different performances among language learners as a result of differences in the attentional, memory and reasoning resources that language learners bring to the task. Task difficulty helps explain learner variance. Table 2.10 presents Robinson's Triadic Componential Framework for pedagogic task classification and task design (2007a, 2010, 2011b).

Table 2.10 Pedagogic L2 task classification-categories, criteria, analytic procedures, and characteristics (Robinson 2007a, pp. 15-16)

Task Complexity (Cognitive Factor) (Classification criteria: cognitive demands) (Classification procedure: information-theoretic analyses)	(a) Resource-directing variables making cognitive/conceptual demands	▪ ± *here-and-now* ▪ ± *few elements* ▪ ± *spatial reasoning* ▪ ± *causal reasoning* ▪ ± *intentional reasoning* ▪ ± *perspective-taking*
	(b) Resource-dispersing variables making performative/procedural dem	▪ ± *planning time* ▪ ± *prior knowledge* ▪ ± *single task* ▪ ± *task structure* ▪ ± *few step* ▪ ± *independency of steps*
Task Condition (Interactive Factors) (Classification criteria: interactional demands) (Classification procedure: behaviour descriptive analyses)	(a) Participation variables making interactional demands	▪ ± *open solution* ▪ ± *one way flow* ▪ ± *convergent solution* ▪ ± *few participants* ▪ ± *few contributions needed* ▪ ± *negotiation not needed*
	(b) Participant variables making interactant demands	▪ ± *same proficiency* ▪ ± *same gender* ▪ ± *familiar* ▪ ± *shared content knowledge* ▪ ± *equal status and role* ▪ ± *shared cultural knowledge*
Task Difficulty (Learner Factors) (Classification criteria: ability requirements) (Classification procedure: ability assessment analyses)	(a) Ability variables and task relevant resource differentials	▪ *h/l working memory* ▪ *h/l reasoning* ▪ *h/l task-switching* ▪ *h/l aptitude* ▪ *h/l field independence* ▪ *h/l mind-reading*
	(b) Affective variables and task relevant state-trait differentials	▪ *h/l openness* ▪ *h/l control of emotion* ▪ *h/l task motivation* ▪ *h/l anxiety* ▪ *h/l willingness to communicate* ▪ *h/l self-efficacy*

Notes: h=high, l=low.

As Table 2.10 shows, task complexity categorises task characteristics based on a set of cognitive criteria (e.g., Bygate et al., 2013; Robinson, 2005). These task characteristics can

affect the learner's attention, memory, reasoning and other processing resources dedicated to the tasks. Task complexity can be divided into two subcategories: resource-directing variables (e.g., ± *intentional reasoning*) and resource-dispersing variables (e.g., ± *planning time*).

Robinson (2013) contends that as task complexity increases along resource-directing dimensions, learners' initially implicit knowledge will gradually become explicit. Putting aside the debate on whether implicit knowledge changes into explicit knowledge (e.g., Paradis 2004, DeKyeser 2007), increasing the complexity of resource-directing variables will impose more cognitive/ conceptual demands on learners. It will also direct learners' attentional and memory resources to the L2 system, facilitate 'noticing' (Schmidts, 2001; Robinson, 2003), encourage grammaticisation, and increase learners' accuracy and complexity performance/production, finally leading to L2 development (Robinson, 2001a, 2011b). The resource-directing variables include:

1) ± *here-and-now* variables: whether learners should refer to events happening now or to events that happened in the past when performing tasks
2) ± *few elements* variables: the number of elements learners need to deal with in tasks
3) ± *spatial reasoning* variables: whether easily spotted or well-known landmarks are present as special location references points, or whether such landmarks are absent in a task
4) ± *causal reasoning* variables: learners need to transfer information in the simple version (- *causal reasoning*), and they need to report reasoning about causal-effect relationships in the complex version (+ *causal reasoning*)
5) ± *intentional reasoning* variables: learners have to report reasoning about other people's thoughts, beliefs and opinions in the complex version and report simple information in the simple version
6) ± *perspective taking* variables: whether a task requires learners to take the first-person perspective, or to take the second- or third-person perspective, or a combination of the above

Resource-dispersing variables will not direct learners to any linguistic system, so learners will not acquire any new L2 form-concept mappings. Instead, increasing complexity along resource-dispersing variables will accelerate 'automatic access to an already established interlanguage system' (Robinson, 2007a, p. 18). In other words, increasing task complexity

along resource-dispersing variables makes a task more complex for learners to handle, and learners' accuracy, complexity and fluency decrease at the same time. However, more opportunities are created which enable learners to access more real-time language situations. Their initially explicit knowledge will become more automatised. A learner's ability to use their language knowledge gradually increases as they perform complex tasks with manipulated resource-dispersing variables. These variables include:

1) ± *planning time* variables: whether or not a task provides learners with planning time
2) ± *prior knowledge* variables: whether learners' previous knowledge is taken into consideration when designing a task
3) ± *single task* variables: whether or not a task comprises two or more subsidiary tasks
4) ± *task structure* variables: whether a clear task structure is given to facilitate learners to complete the task
5) ± *few steps* variables: whether carrying out the task needs one or a few steps or many steps
6) ± *independency of steps* variables: whether there is a chained sequence in carrying out the task, where each step is based on the completion of the previous one.

Robinson (2011a, 2013) lists five ancillary theoretical claims of the Cognition Hypothesis, which state the likely effects of task complexity on language learning and production. The five ancillary theoretical claims are:

1) If the design of a task involves increasing complexity along resource-directing dimensions, it needs learners to expend more effort on conceptualisation and form/function mapping to express it. Thus, it will lead to greater accuracy and more complex production in L2, and finally foster L2 development. Increasing task complexity along resource-dispersing variables may guide learners to access more quickly their current interlanguage system, and then to automatise it.
2) Cognitively complex tasks should lead to more interactions and negotiation of meaning than is the case in the performance of simple tasks.
3) Complex tasks prompt learners to pay greater attention to input, which in turn will lead to greater depth of processing. The result is the relatively long-term retention of input provided compared to that of simpler tasks.
4) When learners perform tasks in the order of the simplest to the most complex, this should lead to greater automaticity and more efficient L2 task performance than when learners

perform in any other sequence, such as from complex to simple, or from simple to complex to simple.

5) Individual learners' perceptions of task difficulty will increasingly differentiate learning from performance when tasks increase in complexity. In other words, when learners perform simpler tasks, less variation can be observed among learners.

The aim of this thesis is to investigate whether the competence of individual L2 learners varies between tasks of different levels of complexity. Therefore, task conditions and task difficulty categories will only be briefly introduced here. Task conditions identify task characteristics based on interactional criteria (e.g., Williams, 1977). If the characteristics of task condition are kept constant each time, gradual shifts from pedagogic practice to real-world situations can be realised when the design of tasks is increased along task complexity. (Robinson, 2009, 2011b). Task difficulty distinguishes between tasks based on ability-determinant criteria (Carroll, 1993; Snow et al., 1984). These task characteristics are more related to learners' perceptions of 'difficulty' when tasks' cognitive demands are increased, or when tasks require more interactional responses. Task difficulty helps to explain variations between learners when they are performing the same task.

Using Levelt's model of speech production (1989), Robinson (2011a) explains how cognitive/conceptual linguistic demands affect L2 speech performance. In L1 speech production, the attention of monolingual speakers' is focused on two things: one is conceptualising the message they wish to convey, and the other one is monitoring their output. Monolingual speakers have to decide how to allocate their attention when the cognitive load of the conceptualising procedure is increased. If they allocate more attention to conceptualising the message, there may be less attention available for monitoring, and this may lead to decreased accuracy. In addition, when high cognitive loads are imposed on monolingual speakers, this may make them select lemmas that match the activated complex concepts, and the selected lemmas may account for increased syntactic complexity.

For L2 learners, their attention has to be allocated to conceptualising, and monitoring, as well as linguistic encoding. Linguistic encoding tends to be automatic in L1 speech production (Kormos, 2011), whereas L2 learners need to learn how to encode lexical, morphological and syntactic concepts. Learners also need to understand how encoding in their L2 is different from how the same concepts are encoded in their L1. Thus, L2 learners always have to decide how they should allocate their attentional resources when the cognitive load of a task is

higher. For instance, if L2 learners allocate more of their attention to conceptualising messages they wish to convey, less attentional resources will be given to linguistic encoding and monitoring, so the learners' output may become less accurate or less fluent. Moreover, when learners are given higher cognitive loads, they must deal with complex concepts whose encoding requires a larger vocabulary and more complex syntactic information. Therefore, increasing the complexity of concepts step by step helps learners to build up new form-meaning connections and helps them to acquire new constructions in the target language (Ellis, 2003). Moreover, increasing the complexity of tasks can result in greater use of their vocabulary, increased syntactic complexity, progressively automatic production, and finally the fostering of syntactic development (Kormos, 2011; Robinson, 2011a).

2.6.2 Studies Investigating Task Complexity Variables

Robinson's task complexity variables have been chosen for the current study for the following reasons. First, Robinson's Cognition Hypothesis (2003, 2005, 2007a, 2011a) and the accompanying TCF for pedagogic task classification and sequencing, is the most comprehensive and well-developed of its kind to date. Secondly, there is a large amount of previous research which has tested the Cognition Hypothesis, and I am able to compare these studies with my study. Thirdly, Robinson (2003) recommends that testing complexity metrics could be based on other models of L2 processing and L2 development, such as Pienemann's Processability Theory. Robinson (2001) also points out that Tarone's (1985) attention to language forms could not explain much of a learner's development, and argues that other factors affect the amount of attention learners pay to language forms, such as the factors or variables mentioned in his Triadic Componential Framework. However, using all variables would go beyond the scope of this study, which aims to evaluate the competing claims of the Interlanguage Hypothesis and the Processability Theory, rather than Robinson's framework. Thus, the three most frequently tested task complexity variables (i.e., ± *planning time*, ±*here-and-now* and ± *few elements*) were selected in designing the tasks for this study. The next subsection provides a review of previous studies done in testing these variables. Table 2.11 is a summary table of the results of each reviewed study in terms of accuracy, fluency and complexity according to task complexity variables.

Table 2.11 A summary of the results of each reviewed study

Task complexity category	Task complexity variables	Study	Results		
			Accuracy	Complexity	Fluency
Resource-directing	± *here-and-now*	Robinson (1995)	The complex – *here-and-now* oral narrative task elicits more grammatical accuracy than the simple + *here-and-now* oral narrative task.	The complex – *here-and-now* oral narrative task elicits more syntactic complexity than the simple + *here-and-now* oral narrative task.	The complex – *here-and-now* oral narrative task elicited less fluent production than the simple + *here-and-now* task.
		Gilabert (2007)	Learners produced more grammatically accurate language under unplanned *here-and-now* conditions than under planned + *here-and-now* conditions.	Learners have greater lexical richness under planned conditions, but with lower structural complexity than under the unplanned conditions.	Learners achieved more fluent speech under planned + *here-and-now* conditions than under unplanned –*here-and-now* conditions.
		Gilabert et al. (2011)	Learners prioritise grammatical accuracy when performing - *here-and-now* tasks.	Learners have lower syntactic complexity under the *here-and-now* variable.	Learners were more fluent in the simple + *here-and-now* task than in the complex - *here-and-now* task.
	± *few elements*	Robinson's (2001a)	Learners' production is marked with greater grammatical accuracy in the complex version than in the simple version.	Learners show greater lexical variety in the complex version than in the simple version. No significant difference observed for syntactic complexity between the two versions.	Their language production was more fluent in the simple version than in the complex version.
		Michel et al. (2007)	Learners' grammatical accuracy increases as they perform – *few elements* task.	An increase in lexical complexity is reported when learners perform *few elements* task, but no significant effect is reported	More fluent speech production was seen in the + *few elements* task than in the – *few elements* task.

				for structural complexity.	
		Michel (2011)	Learners' grammatical accuracy is not affected by task complexity.	The effects of increasing the task complexity on learners are confined to their lexical complexity, with no change to syntactic complexity.	Learners' fluency was not affected by task complexity.
		Wang (2010)	N/A	Learners who could do the complex slideshow task could do the simple Fishfilm task as well, but not vice-versa.	N/A
Resource-dispersing	± *planning time*	Crookes' (1989)	There is no significant difference in accuracy between the two conditions. No improvement was seen in the use of morphology (plural markers – *s*) due to increased planning time	Subjects produced a greater variety of words and more complex language under the planned conditions.	Subjects were more fluent when planning time was given to them.
		Foster and Skehan (1996)	Of the three sets of conditions tested, the undetailed planning conditions produced the most accurate performances	Detailed planning produced significantly more subordination and greater structural variety than undetailed planning conditions, and undetailed planning conditions outperformed no-planning conditions.	Learners were most fluent under undetailed planning conditions than under the other two conditions.
		Skehan and Foster's (1997)	When planning time is given, greater accuracy in performance	Greater complexity in performance (level of	More fluent speech production was observed under the

			(measured by percentage of error-free clauses) is observed in the narrative task.	subordination) is observed in the decision task with planning conditions.	planning conditions than under the no-planning conditions.
		Mehnert's (1998)	More planning time leads to improved performance overall. 1-minute planners show the greatest accuracy.	The 10-minute planners showed higher lexical density and more complex language structures.	Learners were more fluent under planned conditions than under no-planning time conditions.
		Yuan and Ellis (2003)	The online planning group achieved greater grammatical accuracy than the no planning group and the pre-task planning group.	Both planning groups gained greater grammatical complexity. The pre-task planning group was more lexically varied than the other two groups.	No planning group outperformed the other two groups in fluency, and the pre-task planning group was more fluent than online planning group.
		Kawaguchi and Di Biase (2012)	N/A	Not all learners who could produce passive structures in the self-paced profiling task were able to produce passives in the time-constrained task.	Time factor affected the information processing of novice and intermediate L2 users, but not the expert L2 users.
		Ortega (1999)	When given planning time, learners produced language that was significantly more grammatically accurate.	More syntactically complex language was produced under planning time conditions.	Under planning time conditions, learners produced significantly more fluent speech.
		Sangarun (2005)	Greater effects on grammatical accuracy, syntactic complexity and fluency were observed when instructions focused on both meaning and form (strategic planning).		
		Wiggleworth's (1997)	High-proficiency learners showed greater complexity in their output, more fluent speech and more accurate production (e.g., suppliance of plural –s, verbal morphology, and indefinite article) in the more difficult tasks with the benefit of planning time. On the other hand, low-proficiency learners did not benefit from the planning time provided.		
		Tavakoli and Skehan (2005)	When learners are provided with planning time, their language is more fluent, complex and grammatically accurate.		

A detailed introduction to the reviewed studies in relation to each task complexity variable is presented below.

± *Here-and-Now*

This is a resource-directing variable. Long (1985) states that a task is considered to be simple if its context is provided and it is performed in the present tense (+ *here-and-now*). The task is considered to be complex when it is not supported by a context, and the events or objects it deals with are dislocated in time and space (- *here-and-now*). Based on previous studies on L1 acquisition (Bellugi & Brown, 1964), L2 development (Meisel, 1989) and functional linguistic theory (Givón, 1995, 2009, 2013), Robinson (1995) investigates the effects of two tasks with different degrees of cognitive load (*here-and-now* vs. *there-and-then*) on learners' language performance. Under *here-and-now* conditions, the task requires learners to look at a series of picture strips while describing a story in the present tense. The task under *there-and-then* conditions requires learners to use the past tense to describe the story without looking at the picture strips. The *here-and-now* conditions are more complex than the *there-and-then* conditions. Robinson hypothesises that learners tend to produce more complex syntax, pay more attention to form, and utter more multi-positional structures in more complex tasks where the - *here-and-now* variable is manipulated. The results confirm his hypothesis; that is, complex - *here-and-now* narrative tasks elicit greater grammatical accuracy as well as more syntactically complex production than the + *here-and-now* task, whereas simple + *here-and-now* tasks elicit utterances of greater length than do complex tasks.

The greater accuracy elicited in complex tasks identified in the above study is also found in Gilabert and colleagues' studies (Gilabert, 2007; Gilabert, Barón & Levkina, 2011). Gilabert (2007) examines the interaction of planning time and the degree of displacement, or past time reference (± *here-and-now*) on learners' L2 narrative oral performance. The results show that the learners achieved more fluent speech and greater lexical richness when planning time is provided. They produced more grammatically accurate language under unplanned - *here-and-now* conditions, but with lower fluency and complexity. Gilabert et al. (2011) use two versions of a narrative task to investigate the effects of ± *here-and-now* variables on L2 learners' language performances. The simple + *here-and-now* task version requires learners to look at a series of comic strips and describe the story it tells in the present tense; the complex version requires learners to describe a story in the past tense without looking at the comic strip. They find that learners pay more attention to being accurate in the complex -

here-and-now task than in the + *here-and-now* task. However, the lexical and structural complexity of their utterances is not affected by the complexity variable. They conclude that a trade-off effect (Skehan, 2009, 2014) is observed from learners. When learners perform tasks with heavy cognitive loads, the grammatical accuracy and complexity priorities compete with each other for the learners' limited cognitive resources. Learners prioritise accuracy over complexity.

To conclude, L2 learners exhibit more accurate performance when the tasks are designed with - *here-and-now* conditions. Complex - *here-and-now* tasks are shown to elicit more complex productions in Robinson (1995). However, lexically and structurally more complex productions were not found in Gilabert's (2007) and Gilabert, Barón and Levkina's (2011) studies. The available evidence from the above studies therefore partly confirms the prediction of the Cognition Hypothesis, which states that when the complexity of a task is increased along resource-directing variables (e.g., ± *here-and-now*), learners will produce more complex and more accurate language.

± *Few Elements*

This is also a resource-directing variable. The ± *few elements* variable refers to the number of elements a learner has to deal with in a particular task, with +*few elements* being simple, and -*few elements* being complex. According to Robinson (2005a), increasing task complexity along the more complex '- few elements' variable has the potential to lead to greater grammatical accuracy, and greater lexical and syntactic complexity. Many studies have explored the effects of ± *few elements* variables on language performance in order to test the validity of this claim (e.g., Gilabert, Barón & Levkina, 2011; Robinson, 2001a). For instance, Robinson (2001a) introduced what he calls ± *few elements* and ± *prior knowledge* variables to examine the effects of increases in task complexity on learners' language performance. Forty-four university undergraduate EFL learners of Japanese L1 were employed to perform a simple version and a complex version of a map task. In the simple version, learners were given a map of their university. This simple map task only covered a small area (+ *few elements*) and learners were familiar with the area (+ *prior knowledge*). In the complex version, learners were given a large city map. This complex map task contained many unknown landmarks (- *few elements*) that learners were not familiar with (- *prior knowledge*). Learners were randomly paired to carry out interactive tasks, with one learner being the speaker and the other learner being the hearer. The results showed that task complexity did

significantly affect speakers' productions. In the complex version, greater lexical variety and grammatical accuracy were observed, whereas in the simple version, more fluent production was observed. However, no significant difference in syntactic complexity were found between the two versions. The same result is also found in Michel, Kuiken and Vedder's (2007) study, that is, increasing task complexity had a positive effect on learners' grammatical accuracy and lexical complexity with, but no significant effect for structural complexity.

Views on the effects of ± *few elements* variables are not uniform. Michel (2011) investigated the effects of ± *few elements* variables on L2 oral task performance. He invited 64 English L2 learners to participate in two sets of speaking tasks, namely, a dating task and a study task. The dating task had two versions. In the simple version learners were asked to choose among four people to identify the couple which was the best match, and in the complex version they were asked to choose among six people to identify the couple which was the best match. The study task also contained two versions, with the simple version requiring learners to choose the best studying couple out of four people, and the complex version requiring learners to choose the best studying couple out of six people. The results show that the effects of increasing the task complexity on learners were confined to their lexical complexity; learners' grammatical accuracy, fluency and syntactic complexity were not affected by task complexity. Thus, Michel suggests that 'increased task complexity manipulated through the single factor "± *few elements*" does not affect L2 learners' attentional allocation and task performance' (p. 166).

Wang (2010) examines learners' production of a particular L2 syntactic construction, the passive voice, via tasks with different degrees of cognitive load. Wang used the Fishfilm (Tomlin, 1995) task in which learners used the verb *eat* and the noun *fish* throughout 30 eventualities. He also designed a slideshow task containing more information or elements. In the slideshow task, learners were asked to use a variety of verbs and thematic relations to describe 40 eventualities. The results of Wang's study show that learners who had already reached the inter-phrasal procedure stage (developmental stages defined by PT) performed the processing passives differently in both tasks. Specifically, learners who could perform the complex slideshow task could also perform the simple Fishfilm task, but not vice-versa.

In summary, within the reviewed literature concerning ± *few elements* variables, some scholars contend that presenting learners with more elements to deal with in a task will lead to more accurate language, and greater lexical and syntactic complexity (e.g., Michel, Kuiken & Vedder, 2007; Robinson, 2001a). However, other researchers such as Michel (2011) posit that the number of elements in a task does not influence learners' speech production.

± *Planning Time*

This is a resource-dispersing variable. Ellis (2009) states that looking into the effects of planning on L2 oral performance 'serves to test claims regarding the nature of variability in learner language' (p. 474). Tarone and Parrish (1988) argue that attention to language form is a cause of learners' IL style shifting. Other factors, such as the role of planning on IL variation, may also affect IL variation in the cognitive domain (e.g., Ellis, 1987). In Ellis (1987), greater accuracy was found under the planning conditions due to the greater amount of attention available.

Several studies have looked into the effects of pre-task planning on L2 complexity and accuracy in performance (e.g., Crookes, 1989; Foster, 1996; Foster & Skehan, 1996; Mehnert, 1998). Most of these studies confirm that planning helps L2 learners to produce more developed speech when measured by fluency, complexity and accuracy. For example, Crookes' (1989) study shows that under planned conditions, subjects produced a greater variety of words and more complex language. There was no significant difference in accuracy between planned and unplanned conditions. No improvement was seen in the use of morphology (plural markers *–s*) through planning time. Foster and Skehan (1996) report that planning conditions have a linear relationship with complexity. Detailed planning produced significantly more subordination and had greater structural variety than undetailed planning, and undetailed planning outperformed the no-planning situation. The undetailed planning situation achieved the most accurate performance. Skehan and Foster's (1997) results show that in the planning situation, greater accuracy in performance (percentage of error-free clauses) was observed in a narrative task, while greater complexity in performance (level of subordination) was observed in a decision-making task. Mehnert's (1998) results show that more planning time leads to improved performance overall. The 10-minute planners showed higher lexical density and more complex language structures.

Apart from pre-task planning, some studies investigate the effects of online planning on L2 speech production (e.g., Yuan & Ellis, 2003; Kawaguchi & Di Biase, 2012). Yuan and Ellis (2003) distinguish between pre-task planning and online task planning. Pre-task planning refers to the preparation time before carrying out tasks, and online planning refers to the time given to learners for organising, structuring or thinking while carrying out tasks. In their study the no planning group outperformed the other two groups in the aspects of fluency and lexical variety. Both planning groups showed greater grammatical complexity. The online planning group achieved greater grammatical accuracy as well, but the pre-task planning group was more fluent and had a richer vocabulary. In addition, they found dual trade-off effects in their study. Learners attended to accuracy under the online planning condition, but they attended to fluency if they were given opportunities to plan before they performed the task. Another trade-off effect was seen between grammatical accuracy and lexical variety. The online planning group was more grammatically accurate, but the pre-task planning group was more lexically varied. Kawaguchi and Di Biase (2012) looked into the effects of planning on learners' interlanguage from a processability perspective instead of using general measures of accuracy, fluency and complexity. Their results show that not all learners who could produce passive structures in the self-paced profiling task were able to produce passives in the time-constrained task. The amount of time available affected the information processing of novice and intermediate L2 users, but not of the expert L2 users. The results of the time-constrained task suggest that a developmentally significant difference exists between emergence of a structure and automatised production of the structure.

Several studies (e.g., Ortega, 1999; Sangarun, 2005) have looked into what learners actually plan during the planning phase. Ortega (1999) investigated whether learners focused on form when they were given planning time before performing an oral task. The results show that when allowed planning time, learners produced significantly more fluent, accurate and syntactically complex language. Learners reported that they planned for morpho-syntactic structures, utterances, lexical choices and semantic uses. Sangarun (2005) investigated the effects of different strategic planning conditions (i.e., no strategic planning, meaning-focused strategic planning, form-focused strategic planning, and both the meaning- and form focused strategic planning) on L2 oral performance. The results show that the three strategic planning conditions directed learners' attention to the planning of meaning and the planning of form, and to a balanced planning of meaning and form respectively. In addition, greater effects on

accuracy, fluency and complexity were observed under the strategic planning with instructions focusing on both meaning and form.

The interaction of the effect of planning on L2 performance and learners' proficiency levels (e.g., Wiggleworth, 1997; Tavakoli & Skehan, 2005) has also been examined. Wiggleworth's (1997) study shows that learners of different proficiency levels focused on different aspects of discourse during the planning phase. With the benefit of planning time, high-proficiency learners showed greater complexity, more fluent speech and more accurate production (e.g., suppliance of plural –s, verbal morphology, and indefinite article) in the more difficult tasks, whereas low-proficiency learners did not benefit from the planning time provided. Tavakoli and Skehan (2005) find that when learners were provided with planning time, their language was more fluent, complex and accurate. Intermediate level learners' language was more fluent, complex and accurate than that produced by elementary learners. However, the correlation between planning time and proficiency level was not significant.

To conclude, planning time is useful as it can influence L2 learners' outcomes by providing opportunities for constructing utterances, activating procedures and handling communicative strains and pressures. Evidence shows that providing planning time can lead to increases in fluency as well as linguistic and lexical complexity for learners; however, the findings for increases in grammatical accuracy are equivocal. For example, several studies find that learners showed little improvement in accuracy when planning time was provided (Crookes, 1989; Foster & Skehan, 1996; Mehnert, 1998). These studies suggest a trade-off effect between complexity and accuracy when learners perform tasks. On the other hand, studies such as Ortega (1999) and Wiggleworth (1997) do find improvement in accuracy among learners. The latter study reports that high-level learners benefited more from planning time than participants with lower levels of proficiency (Tavakoli & Skehan, 2005).

In summary, within the examined literature, it can be seen that all tasks contain two versions, a simple version and a complex version. The two versions of a task are designed by manipulating task complexity variables (e.g. ± *few elements*, ± *planning time*). The two-version task has become an accepted method to investigate the effects of task complexity on learners' linguistic performance and language development. However, there is no study investigating whether learners' L2 competence as defined by PT varies with tasks of different

degrees of complexity. Thus, the current study adopts Robinson's well-established methodology to answer the question.

2.7. Task Modality

In the reviewed literature, tasks involving different skill types (e.g., writing skill, oral skill, reading skill) were administered to the same learners. As we may recall, Tarone (1985) used a grammaticality judgement test and two oral tasks to elicit different speech styles. She accounts for the differences in accuracy levels as being due variable competence. However, Pienemann (1998) criticises Tarone from a psycholinguistic perspective, and states that writing and oral production are based on different processes, and thus, differences in the performance of learners will be observed. Pienemann suggests that all tasks utilised in a study should be of the same skill type, as this will enable the results for different tasks to be compared. Many scholars (Akinnaso, 1982; Biber, 1991; Chafe, 1982; Emmitt, Zbaracki, Komesaroff and Pollock, 2010; Halpern, 1984) consider speech and writing are two different mechanisms in language learning. Speaking is spontaneous, and a learner does not have much time to plan or revise his/her speech again and again. However, writing is generally characterised by planning. The learner can spend much time revising and polishing his/her writing (Grabe & Kaplan, 2014).

Granfeldt's (2008) study found that task mode did not affect French L2 learners' performance of syntactic complexity, but learners showed a higher variety of vocabularies in writing than in speaking task (Yu, 2010), and moreover they were more accurate in speaking than in writing. The results of Kormos and Trebits's (2012) study showed that their participants used more varied vocabulary in the writing task than in the speaking task. Their performance of syntactic complexity was quite similar in tasks of the two different modes. Hu (2003) finds that English L2 learners are able to achieve high scores on discrete-point grammar tests, but are not able to communicate fluently and accurately in communicative contexts. Kuiken and Vedder (2011) explored the effects of task complexity on L2 learners' linguistic performance in writing and speaking modalities. Learners were asked to provide advice to their friends concerning choosing a holiday destination from the five options provided. In choosing an ideal holiday destination, the simple version required learners to meet three requirements, and the complex version required learners to meet six requirements. In the speaking mode, learners completed the two versions of the task by leaving a phone message on an answering

machine. In the writing mode, learners needed to write two letters for the two versions of the task. The results show that task complexity did affect learners' grammatical accuracy in performance in both the speaking and the writing modes. Learners made fewer grammatical errors in the complex version than in the simple version in both modes. With regard to their syntactic complexity performance, task complexity did not affect learners' performance in the writing tasks, but learners produced significantly fewer dependent clauses in the complex oral task.

As the results of the above reviewed study show, learners have produced different performances under different task modalities, that is, writing mode and speaking mode. Each mode directs and requires learners to experience or express language in its particular way. Thus, looking into the issue of different skills elicited by tasks becomes one of the research areas of this thesis.

2.8 Research Gap and Research Question Areas

My review of the literature has shown that the issue of whether a learner's L2 competence or interlanguage system varies according to the tasks he or she is given has long been debated and discussed. This issue is of pedagogical importance, as it may have implications concerning the validity of language assessment and syllabus design.

According to Pienemann (1998, 2007b), interlanguage variation is highly constrained within predictable language processing procedures. PT emphasises that 'despite considerable differences in performance the basic rule system underlying variable interlanguage performance does not change within one learner between tasks' (Pienemann, 1998, p. 278). In addition, Pienemann (2005, (p. 49)) states that variability occurs because 'processability leaves a certain amount of leeway which allows the learner a range of solutions'. For instance, if learners cannot handle the WH-question processing operation, which requires placing an auxiliary at the second position, they may use other solutions to solve the problem, such as omitting the auxiliary. No matter what variable IL forms a learner chooses to use (e.g. omission, violation, and avoidance), the range of variability stays under the same developmental point.

In contrast, researchers working under the variationist framework (e.g., Ellis, 1985, 1987; Tarone, 1983, 1988, 2014) believe that learner language usage occurs along a capability continuum of speech styles. Learners' interlanguage grammar can move up and down this continuum due to the amount of attention they pay to speech. The amount of attention they pay can be influenced by various tasks, topics or situations. Recently, Bayley and Tarone (2012) have stated that interlanguage is systematically and predictably variable across tasks. Tarone (2014) specifies that learners' interlanguage variability is caused by a number of factors including shifts in social and contextual variables, L1 transfer, linguistic context and so on. However, it is not clear whether this variability is meant to refer to accuracy in performance or acquired knowledge (competence).

One important element missing in the debate is the meaning of 'different tasks'. Robinson's (2007a, 2011a) recently proposed Cognition Hypothesis provides explicit criteria for classifying tasks in terms of task complexity, task conditions and task difficulty. He argues that apart from style-shifting, other matters such as cognitive load can affect the amount of attention paid to language forms through task-based learning. He points out that it is necessary to investigate L2 development via task-based activities that cover a combination of factors. In addition, Robinson (2003) suggests that future research could use other L2 processing and development models such as Pienemann's Processability Theory to measure learners' performances.

No previous studies in the area of Processability Theory or the Interlanguage Hypothesis have used Robinson's task complexity variables to test their own hypotheses. It is not known whether L2 learners' interlanguage grammar systems or competence levels remain stable under tasks with different degrees of complexity. Thus, the current study tries to bridge the gap between the two competing theories by using Robinson's task complexity variables to bring about systematic manipulation to create 'different tasks'. The current study aims to:

1) test the claims of Processability Theory and the Interlanguage Hypothesis in relation to the variability or stability of learners' interlanguage systems
2) investigate whether learners from the same developmental stages show similar levels of accuracy and syntactic complexity when undertaking tasks with different degrees of complexity
3) explore the nature of language produced by L2 learners when they perform speaking and writing tasks.

Based on the aims mentioned above, the current thesis covers three research question areas. The first area regards competence, and it investigates whether competence varies across tasks of different cognitive complexity – that is, whether PT developmental stages vary when tasks vary in their planning times, the number of elements involved and *here-and-now* variables. The question of how the results obtained within PT standard profiling tasks compare with the experimental tasks proposed in the current project is also investigated. The experimental tasks will be explained in the next chapter. The second research question area concerns the performances of learners and whether they vary according to Robinson's cognitive complexity variables in terms of the rule application rates of morphological structures (e.g., past *-ed*, plural *–s*, 3sg *-s* and VP construction). Again, it may be interesting to compare the profiling tasks and the experimental tasks. The third research question area relates to the issue mentioned by Pienemann concerning the skills used in the performance of different tasks. This issue is not treated extensively in the current project, which is primarily concerned with oral skills. However, some written data is available from the translation task performed by some learner groups. Hence, some comparisons may be drawn across skill modalities. More detailed and formalised research questions and hypothesises will be presented in Chapter 3.

2.9 Summary

This chapter has reviewed the literature related to two major theories of SLA (i.e., Processability Theory and the Interlanguage Hypothesis) whose claims appear to be incompatible with each other. PT states that L2 learners' interlanguage variations are highly constrained within the learners' predictable processing procedure. The learners' interlanguage competence remains stable across tasks involving the same skill. However, the Interlanguage Hypothesis asserts that L2 learners' interlanguage variations are caused by a combination of factors, and one of the factors is the nature of the tasks that learners perform. Both theories consider tasks as a tool to elicit L2 performance, but the tasks that the two theories use to test their own claims are different. Robinson's Cognition Hypothesis offers a well-defined formalism for L2 tasks. Thus, tasks designed from the Cognition Hypothesis perspective are used to investigate the issue of interlanguage variation. Based on the research gap identified and the literature reviewed, the research questions are presented in Chapter 3. The corresponding research hypotheses and the research methods adopted for this study will also be introduced in the next chapter.

Chapter 3 Research Methods

The previous chapter identified gaps in the literature and mentioned three research question areas. This chapter presents three research hypotheses which correspond to the three research questions, and it gives a detailed account of the data collection and the instruments by which the research questions are investigated. This chapter is organised as follows: three research hypotheses corresponding to the research questions are listed and explained in Section 3.1. The recruitment criteria and the grouping of informants are provided in Section 3.2. Section 3.3 presents a detailed description of the tasks used in this study. Section 3.4 introduces methods of data collection. Methods of data analysis are presented in Section 3.5, and the chapter concludes with a summary in Section 3.6.

3.1 Research Questions and Hypotheses

Based on the three research question areas mentioned in the previous chapter, the current study posits the following three research questions:

1. Does L2 competence vary when learners undertake tasks of different cognitive complexity?
    1. a) Does competence as defined by PT vary according to Robinson's cognitive complexity variables? That is, does the PT stage of development vary with (i) variable planning time tasks; (ii) variable *here-and-now* tasks; and (iii) variable *few elements* tasks?
    1. b) Are the results obtained with the experimental tasks mentioned above comparable to results obtained with PT standard profiling tasks?
2. Do L2 learners' performances vary according to tasks of different cognitive complexity?
    2. a) Do learners' performances vary in terms of rule application rates of morphological structures (e.g., past *-ed*, plural *–s*, 3sg *-s* and VP construction) according to Robinson's cognitive complexity variables?
    2. b) Are results obtained with the experimental tasks mentioned above comparable to results obtained with PT standard profiling tasks?
3. Do L2 learners' competence levels as defined by PT vary according to task modality (i.e., speaking modality vs. written modality)?

A research hypothesis corresponding to each research question is presented below, followed by an explanation of its theoretical motivations and assumptions.

Hypothesis for Research Question 1:

> *A learner's L2 competence as defined by PT will not vary with task complexity.*

This hypothesis is based on Pienemann's Steadiness Hypothesis (1998). Pienemann states that a learner's IL grammatical system or competence does not change across communicative tasks if the tasks being carried out involve the same skill. Thus, even if the tasks are of different degrees of complexity, they belong to the same skill type (e.g. speaking skills), so the learner's IL grammatical system or competence remains stable across communicative tasks.

Hypothesis for Research Question 2:

> *A learner's performance varies in terms of rule application rates of morphological structures (i.e., past -ed, plural –s, 3sg –s and VP construction) according to Robinson's cognitive complexity variables.*

This hypothesis is based on Robinson's Cognition Hypothesis (2005, 2007, 2009, 2011a). Robinson states that increasing task complexity along resource-directing dimensions, such as ± *here-and-now*, could 'push learners to greater accuracy and complexity of L2 production in order to meet the consequently greater functional/communicative demands they place on the learner' (Robinson, 2011a, p.18). Specifically, when a learner performs tasks which are designed by manipulating ± *here-and-now* and/or ± *few elements* variables, the learner will show more cases of syntactic complexity and greater accuracy in the performance of complex tasks (i.e. – *here-and-now*, – *few elements*). However, if tasks are altered by increasing task complexity along resource-dispersing dimensions, such as ± *planning time*, the effects of task complexity on accuracy, fluency and complexity will decrease simultaneously. In other words, when the learner performs the two tasks which are differentiated from each other by manipulating ± *planning time* variables, the learner will show more cases of syntactic complexity and greater accuracy in simple tasks (i.e. + *planning time*) in which planning time is provided to the learner.

Hypothesis for Research Question 3:

A learner's L2 competence as defined by PT will vary according to task modality.

This hypothesis is based on Pienemann's (1998) Steadiness Hypothesis, which states that for a learner the 'basic nature of the grammatical system of an interlanguage does not change in communicative tasks as long as those are based on the same skill type in language production' (Pienemann, 1998, p. 273). When asked to do tasks testing different skills, such as speaking skills and writing skills, the learner's L2 competence may vary between the different modalities elicited by the tasks.

3.2 Informants

In order to answer the research questions, and test the hypotheses, thirty Chinese adult L1 learners of English L2 were recruited as informants for this project. Three groups of informants were recruited according to their English proficiency levels based on their International English Language Testing System (IELTS) scores.[2] The proficiency levels were: high, intermediate and lower-intermediate. There were ten informants in each category. The ten informants with a high proficiency level in English were recruited from students who enrolled in the Master of Interpreting and Translation (I&T) program at Western Sydney University (WSU). An overall band score of 7.0 or higher in IELTS is required to apply for admission into WSU's I&T program. Informants of both intermediate and lower-intermediate levels were recruited from WSU College. They were enrolled in the English for Academic Purposes (EAP) course at the time of participating in this project. The EAP course is a preparatory course that prepares students for university courses. As it is stated in the college's official webpage (WSU College, 2016), the college currently offers five EAP courses for students (see Appendix A for a detailed description). The ten informants of intermediate level were recruited from students who attended EAP3 and EAP4 courses at the college, which required an IELTS score of 5 or over. The ten informants of lower-intermediate level were taking EAP2 course at the time of recruitment. The EAP2 course required an IELTS score of 4.5.

[2] IELTS (2016) is the world's well-established English language test, consisting of four parts: speaking, listening, reading and writing. It uses a 9-score scale to grade each test-taker's result. Test-takers are graded from 1 to 9 for each part of the test, and then an overall band score is produced as their final score.

The informants in each group needed to be distinguished from each other as well. In order to differentiate between the learners within each group, Nation and Beglar's (2007) vocabulary size test [3] was adopted. According to Nation and Beglar, 'the vocabulary size test is developed to provide a reliable, accurate, and comprehensive measure of a learner's vocabulary size from the first 1,000 to the fourteenth 1,000 word families of English' (2007, p.9). This test has established its validity, reliability and accuracy, and has been used in a number of research projects (e.g., Kawaguchi, 2013; Nation, 2006). In this study, the vocabulary size test was distributed to the learners in a test paper form, and they were asked to complete the test in one hour or less. Each informant's correct number of vocabulary entries was recorded. The number was then multiplied by 100 [4], and adopted as the informant's vocabulary size test score.

Following Human Ethics Research guidelines (2016), all the thirty informants' identities were kept confidential and were anonymised. They were coded according to their English proficiency levels (represented by capital letters) and vocabulary size sorted from smallest to largest (expressed as a two-digit number, e.g., 01, 11, 21). The three proficiency levels were represented by the capital letters H, M and L, which referred to the High, Intermediate and Lower-intermediate levels respectively. Regarding the vocabulary size, the informants of high proficiency level were labelled from H01 to H10 in ascending order. Similarly, the informants of intermediate level were labelled from M11 to M20, and the informants of lower-intermediate level from L21 to L30. Table 3.1a below summarises the 30 informants' IELTS scores and their lexical sizes arranged in ascending order. Table 3.1b lists the 30 informants' lexical sizes in ascending order.

We can see from Table 3.1a that there is a small proficiency gap measured by IELTS scores between the lower-intermediate and intermediate informants. If one overseas student wants to pursue further study in Australia, the minimum IELTS score for acceptance in a language preparation course is a 4-score. Thus, it is difficult to find really lower-level informants in Australia. From Table 3.1b, it can be seen that some informants (e.g., L30, M20) have large vocabularies even though they are from lower proficiency levels. For example, L30's vocabulary is 7,300, which is larger than those of H01 and H02. Meanwhile, some higher-

[3] Nation & Beglar's (2007) vocabulary size test is available on the website http://www.lextutor.ca/tests/levels/recognition/1_14k/. It includes multiple-choice questions with ten each from every 1,000 word level up to 14,000 word level, i.e., 140 questions in total.
[4] One word represents 100 word families in the band.

level informants' (e.g., M11, M12, H03) vocabularies are smaller than their counterparts in lower levels. In order to make the three groups distinctively different from each other and answer the research questions precisely, the most representative informants from each level were selected, as shown in the shaded cells in Table 3.1b. The most representative informants comprised five lower-intermediate informants with the smallest vocabularies (L21-L25), the five high-level informants with the largest vocabularies (H06-H10), and five intermediate informants with vocabularies of intermediate size (M13-M17).

Table 3.1 The 30 informants' IELTS Scores and Lexical Sizes

3.1a	IELTS score	Vocabulary size test (score)
L21	4	3,700
L22	4.5	3,800
L23	4	4,500
L24	4.5	4,600
L25	4.5	4,600
L26	4.5	5,400
L27	4.5	5,700
L28	4.5	5,900
L29	4.5	6,200
L30	4.5	7,300
M11	5	5,300
M12	5	5,400
M13	5.5	5,900
M14	5.5	6,300
M15	5	6,600
M16	5.5	7,200
M17	5	7,200
M18	5	7,400
M19	5.5	7,500
M20	5.5	7,800
H01	7	6,700
H02	7	7,000
H03	7	7,600
H04	7	7,600
H05	7	7,600
H06	7	8,300
H07	7	9,400
H08	7	10,200
H09	7	10,600
H10	7	10,800

3.1b	IELTS score	Vocabulary size test (score)
L21	4	3,700
L22	4.5	3,800
L23	4	4,500
L24	4.5	4,600
L25	4.5	4,600
M11	5	5,300
L26	4.5	5,400
M12	5	5,400
L27	4.5	5,700
L28	4.5	5,900
M13	5.5	5,900
L29	4.5	6,200
M14	5.5	6,300
M15	5	6,600
H01	7	6,700
H02	7	7,000
M16	5.5	7,200
M17	5	7,200
L30	4.5	7,300
M18	5	7,400
M19	5.5	7,500
H03	7	7,600
H04	7	7,600
H05	7	7,600
M20	5.5	7,800
H06	7	8,300
H07	7	9,400
H08	7	10,200
H09	7	10,600
H10	7	10,800

While Table 3.1 classifies the informants into three groups, Table 3.2 below summarises the background information for each informant. The table presents each informant's IELTS score, their highest level of education at the time of participation, their age, gender, years of EFL instruction received in Mainland China, and their length of stay in Australia.

Table 3.2 The 30 informants' background

	IELTS score	Education (Completed)	Age	Gender	No. of years of EFL instruction in China	Length of stay in Australia
L21	4	High school	20	M	9 years	6 months
L22	4.5	High school	18	F	6 years	8 months
L23	4	Diploma of engineering	21	M	9 years	6 months
L24	4.5	Bachelor of engineering	24	M	10 years	Less than 3 months
L25	4.5	High school	21	F	7 years	6 months
L26	4.5	Bachelor of economy	26	M	10 years	Less than 3 months
L27	4.5	Business English (completed year one in university)	21	F	10 years	Less than 3 months
L28	4.5	Bachelor of photography	26	M	9 years	Less than 3 months
L29	4.5	Diploma of nursing	23	F	9 years	6 months
L30	4.5	Diploma of Chinese as a second language	26	M	9 years	Less than 3 months
M11	5	Diploma of marketing	22	F	9 years	6 months
M12	5	High school	19	F	10 years	8 months
M13	5.5	Bachelor of Chinese education	26	F	9 years	6 months
M14	5.5	Bachelor of business	26	M	10 years	Less than 3 months
M15	5	High school	19	F	10 years	8 months
M16	5.5	Bachelor of management of tourism	26	F	10 years	Less than 3 months
M17	5	Bachelor of nursing	24	F	10 years	Less than 3 months
M18	5	Bachelor of interior design	27	M	10 years	Less than 3 months
M19	5.5	Bachelor of administration	27	F	9 years	6 months
M20	5.5	High school	18	F	10 years	6 months
H01	7	Bachelor of Accounting	24	F	10 years	1 year
H02	7	Bachelor of Traditional Chinese Medicine	25	F	10 years	1 year
H03	7	Bachelor of Accounting	24	M	10 years	4 years
H04	7	Bachelor of Business	27	F	9 years	4 years
H05	7	Bachelor of Information engineering	24	M	10 years	1 year
H06	7	Bachelor of Management of tourism	27	F	10 years	4 years
H07	7	Bachelor of Inorganic non-metallic material	24	M	9 years	1 year
H08	7	Master of Accounting	32	F	10 years	2 years
H09	7	Bachelor of translation and Interpreting	23	F	9 years	3 years
H10	7	Bachelor of English	26	F	10 years	2 years

Table 3.2 shows that the high-level informants (H01 to H10) all gained an IELTS score of 7. Half of the informants in the intermediate group (M11, M12, M15, M17 and M18) had IELTS scores of 5, and the other half (M13, M14, M16, M19 and M20) had scores of 5.5. As for the lower-intermediate informants, eight had achieved a score of 4.5 and the other two informants (L21 and L23) had achieved a score of 4. The informants' ages ranged from 18 to 32 (M=23.86, SD=3.27). All 30 informants reported that they had received between six and ten years (M=9.38, SD=0.94) of formal English classroom instruction in Mainland China.

Informants' lengths of stay in Australia ranged from three months to four years (M=12.52, SD=14.4). Of the thirty participants, eleven were males and the other nineteen were females. All informants reported that they had never been to or studied or lived in any English speaking countries other than Australia, except that one informant (H01) had had a two-week holiday in the United States.

Besides the 30 informants, this study had a control group, which consisted of a native English speaker who was a second-year Bachelor of Psychology student at WSU, and a professional English-Chinese translator who is a balanced bilingual speaker with Mandarin Chinese as her first language. The professional translator was recruited to do a translation task which was beyond the native English speaker's ability.

3.3 Tasks

Two types of tasks were used in this study: profiling tasks and quasi-experimental tasks. The design of these two types of tasks was based on three task complexity variables listed in Robinson's (2009) Triadic Componential Framework, that is, ± *here-and-now*, ± *planning time* and ± *few elements*. The reason for choosing these three variables is that they are the most tested variables among the 12 task complexity variables listed in Robinson's Triadic Componential Framework. Since this study does not aim to test Robinson's Cognition Hypothesis, it would be well beyond its scope and purpose if all the variables were used in the tasks. Moreover, no previous study has used the three chosen variables on adult Chinese L1-English L2 learners of various proficiency levels. Table 3.3 summarises each task and the particular task complexity variable that is manipulated in the tasks.

Table 3.3 A summary of tasks used in this study

Profiling tasks	'Meet the partner' and 'spot the differences' (+ *here-and-now*)
	Time-defined Fishfilm (+ *few elements*)
	Translation (written)
Quasi-experimental tasks	'Topic and comments' (- *here-and-now*)
	Self-paced picture description (+ *planning time*)
	Time-defined picture description (- *planning time*; - *few elements*)

The purpose of profiling tasks was to identify the informants' PT stages and developmental stages. The 'meet the partner' and 'spot the differences' task manipulates + *here-and-now* variable, because this task required the informants to perform a task based on the pictures

shown to them. The time-defined Fishfilm task contained only one item (i.e., fish) and one action (i.e., eat), so it was the task manipulated + *few elements* variable. Translation task was a written task. Quasi-experimental tasks were used to make comparisons with the stages identified from the profiling tasks. The 'topic and comments' task did not provide the informants with pictures. They had to ask their partner questions based on abstract ideas, so this task was a task of – *here-and-now* variable. The informants were provided plenty of planning time to complete the self-paced picture description task (+ *planning time*), while the informants were only given 9 seconds to describe each picture event in the time-defined picture description task (– *planning time*). The time allowed for description of each picture in the time-defined picture description task was the same as the time-defined Fishfilm task, but the former task contained more items and more actions (i.e., – *few elements*) than the latter. A detailed description of each task is presented below.

3.3.1 Profiling Tasks

In addition to the IELTS test scores that were used to identify the informants' proficiency levels, profiling tasks were adopted to further measure each informant's L2 competence from the developmental perspective as defined by PT. The IELTS test is a core test widely used in Australia to measure a learner's general ESL proficiency. It does not reveal any particular language patterns that the informant can use or has mastered. Thus, profiling tasks were utilised to identify each informant's L2 morphological and syntactic acquisition stages.

Two task modes (oral and written) were used to determine each informant's developmental stage. The reason for using these two modes is that the skills for performing oral tasks are different from those for written tasks (Pienemann, 1998). Apart from investigating the informants' use of certain morphological rules in both task modes, the oral profiling tasks examine the informants' ability to produce questions and their structural choices (e.g., active or passive). However, the written translation task aims to capture the informants' productive language ability relating to syntactic structures, such as passives and causatives. Thus, the informants' morphological and syntactic acquisition stages shown in the two task modes may be different. Detailed descriptions of the tasks are presented in the ensuing sections.

a) Oral Performance: 'Meet the Partner' and 'Spot the Differences' (+ *here-and-now*), and Time-defined Fishfilm (+ *few elements*)

The 'meet the partner' and 'spot the differences' tasks are interactional communicative tasks that are traditionally used in research on PT. The time-defined Fishfilm task is a monological task aiming at investigating the informants' use of actives and passives.

***'Meet the Partner' and 'Spot the Differences'* (+ *here-and-now*)**

This type of task is widely used in studies aiming to measure a learner's developmental stage (e.g., Kawaguchi, 2005; Medojević, 2014; Pienemann, 1998; Wang, 2006, 2010). The 'meet the partner' task required the informants in the same proficiency level to work in pairs. The main job for each pair was to ask questions of each other based on the six key words listed on their worksheets. There was also a graphic icon for each key word on the worksheet (see Appendix B). The key words helped the informants to get clues for what to talk about, and the graphic icons further suggested the topic of focus. The six key words printed on the worksheet were *name*, *country of birth*, *language spoken*, *occupation*, *pets*, *hobbies* and *favourite food*. Next, the pairs carried out the 'spot the differences' task. Each pair needed to perform three picture differences tasks. The topics of these three were 'street scene' pictures, 'family scene' pictures and 'Goldilock's adventure' pictures (Appendix B). In each task, the pictures shown to the informant and his/her partner respectively were similar but with approximately 10 differences. For example, in the 'street scene' pictures, both pictures showed a corner of a street, but one picture showed a man getting into a taxi, while the other picture showed a man getting out of a taxi. Each informant in the pair was instructed to find out as many differences as possible without looking at their partner's picture, either by asking his/her partner questions, or by describing his/her own picture. The elicited morphological structures from the informants were plural forms, progressing forms *-ing*, and 3sg-*s* forms. The elicited syntactic structures were mainly questions formulated by the informants, including constituent questions and yes/no questions.

Time-defined Fishfilm Task (+ few elements)

The Fishfilm [5] (Tomlin, 1995, 2002) is a video clip which was originally designed to

[5] It is stated clearly on Tomlin's website: 'The Fishfilm 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'. It is a free access, computer-based online task that can be found at Tomlin's website http://logos.uoregon.edu/tomlin/research_fishfilm_resource.html.

investigate the relationship between a native speaker's focal attention and structural choice. This task was adopted in this study to examine the informants' structural choices. Many studies (Medojević, 2014; Kawaguchi, 2013; Wang, 2006, 2010) have successfully used this Fishfilm task to elicit passives structures from learners. This task takes 4.6 minutes to complete, and contains thirty eventualities.[6] In the time-defined Fishfilm task video clip, two fish of different colours appear from either side of the screen and a flashing arrow points to one of the fish. The two fish swim towards the centre and one fish eats the other (see Figure 3.1). The fish with an arrow pointing to it may be the one who eats (i.e., agent-cued) or the one who is eaten (i.e., patient-cued) (see Figure 3.2). There were fifteen agent-cued and fifteen patient-cued eventualities. The thirty eventualities occur randomly. The informants were instructed to describe each eventuality in one sentence by starting with the fish that had an arrow pointing to it. Each eventuality lasted 9 seconds. After the nine-second time period ran out, the next event would appear on the computer screen.

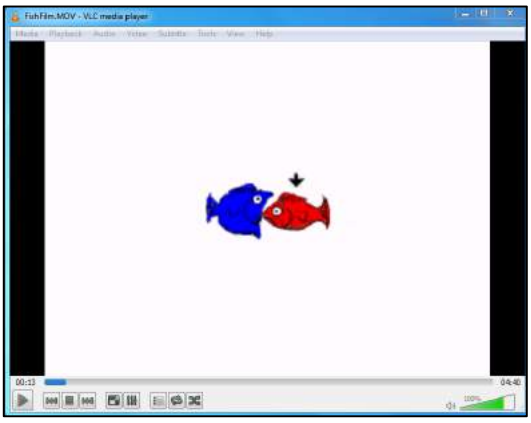


Figure 3.1 A screenshot of the time-defined Fishfilm video clip

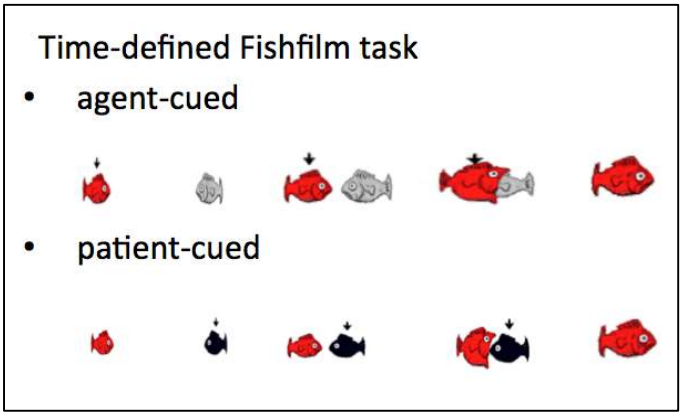


Figure 3.2 Examples of agent-cued and patient-cued eventualities in the time-defined Fishfilm task

[6] Tomlin's 'Fishfilm' task contains 32 eventualities, but the first two eventualities, which are designed to be used for practice, have been excluded from the analysis according to Tomlin's protocol.

As Figure 3.2 shows, the fish with an arrow pointing to it in the first line is agent-cued, and the fish with an arrow pointing to it in the second line is a patient-cued fish. Tomlin (1995, 1997) reports that native speakers of English alternate between active and passive voice to change the focus from one fish to the other. Since the task required the informants to describe each event starting from the fish with an arrow pointing to it, the informants had to alternate between active and passive structures accordingly, as in (1).

(1) NS: The red fish eats the grey fish.
NS: The black fish is eaten by the red fish.

b) Written Performance: Translation

The written profiling task adopted in this project is a translation task. This type of tasks was first used in Kawaguchi's (2013) study, which asked informants to translate 25 Japanese sentences into English. The purpose of the translation task was to capture informants' productive language ability relating to syntactic and morphological structures based on PT. In the current study, the informants were required to translate 32 Chinese sentences[7] into English. They were also instructed to use a particular English verb for each sentence. Some of the verbs used in this translation task were chosen from Kawaguchi's (2013) English verb list which contains various categories of verbs. Others were selected by the researcher from the first vocabulary band (i.e., first 1k) of Heatley and Nation's (2015) BNC/COCA word family lists (1-25k).[8] In addition, three verbs (i.e., *increase*, *shock,* and *confuse*) were taken from the second vocabulary band. In total, 32 English verbs were chosen for the study. The chosen verbs were used to elicit various syntactic structures from the learners, such as transitive, ditransitive, intransitive, passive and causative constructions. Six verbs (i.e., *eat*, *buy*, *break*, *wash*, *open* and *give*) appeared twice in the translation task in order to test the informants' ability in using the same verb to form different structures. For example, *eat*, which is a transitive verb, can be used in a canonical active structure (e.g., *she eats a cake*),

[7] All the 32 Chinese sentences were checked by two professional translators before being administered to the learners. The reference version of the target English translation was also checked and then amended by these two professional translators.

[8] Heatley and Nation's (2015) BNC/COCA lists (1-25k), which is a range program with British National Corpus/Corpus of Contemporary American English (BNC/COCA) lists 25,000 words. This list has been used as the default vocabulary band list in this study. This range program can be accessed from http://www.victoria.ac.nz/lals/about/staff/publications/BNC_COCA_25000.zip

and it can be used in a non-canonical passive structure (e.g., *the cake was eaten by her*). Table 3.4 below lists the 32 verbs and the target structures.

Table 3.4 The 32 verbs and the target structures in the translation task

Canonical		Non-canonical			
		Lexically non-canonical		Structurally non-canonical	
Transitive (n=7)	Ditransitive (n=5)	Intransitive (unaccusative) (n=5)	Transitive (Psych verb) (n=5)	Passive (n=5)	Causative & causative-passive (n=5)
eat	give	increase	shock	choose	work
buy	show	freeze	confuse	give	study
break	tell	grow	worry	break	clean
wash	pass	open	interest	eat	read
catch	buy	finish	bore	take	wash
open					
play					

As shown in Table 3.4, seven transitive verbs and five ditransitive verbs were used to elicit canonical structures. Another five intransitive verbs and five transitive psych verbs were used to elicit lexically non-canonical structures. The remaining ten verbs were used to elicit structurally non-canonical structures, including passives, causatives and causative-passives.

The translation task was distributed to the informants in the test paper form (Appendix C). The informants were instructed to complete the translation task within 40 minutes and they were not allowed to use any dictionaries.

These profiling tasks were traditionally used to measure the learner's L2 competence from a PT perspective, but the profiling tasks were not able to measure whether the learner's L2 competence remained stable across tasks with different degrees of task complexity. This is why the experimental tasks were included in this study.

3.3.2 Quasi-experimental Tasks

The 'meet the partner' and 'spot the differences' tasks mentioned in the profiling tasks section provided informants with visual aids (i.e., pictures). The informants were in a *here-and-now* situation when they performed the tasks. The time-defined Fishfilm task asked the informants to use one item (i.e., fish) and one action (i.e., eat) to describe eventualities, so it is considered to be a task with few elements from Robinson's viewpoint on task complexity, and so the task complexity is low.

As mentioned in Chapter 2, Robinson (2009, 2011) posits that tasks for learners can be designed with different degrees of cognitive load. Thus, four quasi-experimental tasks were designed to include higher degrees of cognitive load than the profiling tasks, as well as to manipulate ± *planning time*, ± *few elements* and ± *here-and-now* variables. The three quasi-experimental tasks are a 'topic and comments' task (- *here-and-now*), a self-paced picture description task *(+ planning time*), and a time-defined picture description task (- *planning time; - few elements*). The aim of using these quasi-experimental tasks is to measure the informants' L2 competence as well as their linguistic performance across tasks with different degrees of cognitive load.

a) 'Topic and Comments' Tasks (- *here-and-now*)

The design of the 'topic and comments' tasks is considered to be a more complex task than the profiling 'meet the partner' and 'spot the differences' tasks, because the 'topic and comments' task did not provide the informants with a *here-and-now* situation. They had to base their responses on abstract ideas (i.e., conversation topics) to perform the task.

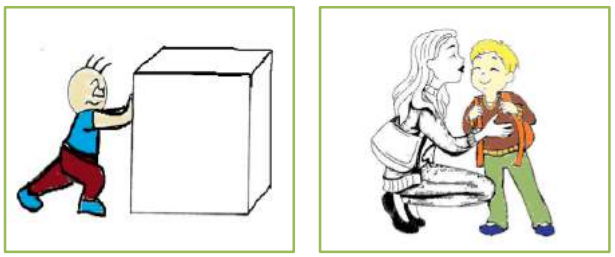
The 'topic and comments' task included three conversation topics involving describing three events, namely, a past event, a present event and a future event. In order to avoid repeated task effects, the three topics listed on each informant's worksheet were different (see Appendix D). For instance, the topics for one of the informants in a pair were *old school days*, *friends* and *your future five-year plan*. The topics for the other informant of the pair were *the last weekend*, *a person you admire in your family* and *your next holiday plan*. These topics were selected from Ma's (2011) and Kawaguchi and Ma's (2012) natural conversation tasks. According to their data analysis, these topics can elicit target syntax structures. The informants were instructed to ask at least five questions for each topic. Each informant in the pair had to find out as much information about his/her partner as he/she could. The main linguistic skill this task examined was the informants' question formation. English utilises a variety of linguistic devices to form Yes/No questions and Wh-questions. The different question structures belong to different developmental stages defined by PT. In addition, their abilities to use past tense, present tense and future tense as well as the third person singular form were observed.

b) Self-paced Picture Description (+ *planning time*)

This self-paced picture description task was designed by manipulating one of the resource-dispersing variables, that is, the ± *planning time*, which referred to the amount of planning time the tasks involved. The self-paced picture description task (+ *planning time*) is considered to be an easier task than the time-defined picture description task (– *planning time*) which will be introduced in the next section.

The informants were not given any time limit in the self-paced picture description task, and could describe the picture presented on the computer screen and then proceed to the next one (by pressing the space bar) at their own pace in this task. Microsoft Office PowerPoint 2007 was used to present the stimuli. Similar to the time-defined picture description task, the self-paced picture description task also used two test trials and thirty actual trials to elicit either active or passive sentences from the informants based on each event that the picture showed (see Appendix E). The informants were instructed to use the brightly coloured item as the subject of each produced sentence. When they were satisfied with their current answer, they could press the space bar to see the next slide. In other words, the informants were given enough time to think about their answers before they started to describe each slide, or they could modify their utterances repeatedly until a satisfactory answer was achieved. Two examples are given in Figure 3.3 below.

Figure 3.3 Two examples of the self-paced picture description task



The picture on the left was presented as an animation in which a boy is pushing a box rightward, whereas the picture on the right is a still image. When describing each of the pictures, the informants had to use one English sentence to describe each event and start the sentence with the word which referred to the item which as presented in colour rather than black and white, as shown in (2).

(2) H02: A boy is pushing a cube.
H02: The boy was kissed by a woman.

The design of the task involved the selection of fifteen action verbs. There were two criteria for choosing these verbs. Firstly, the verbs had to be in Heatley and Nation's (2015) in the first two 1000-word family lists of the range program (1-25k). According to McLean and Kramer (2015), the first two 1000-word family lists are lists of the most frequently used words in English, and even the informants at a low proficiency level are able to use the words. Thus, selecting the action verbs from the lists of high frequency words ensured the informants could understand each event and were able to produce the target structure. Secondly, the verbs had to be transitive verbs which could be used in both active and passive voice structures. The informants were instructed that they could use any verbs in their descriptions as long as they could convey the meaning accurately. Table 3.5 lists the properties of the visual stimuli used in the self-paced picture description task.

Table 3.5 The properties of the visual stimuli for the self-paced picture description task

No.	Verb	The band of the target verb	Role of coloured item (agent or patient cued)	Reference version
Trial				
T1	feed	1	Agent- a man	A man is feeding birds.
T2	feed	1	Patient- a cat	A cat is being fed by a man.
Experiment				
1	pull	1	Agent- a girl	A girl is pulling a toy car.
2	pull	1	Patient-a boy	A boy is being pulled by a dog.
3	break	1	Agent-a man	A man just broke the window.
4	break	1	Patient- a pencil	A pencil is being broken by somebody.
5	push	1	Agent-a boy	A boy is pushing a square block.
6	push	1	Patient-a boy	A little boy is being pushed by a bully.
7	hold	1	Agent-a lady	A mother is holding her child in her arms.
8	hold	1	Patient-roses	A basket of roses is being carried by a rabbit.
9	pat	2	Agent-a girl	A little girl is patting a rabbit.
10	pat	2	Patient-a cat	A cat is being patted on its head by a boy.
11	chase	2	Agent-a dog	A dog is chasing a robber.
12	chase	2	Patient-a ball	A rainbow colored beach ball is being chased by a dog.
13	paint	1	Agent-a man	A man is painting his front door.
14	paint	1	Patient-a fence	A red fence is being painted by a woman.
15	play	1	Agent-a man	A man is playing the piano.
16	play	1	Patient-a violin	A violin is being played by a boy.
17	shoot	1	Agent-a police	A police officer is shooting a villain.
18	shoot	1	Patient-a balloon	A blue balloon is being popped by an arrow.
19	kiss	1	Agent-a man	A man is trying to kiss a trophy.
20	kiss	1	Patient-a boy	A little boy is being kissed by his mum.
21	stop	1	Agent-a police	A police is stopping a robber.
22	stop	1	Patient-a train	A train is being stopped by a police officer.
23	steal	1	Agent-a mouse	A blue mouse is stealing a piece of cheese.
24	steal	1	Patient-a TV set	A television is being stolen by a robber.
25	kick	1	Agent-a boy	A little boy is kicking a rock.
26	kick	1	Patient- a ball	A ball is being kicked by a girl in sports clothes.
27	bite	2	Agent-a mouse	A mouse is eating some cheese.
28	bite	2	Patient-a man	A man is being bitten by a dog with its sharp teeth.
29	throw	1	Agent-a woman	A lady is throwing a basketball.
30	throw	1	Patient-a paper plane	A red papar airoplane had just been thrown into the air by a little girl.

A pilot study involving two native English speakers and two adult Chinese L1-English L2 advanced learners was carried out. The results showed that this task was able to elicit the targeted structures successfully.

c) Time-defined Picture Description (- *planning time*; - *few elements*)

This time-defined picture description task required the informants to describe each event within a nine-second time limit. Some of the picture and animation events used in this task were taken from Wang's (2010) study, while the others were created by the researcher (see Appendix F).

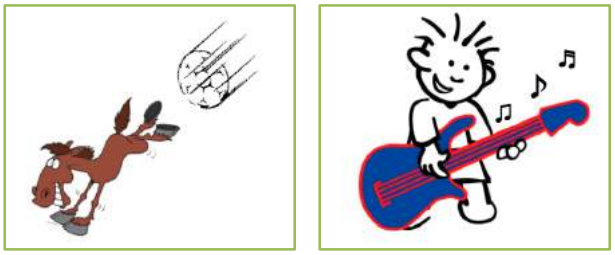
DMDX Display software[9] (version 4.3.0.1) was used to present stimuli for the task to the participants. The DMDX program was run on a Sony laptop computer with Windows 7 as the core system. The time-defined picture description task consisted of two practice trials and thirty real trials. The thirty real trials, which ran for a total of 5.3 minutes, contained 15 agent-cued and 15 patient-cued eventualities. In each event, the cued item was coded in bright colours (e.g. red, blue, yellow and so on), while the remaining items were in black, white or grey.

At the beginning of the task, each informant was presented with a bilingual (English and Chinese) instruction slide[10] on the computer screen. The informant was then asked to do two practice trials after reading the instructions. These two practice trials further ensured that the informant understood what the task required him/her to do. Each trial was either a still picture or a simple animation depicting a simple event. In each trial, there were two or three items with one item being coloured. These items were coloured to draw attention to them (Horgan, 1976; Lempert, 1984), and to elicit target structures, namely, active and passive structures, from the informants. The informants were also instructed to use one English sentence to describe each event presented on the screen. They were asked to begin the sentence with a term referring to the cued item. They were informed that it was not necessary for them to mention the colour of the cued items due to the limited time given to them. Each trial lasted for 9000 milliseconds ms. The event for each trial appeared on the computer screen for approximately 5000 ms, and the screen turned white during the remaining 4000 ms. Once a trial was completed, the screen turned green for 1000 ms. The green screen signalled to the informants that the computer had stopped recording and they were about to view the next event. Figure 3.4 shows two examples of the time-defined picture description tasks.

[9] It is stated on the DMDX main webpage: 'DMDX is a Win 32-based display system used in psychological laboratories around the world to measure reaction times to visual and auditory stimuli. It was programmed by Jonathan Forster at the University of Arizona'.

[10] It was a self-paced bilingual instruction. Informants could take their time to read the instructions in whichever language (i.e. English or Chinese) they preferred.

Figure 3.4 Two examples of the time-defined picture description tasks



In Figure 3.4 it can be seen that each of the two picture events had one coloured item and one black and white item. The example on the left was an animated event in which the horse was the cued item, and the greyed-out ball was flying towards to the top right corner. The example on the right was a still picture which contained a coloured guitar (i.e. the cued item) and a greyed-out boy. The left-hand example was intended to elicit an active structure, and the right-hand example aimed to elicit a passive structure.

As we may recall from Chapter 2, the ± *few elements* variable refers to the elements contained in a task. In my study, the time-defined Fishfilm task (+ *few elements*) introduced above contained the same actor, that is, either a fish as an agent or a fish of a fish as a patient. The Fishfilm task also involved one action, '*eating*'. Each eventuality in the time-defined picture description task (- *few elements*) contained two actors, either humans, animals, or objects. The task also involved fifteen action verbs. Thus, it can be seen that more elements were included in the time-defined picture description tasks than in the time-defined Fishfilm task.

The target verbs utilised in the time-defined picture description task were the same as those in the self-paced picture description task. Table 3.6 below summarises the 30 events designed for this task and their target structures.

Table 3.6 The properties of the visual stimuli for the time-defined picture description task

No.	Verb	The band[11] of the target verb	Role of coloured item (agent or patient cued)	Reference version[12]
Trial				
T1	feed	1	Agent-a woman	A girl is feeding a cat.
T2	feed	1	Patient-a dog	A dog is being fed by a boy.
Experiment				
1	pull	1	Agent-a girl	A little girl is pulling a toy.
2	pull	1	Patient-a car	A red car is being pulled away by a tow truck.
3	break	1	Agent-a ball	A ball broke a window.
4	break	1	Patient-a bottle	A bottle is broken by a ball.
5	push	1	Agent-a woman	A lady is pushing a shopping trolley.
6	push	1	Patient-a girl	A girl is being pushed by a boy.
7	hold	1	Agent-a man	A young boy is holding a baby.
8	hold	1	Patient-a cat	A cat is being held by a woman.
9	pat	2	Agent-a man	A blind person is patting a dog.
10	pat	2	Patient-a cat	A cat is being patted by a young girl.
11	chase	2	Agent-a man	A man is chasing a butterfly.
12	chase	2	Patient-a mouse	A mouse is being chased by a cat.
13	paint	1	Agent-a woman	A girl is painting a wall.
14	paint	1	Patient-a fence	A red fence is being painted by a painter.
15	play	1	Agent-a man	A boy is playing the drums.
16	play	1	Patient-a guitar	A guitar is being played by a boy.
17	shoot	1	Agent-a cowboy	The cowboy was shooting the policeman.
18	shoot	1	Patient-a bird	A pink bird is being shot by an arrow.
19	kiss	1	Agent-a man	A guy is kissing a girl.
20	kiss	1	Patient- a woman	A girl is being kissed by a guy.
21	stop	1	Agent-a woman	A girl stops the boy.
22	stop	1	Patient-a car	A car is being stopped by the police officer.
23	steal	1	Agent-a robber	A robber is stealing money from a treasure chest.
24	steal	1	Patient-a 100-dollar	A 100-dollar is being stolen from the handbag.
25	kick	1	Agent-a horse	A horse is kicking a ball.
26	kick	1	Patient-a ball	A ball is being kicked by a boy.
27	bite	2	Agent-a dog	A dog is biting a man's leg.
28	bite	2	Patient-a hamburger	A hamburger is being eaten by a man.
29	throw	1	Agent-a baseball player	A baseball player is throwing a ball.
30	throw	1	Patient-a basketball	A basketball is being thrown by a basketball player into a hoop.

In order to avoid the repeated task effect, the agents and patients involved in the time-defined picture description task and the self-paced picture description task were different. For example, the verb *stop* was used in both tasks. In the time-defined picture description task, the agent and patient associated with the verb *stop* in the active-expected sentence were *a girl*

[11] Heatley and Nation's (2015) vocabulary bands (1-25k) have been used as the default vocabulary band list for the translation task, the time-defined picture description task, and the self-paced picture description task in this study.

[12] The reference version was provided by the native English speaker who served as a control.

and *a boy*, as in (3). However, in the self-paced picture description task, the agent and the patient were *a police* and *a robber*, as in (4).

(3) time-defined picture description task:
a girl stops the boy.
(4) self-paced picture description task:
a police is stopping a robber.

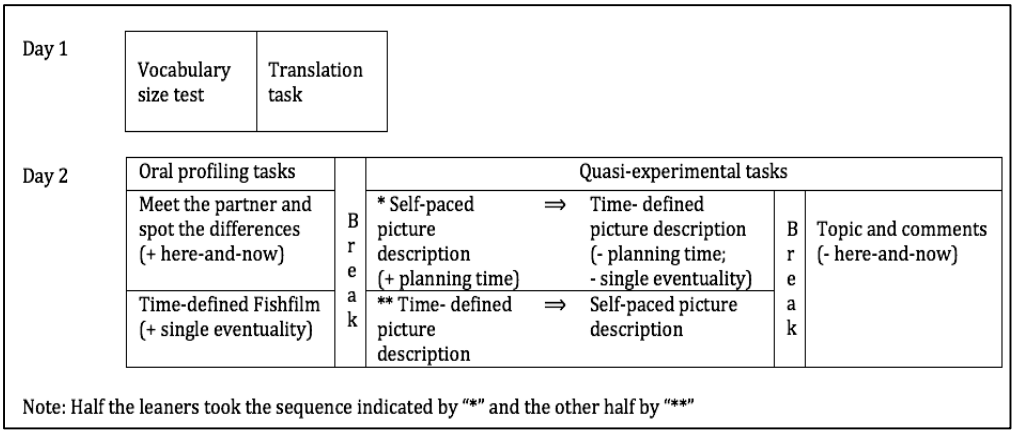
3.4 Data Collection

While Sections 3.3 explained the design of each task involved in this study, this section describes the data collection procedure and the methods for recording and transcribing data. The pilot study indicated that the completion of the tasks could not be done within three hours. Therefore, the informants were asked to do these tasks on two separate days to avoid fatigue and loss of concentration during the course of their involvement in this study.

On the first day, each informant was asked to do the vocabulary size test and the written translation task. The completion of these two tasks took one hour and forty minutes per informant.

On the second day, the informants were instructed to do the oral profiling tasks first, and then the quasi-experimental tasks. During the oral profiling tasks, the informants needed to form pairs to perform the 'meet the partner' and 'spot the differences' tasks. They did the time-defined Fishfilm task individually. These tasks took them around thirty minutes to complete. After completing the oral profiling tasks, each informant was given a five-minute break. Then the informants were asked to do the self-paced picture description task and the time-defined picture description task individually. These tasks took each informant about thirty minutes to complete. After another five-minute break, each informant performed the 'topic and comments' task. It took half an hour to complete. Upon the completion of the tasks, each informant was given AU$50 as the travel reimbursement. The data collection procedure is shown in Figure 3.5.

Figure 3.5 The flow of data collection sessions



As Figure 3.5 shows, all informants first did the time-defined Fishfilm task which was a profiling task. Then, the informants were required to perform the time-defined picture description task and the self-paced picture description task. However, in order to overcome the carry-off effect of the tasks, the informants in each proficiency level were then divided into two sub-groups. The following Table 3.7 summarises the 30 informants' orders of task performance.

Table 3.7 The 30 informants' performance order of the time-defined picture description and the self-paced picture description tasks

	From the Time-defined Picture Description Task First	From the Self-paced Picture Description Task First
Lower-intermediate	L22, L24, L26, L27, L29	L21, L23, L25, L28, L30
Intermediate	M14, M16, M17, M18, M19	M11, M12, M13, M15, M20
High	H03, H04, H07, H08, H10	H01, H02, H05, H06, H09

As the table shows, each sub-group consisted of five informants within the same proficiency level. One sub-group did the time-defined picture description task first, followed by a self-paced picture description task. The other sub-group did the two tasks in the opposite order.

The data collection took place either in the researcher's office or in one of the study rooms in the library at WSU or WSU College. Each informant's oral performance was audio-recorded. A professional-grade Sony recording machine was used to obtain high-quality recordings of the speech productions.

In total of 180 oral and 30 written samples of data were produced by 30 informants. Each data sample was transcribed by the researcher. Di Biase's (2000) set of transcription conventions (see Appendix G) was adopted. A native English speaker was recruited to work

with the researcher and check each sample of data. A 90% agreement rate for transcription was achieved between the researcher and the native speaker. Table 3.8 records each task's data size per informant, and Table 3.9 records each informant's type and token counts across tasks.

Table 3.8 Data size of the 30 informants

Learners	Communicative tasks (turns)		Active-passive alternation tasks (sentences) /30			Translation task (sentences) /32
	'Meet the partner' and 'spot the differences'	Topic and comments	Fishfilm	Time-defined	Self-paced	
L21	45	53	30	22	29	30
L22	78	58	30	23	30	32
L23	46	53	27	14	30	32
L24	47	48	30	24	30	32
L25	48	61	29	28	30	32
L26	49	48	26	27	29	32
L27	77	58	29	28	30	32
L28	50	49	28	30	30	32
L29	49	62	29	20	28	32
L30	50	50	30	29	30	32
M11	58	47	30	23	28	32
M12	49	66	29	28	30	32
M13	51	48	30	30	30	32
M14	52	45	30	25	30	32
M15	50	67	29	28	30	32
M16	53	44	30	30	30	32
M17	47	50	30	30	30	32
M18	48	50	28	30	30	32
M19	60	47	30	23	30	32
M20	49	48	30	30	30	32
H01	78	49	30	30	30	32
H02	44	58	30	30	30	32
H03	93	153	30	30	30	32
H04	92	58	30	29	30	32
H05	78	50	30	30	30	32
H06	43	58	30	29	30	32
H07	95	84	30	28	30	32
H08	94	58	29	29	30	32
H09	91	84	30	27	30	32
H10	96	153	30	30	30	32
NS	87	73	30	30	30	N/A

For each informant, the number of turns produced in the 'meet the partner' and 'spot the differences' tasks, and the 'topic and comments' tasks, were counted. The notion of a turn in this study refers to 'a normally continuous (including pauses) utterances of a speaker, until the Interlocutor (i.e., the other participant in the interaction) either takes his/her turn where he/she judges to be the end of the first speaker's utterances or interrupts the first speaker's utterance in order to take his/her turn' (Di Biase, 2000, p. 25). The data size of each informant's written profiling task, that is, the translation task, was based on the total number of sentences the informant translated. When performing the time-defined Fishfilm task, the time-defined picture description task and the self-paced picture description task, each informant produced one sentence per event. So the table recorded the total number of sentences produced by each informant in each of the three task.

As Table 3.9 shows, most informants, regardless of proficiency level, had more counts of type and token in the 'topic and comments' task than in the other tasks. The high-level informants had more counts of types and token in total than the other two levels, and the lower-intermediate informants had the least counts in total.

Table 3.9 Type and token counts across tasks

Informant	Communicative tasks				Active-passive alternation tasks						Translation task		Total	
	'Meet the partner' and 'spot the differences'		Topic and comments		Fishfilm		Time-defined		Self-paced					
	Type	Token	Type	Token	Type	Token	Type	Token	Type	Token	Type	Token	Type	Token
L21	108	303	120	323	18	222	65	193	72	234	115	200	360	1475
L22	120	389	147	413	17	219	64	180	71	192	125	203	379	1596
L23	133	478	124	392	15	260	77	205	138	364	130	224	482	1923
L24	111	344	118	306	19	244	73	216	83	247	131	230	383	1587
L25	128	352	127	314	18	246	61	195	69	281	131	220	388	1608
L26	126	406	168	432	20	265	73	236	84	263	145	237	464	1839
L27	138	548	161	504	16	244	71	228	65	251	137	231	483	1946
L28	112	278	139	345	18	219	73	216	89	238	123	208	377	1504
L29	114	305	204	593	15	249	51	122	64	175	128	215	423	1659
L30	115	302	179	500	15	231	84	232	90	222	127	203	404	1690
M11	116	263	130	317	15	242	82	209	102	280	123	226	387	1537
M12	204	655	222	777	22	265	78	245	81	268	130	237	537	2447
M13	169	467	340	1214	17	248	89	249	110	350	135	241	546	2769
M14	156	528	118	321	15	227	81	208	95	257	133	224	439	1765
M15	200	539	222	638	16	256	80	248	94	309	133	220	502	2210
M16	189	699	202	545	20	266	94	238	93	274	130	237	513	2259
M17	176	558	186	439	15	188	72	203	85	229	131	213	457	1830
M18	184	484	180	432	18	252	69	205	86	251	138	241	466	1865
M19	164	409	180	499	20	231	85	231	87	277	134	222	453	1869
M20	169	523	232	737	17	187	106	277	86	230	121	225	489	2179
H01	170	537	217	521	14	244	85	211	88	223	131	227	504	1963
H02	190	612	217	575	22	247	80	233	90	256	126	224	527	2147
H03	197	560	415	1722	39	254	96	236	107	268	137	211	669	3251
H04	193	711	271	1029	18	249	86	226	84	243	129	222	624	2680
H05	202	747	244	682	15	270	88	249	91	238	134	237	595	2423
H06	143	426	175	436	17	262	84	223	88	258	125	226	458	1831
H07	224	694	315	836	19	249	96	228	128	313	132	220	683	2540
H08	187	650	259	660	15	234	70	204	87	240	127	211	547	2199
H09	165	577	247	717	18	244	84	222	85	222	130	224	551	2206
H10	205	843	402	1539	18	251	95	240	95	260	125	230	740	3363
NS	175	582	261	736	18	249	93	245	106	263	130	227	573	2302

3.5 Data Analysis

This section describes the methods for analysing the informants' oral and written profiling tasks and the quasi-experimental tasks in order to answer the research questions.

3.5.1 L2 Competence Analysis

In order to investigate whether L2 competence varies according to different tasks, the informants' PT morphological and syntactic developmental stages were analysed task by task, and then comparisons of stages were made across tasks. Table 3.10 below gives a summary of the methods used to answer the first research question, that is: Does L2 competence vary when learners undertake tasks of different cognitive complexity?

Table 3.10 A summary of methods used in answering the first research question

Profiling tasks	Experimental tasks
• **'Spot the differences' task (incl. 'meet the partner' introduction)** (+ *here-and-now*) Data Analysis - PT morphological stages - PT syntactic stages (Question sentences: Prominent Hypothesis)	• **Topic & comment task** (- *here-and-now*) Data Analysis - PT morphological stages - PT syntactic stages (Question sentences: Prominent Hypothesis)
• **Time-defined FishFilm task** (+ *few elements*) Data Analysis - PT syntactic stages (active-passive alternation: Lexical Mapping Hypothesis) *Results of* (+ *few elements*) *time-defined Fishfilm task will be compared with* (- *few elements*) *time-defined picture description task.*	• **Tasks of *planning time* variable:** (+ *planning time*) self-paced picture description task (- *planning time*) time-defined picture description task Data Analysis - PT syntactic stages (active-passive alternation: Lexical Mapping Hypothesis)

As Table 3.10 shows, each informant's PT morphological and syntactic stages were analysed in the profiling tasks and experimental tasks. The profiling tasks, which were described in Section 3.3, aim to identify each informant's L2 developmental stages. The informant's developmental stages identified from the profiling tasks were then used to make comparisons with the stages shown in the quasi-experimental tasks. Detailed explanations of the methods used to answer the first research question are presented below. The data were analysed in terms of the participants' morphological and syntactic development stages.

a) Morphological Development Analysis

Each informant's morphological development was measured based on the developmental stages hypothesised for L2 English morphology (Pienemann, 1998; Di Biase, Kawaguchi & Yamaguchi, 2015). PT depicts that a learner's acquisition trajectory when learning a second

language occurs in a hierarchical sequence; that is, the acquisition of morphological forms or syntactic structures from each lower stage is a prerequisite to reaching a higher stage. Table 3.11 lists the morphological developmental stages.

Table 3.11 Developmental stages hypothesised for L2 English morphology (Pienemann, 1998; Di Biase, Kawaguchi & Yamaguchi, 2015, p. 89)

Stage	Processing procedure		Structure	Examples taken from this study's dataset
6	S-bar procedure		e.g., subjunctive marking in subordination	I suggest he come quickly I wish she had a good time here
5	Sentence procedure		SV agreement (the third person singular -*s*)	Lucy likes shopping
4	Phrasal procedure	VP procedure	Aux + V: have + V-*ed*	 All the relations have changed over the five years
3			modal + V be + V-*ing*	he can play she is eating noodles
		NP procedure	phrasal plural marking	many stars three beds
2	Category procedure		past -*ed* plural -*s* possessive *'s* verb -*ing*	Lucy played cats eating mum's book she swimming
1	Lemma access		single words formulas	hello my name is Lucy

As Table 3.11 shows, among the six stages of morphological development, the category procedure stage does not require an exchange of grammatical information, and so it is specified that these rules, such as the marking of plural -*s*, past -*ed*, and irregular past tense, were acquired earlier than the NP procedure stage. NP agreement, such as plural -*s* +numeric quantifiers (e.g. *three beds*) and plural -*s* +other quantifiers (e.g. *many stars*), requires information exchange within the noun phrase. PT hypothesises that NP agreement processing is acquired earlier than VP agreement processing (e.g. *she is eating noodles*; *he can play*). The VP process requires the exchange of grammatical information within the verb phrase. The next stage, the sentence procedure stage, which is represented by subject-verb agreement, is considered to be the highest stage that can be identified in the dataset for this study. At this stage, the exchange of grammatical information is required across phrases within the sentence (e.g. *Lucy likes shopping*). The final-stage S-bar procedure includes structures such as subjunctive marking in subordination (e.g., *I suggest he come quickly*).

Each informant's morphological developmental stage was examined across all tasks by adopting the emergence criterion defined by PT. As mentioned in Section 2.3.3, the

judgement of emergence should be based on two criteria: lexical variation and morphological variation. Lexical variation indicates the learner is able to apply the same morphological rule to different lexicons. For example, in a task which requires describing habitual actions, an informant would add *–s* at the end of different verbs, contrasting, e.g, '*He* ***drinks*** *beer*' and *'He* ***eats*** *noodle'*. Morphological variation instead requires that a verb take different morphological forms to express different meanings. For example, an informant can produce a series of sentences such as 'I ***ate*** noodles yesterday', 'The girl ***is eating*** an ice cream', and 'She ***eats*** an apple a day'. If both lexical variation and morphological variation can be identified in an informant's speech data, then it can be concluded that the informant has met the emergence criterion, and thus he/she has acquired a specific morphological rule.

b) Syntactic Development Analysis

With respect to requisite variation between the existence of two instances of a particular syntactic structure, it is enough to conclude that this structure has 'emerged' from the learners' speech data (Pienemann et. al., 2005). Meanwhile, it is necessary to make sure that the occurrence of a structure is not a formulaic use (e.g., *how are you? what is your name?*).

The Prominence Hypothesis for constituent questions and the Prominence Hypothesis for yes/no questions (see Section 2.3 for detailed descriptions) were adopted to analyse each informant's syntactic stage in the 'meet the partner' and 'spot the differences' tasks, and the 'topic and comments' task. The frequency of each constituent question structure produced by the informants was counted to check what syntactic stage an informant had achieved. The frequency of occurrences of each yes/no question structure produced by the informant was counted, and then the informant's syntactic stages were recorded.

The Lexical Mapping Hypothesis was used to determine each informant's syntactic stage in the time-defined Fishfilm task, the time-defined picture description task and the self-paced picture description task. This is because the Lexical Mapping Hypothesis focuses on non-canonical word order structures (e.g., passives). The hypothesised stages are shown in Table 3.12 below. The frequency counts for correct mapping in each stage (e.g., the stage of default mapping, the stage of non-default mapping) are recorded for the purposes of examining what syntactic stage the informant has reached.

Table 3.12 Developmental stages hypothesised for L2 English syntax based on the Lexical Mapping Hypothesis (Di Biase, Kawaguchi & Yamaguchi, 2015, p. 113)

Stage	Constructions	Examples from this study's dataset
Nondefault mapping	unaccusatives, passives, causatives, exceptional verb constructions, etc.	the bottle broke the lamb was eaten by the wolf mum made Lucy clean room she received a letter
Default mapping and additional arguments	agent/experiencer mapped on SUBJ, patient/theme mapped on OBJ, and other members of the a-structure hierarchy, such as goals and locatives, mapped on OBL.	Lucy put the book on the shelf Mum gave Lucy a new book Lucy went to school by train
Default mapping	agent/experiencer mapped on SUBJ patient/theme mapped on OBJ	Lucy eating Lucy feed cats
Lemma access	single words formulas	hello book my name is Lucy

Table 3.12 shows that, at the beginning stage, English L2 learners can only produce single words (e.g., *book*) or formulas (e.g., *my name is Lucy*). At the default mapping stage, they are able to map the agent/experiencer on SUBJ and the patient/theme on OBJ, and produce sentences such as *Lucy feed cats*. After arriving at the next stage (i.e. default mapping and additional arguments), they may add additional arguments to the default mapping, and then they can produce utterances such as *mum gave Lucy* ***a new book***, and *Lucy went to school* ***by train***. When they reach the final stage of non-default mapping, they are able to produce constructions such as passives (e.g., *the lamb was eaten by the wolf*), causatives (e.g., *mum made Lucy clean room*), unaccusatives (e.g., *the bottle broke*) and exceptional verb constructions (e.g., *she received a letter*).

The time-defined Fishfilm task, the time-defined picture description task and the self-paced picture description task involved agent-cued and patient-cued eventualities. They aimed to investigate whether the informants were able to produce an active structure when an agent-cued mapping (i.e. agent) was the target, and whether they could produce a passive structure when a patient-cued mapping (i.e. patient) was the target.

This analysis followed Kawaguchi (2013). The rationale for adopting Kawaguchi's method of analysis is twofold: 1) Kawaguchi used a new method (i.e., a syntactic hierarchy analysis based on the Lexical Mapping Hypothesis) to analyse her data in the widely used Fishfilm task; 2) Kawaguchi's method only examined Japanese L2. In the current study, the analysis based on the Lexical Mapping Hypothesis was used to examine English L2.

In the agent-cued mapping tasks, the frequency of occurrences of the following three types was calculated: 1) the targeted active voice structure (i.e., the mapping matches the cue), 2) the passive voice structure (i.e., the mapping does not match the cue), and 3) other structures or non-production. In the patient-cued mapping tasks, a similar method of calculation was adopted. However, its target structure was passive voice, not active voice. The numbers of instances of active voice, other structures or non-production were also counted. Take the self-paced picture description task as an example (5).

(5) NS: A man is being bitten by a dog. (a target passive voice structure)
L23: The bad man he want to cry but because he have a bad dog is … biting on the feet his feet. (Mapping does not match cue.)

The native speaker of English (NS) recruited for this study produced a passive sentence for each of the patient-cued eventualities, i.e., the mapping matched the cue. However, in the example above, the informant L23 produced an active sentence in a patient-cued event, and so it was counted as a case in which the mapping did not match the cue.

3.5.2 L2 Performance Analysis

Subsection 3.5.1 above explained the methods used to identify the informants' morphological and syntactic stages in the profiling and experimental tasks. In order to answer the second research question, that is, to investigate whether L2 learners' performances vary according to tasks of different cognitive complexity, the informants' grammatical accuracy in the profiling and experimental tasks was measured. The methods used to do this are described in the current subsection. Table 3.13 below summarises the methods used for answering the second research question.

Table 3.13 Methods used in answering the second research question

Profiling tasks	Experimental tasks
• **'Spot the differences' task (incl. 'meet the partner' introduction)** Data Analysis Rule applications of morphological structures of: -past *-ed* -pl *–s* (lexical) -pl *–s* (phrasal) -third person singular	• **Topic & comment task** Data Analysis Rule applications of morphological structures of: -past *-ed* -pl *–s* (lexical) -pl *–s* (phrasal) -third person singular
• **Time-defined FishFilm task** (*+ few elements*) Data Analysis - VP constructions *Results of* (*+ few elements*) *time-defined Fishfilm task will be compared with* (*- few elements*) *time-defined picture description task.*	• **Tasks of *planning time* variable:** (*+ planning time*) self-paced picture description task (*- planning time*) time-defined picture description task Data Analysis - VP constructions

As Table 3.13 shows, the analysis of grammatical accuracy focuses mainly on identifying the morphological errors in the use of verb phrases by the informants in the time-defined Fishfilm task, the time-defined picture description task and the self-paced picture description task. The analysis of the application of rules for morphological structures (e.g., past *-ed*, plural *–s*, third person singular form) was used in the 'meet the partner' and 'spot the differences' task and the 'topic and comments' task.

a) Verb Phrase Constructions

This analysis first identified each informant's errors in verb phrases, and then counted the number of sentences with error-free VPs. There were two reasons for investigating the informants' VP accuracy: 1) VP procedure belongs to a higher-stage processing procedure based on the PT, so analysing the accuracy of learners' VP might tell us how they process higher-stage procedures in tasks with different degrees of complexity; and 2) Chinese learners always have difficulty using VP either in their writing or speaking (Zhang & Mi, 2010), so the analysis might give us some information about the use of VPs by this group of learners.

Six different types of VP morphology errors were identified and categorised after the informants performed the time-defined Fishfilm task, the time-defined picture description task and the self-paced picture description task. Table 3.14 below lists the six error types with examples taken from the informants' speech data.

Table 3.14 Analysis of morphology (Types of errors)

Error types		Examples
Subject-verb agreement		(L22) The pink fish **eat** black fish.
Verb form (unrelated to auxiliary verb)		(L21) The cat was **holded** by the woman. (H05) The bird has been sho. **shooted** by an arrow.
VP agreement	Aux omission (VP no Aux)	(L22) The grey fish **eaten** by white fish. (H04) The girl **showing** the stop sign for um..um..to to a man.
	Selection of wrong Aux (VP aux)	(H05) The green fish **has** eaten by a pink fish. (M12) The pen **be** baken by a man.
	Aux-verb compatibility	(L25) The black fish **is eat** by red fish. (H01) A bal a bird **is shoot** by an arrow. (M20) A girl with green shirt **push** by a boy.
Phonology (ambiguous cases only) (P)		(L21) The red fish was /**eatin**/ (eating? eaten?) by blue fish.

After the identification and calculation of the errors, the number of error-free VP utterances produced by each informant was counted. The formula for calculating the VP accuracy rate was: the number of grammatically correct utterances divided by the total number of agent-cued eventualities (i.e. accuracy rate = number of correct VPs/15) or the total number of patient-cued eventualities (i.e. accuracy rate = number of correct VPs/15). The informants' VP accuracy rates were compared for different structural voices (i.e., active vs. passive), within each task complexity variable (i.e., + *planning time* vs. – *planning time*) and across proficiency levels (i.e., lower-intermediate vs. intermediate vs. high).

b) Rule Application Percentage

The rule application percentage is widely used in studies (e.g., Bayley & Langman, 2004; Pienemann, 1998; Tarone, 1985) to measure the actual application of a grammatical rule by a learner in a piece of speech production. The four observed grammatical rules were: past *-ed*, plural *–s* (lexical), plural *–s* (phrasal), and the third person singular form.

According to PT, these grammatical rules belong to different processing procedures. The processing of past *–ed* and plural *–s* marking (lexical) structure belong to the category procedure stage. The processing of the plural*–s* (phrasal) is at the noun phrasal procedure stage and the processing of the third person singular form is two stages higher. The aim of analysing these grammatical rules is to see the informants' actual application of grammatical rules at different stages (i.e., lower stage vs. higher stage) across tasks. Each informant's accuracy rate in terms of the use of these grammatical rules was counted. The formula to calculate each rule application percentage was: the number of the rule application divided by the total number of obligatory occurrences of this rule in the task.

3.5.3 Task Modality Analysis

Table 3.15 summarises the methods used to explore whether the L2 learners' competence levels as defined by PT vary according to task modality (i.e., speaking modality vs. written modality), which is the third research question of this study.

Table 3.15 Methods used in answering the third research question

Written Mode	Oral Mode
Translation tasks	**Topic & Comments task**
Data Analysis -PT morphological stages -PT syntactic stages (Lexical Mapping Hypothesis)	Data Analysis -PT morphological stages
	Self-paced picture description task -PT syntactic stages (Lexical Mapping Hypothesis)

In Table 3.15, the informants' PT morphological stages shown in the written translation task are compared with the morphological stages shown for the 'topic and comments' task. The PT syntactic stages in the written mode were compared with the syntactic stages shown in the self-paced picture description task. The informants' syntactic stages were based on the Lexical Mapping Hypothesis, which has been introduced in Section 3.5.1 above.

3.6 Summary

In order to investigate whether L2 learners' competence as defined by PT varies according to task complexity variables, two types of task were used in this study. The first task type was profiling tasks, which were used to determine each informant's morphological and syntactic stage. The second type of task was experimental tasks relating to task complexity variables. There were two reasons for using this type of task: 1) to find out each informant's developmental stage; 2) to explore each informant's performance across tasks with different degrees of complexity. In order to achieve these two purposes, specific measures from PT (e.g., the Lexical Mapping Hypothesis, the Prominence Hypothesis) were used. This type of measure has never been used previously in a task complexity study. The results of this study may help us examine informants' competence from a PT perspective. Moreover, no previous PT study has used Robinson's task complexity variables to design tasks for the purpose of eliciting structures. Thus, the results may also add to our knowledge of informant's IL competence across tasks of different degrees of complexity. A detailed description of the results of the profiling tasks and the two experimental tasks is presented in the next chapter.

Chapter 4 Results

In the previous chapter, the research methods used in this study were described. In Chapter 4, the results of each task are presented. Section 4.1 shows the results of each informant's morphological and syntactic developmental stages identified through their two oral profiling tasks. Section 4.2 shows each informant's morphological and syntactic developmental stages in the written translation task. In Section 4.3, the results concerning each informant's syntactic complexity and accuracy in the three quasi-experimental tasks are presented. This chapter simply describes the results, and a discussion of the results is presented in Chapter 5.

4.1 Oral Profiling Tasks

The aim of the oral profiling tasks was to identify the 30 ESL informants' morphological and syntactic stages from a PT perspective. The two subsections below first present the results of morphological and syntactic development analysis of the 'meet the partner' and 'spot the differences' tasks, and then the syntactic development analysis of the time-defined Fishfilm task.

4.1.1 'Meet the Partner' and 'Spot the Differences' Tasks

a) Morphology

According to the emergence criteria defined by PT, evidence of the emergence/ acquisition of a morphological rule requires lexical variation and morphological variation. Di Biase and Kawaguchi (2002) state that a structure is considered to be 'emerged' when it appears 'more than once in lexically and structurally valid environments' (p. 290). By applying this criterion, Table 4.1 presents the informants' PT morphological developmental stages in the 'meet the partner' and the 'spot the differences' tasks according to their levels (L21-L30, M11-M20 and H01-H10). In this table, the number before the slash (i.e., /) stands for the number of occurrences of a certain English L2 morphological form produced by a learner, and the number after the slash refers to the total number of the morphological forms in the contexts. The number after the 'greater than' sign (i.e., >) refers to the number of times a certain morphological form is used inappropriately. For example, L24 uttered "*I drive my cars around the city*". He oversupplied the plural form of the noun "*car*". L30 asked his partner "*does there any toy car on the corner*?" He used the 3rd person singular *–s* inappropriately. Thus, these two applications were considered as the oversupply of particular

grammatical forms. A blank cell indicates that no morphological form has been produced in the informant's speech data. For instance, as shown in Table 4.1a, L21 did not use any 'past –*ed*' morphological form, but he produced 'plural -*s*' seven times (e.g., cards, noodles, glasses, bottles) out of eight obligatory contexts. L21 failed to use any third person singular form, although there were two obligatory contexts. The implicational analysis of PT developmental stages is listed in Appendix H.

Table 4.1 'Meet the partner' and 'spot the differences' tasks: morphology

a. Lower-intermediate

PT stages	Category					Noun phrasal (NP)			Verb Phrasal (VP)			Inter-phrasal
Structure/ Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Modal + V	Have + V-ed/V-en	3sg-*s*	has/ does
L21					7/8	2/7		2/4	1/1		0/2	1/1
L22			1/1		11/11	3/5	0/1	1/4	1/2		0/8	0/1
L23					3/5	8/8	0/1	3/4	3/3		0/1	0/2
L24	2			1/2	11/11 >1	4/5 >1	4/4	2/4	7/7		1/4	
L25	1				8/8	7/7		2/2			0/5	
L26	10	1/1	1/1	1/1	12/13	8/9	10/10	8/9	10/10	1/1		
L27	2		1/1		16/16 >1	5/9	3/3	14/16	1/1		1/1	0/4
L28	1		1/1		5/5	2/2	3/6	0/1			0/3	1/1 >1
L29					11/11 >1	9/9 >1	3/3	9/9		1/1	0/1	
L30		1/1			10/10	2/3	1/3	0/5			0/5	1/1 >1

b. Intermediate

PT stages	Lexical					Noun phrasal (NP)		Verb Phrasal (VP)				Inter-phrasal
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Modal + V	Have + V-ed/V-en	3sg-s	has/ does
M11	2				6/6	2/2 >1	0/1	2/3			3*/9	
M12	3	1/1	12/12		5/6	5/7	2/4	6/7	2/2	2/2	0/1	
M13	4	4/5	3/3 >1	1/1	13/16 >1	7/7	7/8	6/7	3/3	1/2	1/5	0/1
M14	2		1/1			5/7	1/2	2/3	1/1		0/3	0/1
M15	3		7/7 >4	0/1	9/14	5/5	0/2	5/8			0/4	0/1
M16	10	3/3	8/8	1/1	11/14	7/9	3/3	10/10		1/1	0/2	1/3
M17	4	1/1			7/8	5/5	2/2	8/8	3/3			1/2
M18	11	0/1	1/2		12/16 >1	8/11	3/3	11/11	2/2			0/3
M19	3	1/1	1/1		13/14	4/5	3/4	3/3			0/5	0/2
M20	3		2/2		17/19	4/8	1/1	11/11	2/2	2/2	3/3	

* M11 produced 'looks' three times, and it is not met the morphological emergence criteria.

c. High

PT stages	Lexical					Noun phrasal (NP)		Verb Phrasal (VP)				Inter-phrasal
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Modal + V	Have + V-ed/V-en	3sg-*s*	has/ does
H01	2	3/3		1/1	7/7	9/10	3/3	13/13	4/4		3/3	1/1
H02	7	1/1			12/14	13/13	2/3	6/6	6/6		3/5	
H03	2	1/1	2/2	8/8	5/8	10/10	7/7 >1	11/11	7/7	1/1		
H04	8	2/2	2/2		11/13	10/11 >1	6/7	8/8	6/6		4/4	1/1
H05	6	2/2		1/1	9/10	14/14	5/6	11/11	2/2			
H06	5		2/2		11/12	7/7	4/4	6/7	2/2		3/3	2/2
H07	11	2/2	1/1	13/15	15/15	2/2	17/17	8/8			3/3	
H08	4	2/2	2/2	3/3	15/19	6/7		6/7		1/1	2/3	
H09	10		1/1	16/17	14/15	9/10	2/4	8/8	2/2			3/3
H10	9	2/3	4/4	15/17	19/20	9/9	3/4	14/14	15/15		3/3	1/1
NC	6	3/3	2/2		16/16	5/5	3/3	12/12	8/8	2/2	8/8	5/5

As can be seen, all lower-intermediate informants were considered to have attained the NP procedure stage or higher because they were able to produce 'plural *-s* + numeric quantifiers' (e.g., *two bottles*). With the exception of L22, L28 and L30, all lower-intermediate informants were capable of VP agreement procedures represented by the rules, '*Be + Ving*', '*Modal + V*' and '*have + V participle*'. L22, L28 and L30 were judged to be at the NP procedure stage. It was also noticed that none of the 10 lower-intermediate informants attained the inter-phrasal procedure stage (i.e., use of the third person singular form).

Table 4.1b shows each intermediate informant's morphological developmental stage. All informants of intermediate level were able to produce structures involving lexical, NP and VP procedures. Only M20 exhibited evidence of acquiring the inter-phrasal procedure stage represented by the third person singular form since the informant provided *-s* on verbs three times out of three obligatory contexts. However, it was observed that the third person singular *–s* appeared with the same verb, *looks*, all three times shown in example (1) in M11's speech production. M11 was able to supply the third person singular form only for the verb *look*, and failed to apply this rule to other verbs, such as *ride*, *sit* and *go*. Therefore, M11 did not satisfy the emergence criterion for being at inter-phrasal stage.

(1) M11's use of the third person singular form

Turn 18 yes, and looks like he ride the bicycle go to some place

Turn 20 umm she sit on the chair and looks writing something

Turn 22 no, it looks like letter

Turn 28 (a customer) go to taxi.

As shown in Table 4.1c, all high-level informants were able to produce lexical, phrasal and inter-phrasal morphologies. At the inter-phrasal stage, all informants produced the third person singular *–s* in the obligatory contexts, with the exception of H05 where there were not obligatory contexts for *–s*. The distributional analysis also shows that the native control participant had reached the highest PT morphological stage.

b) Syntax: Interrogatives

The methods used to analyse the informants' syntactic stages is described in Section 3.5 in Chapter 3. The syntactic developmental stages hypothesised for L2 English constituent questions and for Yes/No questions were analysed. First, let us look at the distributional analysis of the informants' production of constituent questions.

Constituent questions

Table 4.2 displays the syntax distributional analysis of the 30 informants' production of constituent questions. Unlike morphological marking, there is no 'obligatory' context for specific structures. The numbers in the table refer to the frequency counts for the use of a syntactic structure.

Table 4.2 'Meet the partner' and 'spot the differences' tasks: constituent questions
a. Lower-intermediate

PT stages	Lemma access	Canonical word order	XP_{FOC} canonical word order	XP_{FOC} non-canonical word order		
Structure / informant	Single words; formulas	WH_{QUE} in-situ	WH_{QUE} SVO	WH_{QUE} COP S	WH_{QUE} MOD SV (O)	WH_{QUE} AUX SV (O)
L21	3			3	1	
L22	3	1	2	3		1
L23	3			2		
L24	2		5	4	1	2
L25	3			2		1
L26	3		2	9	3	7
L27	4		4	3		4
L28	4			2		1
L29	2		1	4		
L30	3		1	2		
Total	30	1	15	34	5	16

b. Intermediate

PT stages	Lemma access	Canonical word order	XP_{FOC} canonical word order	XP_{FOC} non-canonical word order		
Structure / informant	Single words; formulas	WH_{QUE} in-situ	WH_{QUE} SVO	WH_{QUE} COP S	WH_{QUE} MOD SV (O)	WH_{QUE} AUX SV (O)
M11	3			4		1
M12	3		2	2		2
M13	3			6		2
M14	3	2		4		1
M15	3			4		
M16	2			4		
M17	1		1	1		2
M18	2		2	2		2
M19	3			4		
M20	2			2	1	
Total	25	2	5	33	1	10

c. High

PT stages	Lemma access	Canonical word order	XP_{FOC} canonical word order	XP_{FOC} non-canonical word order		
Structure / informant	Single words; formulas	WH_{QUE} in-situ	WH_{QUE} SVO	WH_{QUE} COP S	WH_{QUE} MOD SV (O)	WH_{QUE} AUX SV (O)
H01			1	2	1	1
H02	2			2	1	1
H03				3	1	2
H04	2			2	1	1
H05	2		2	3		1
H06	2			3		
H07	1	1		6		1
H08	7	1	1	8		2
H09	4	1		1	1	4
H10	3			2	5	4
Total	23	3	4	32	10	17
NC	2			8	2	5

In Table 4.2a, it is evident that all informants produced single-word questions (e.g., *where?*) or formulas (e.g., *how about you?*) in performing the tasks as shown in the example (2) below. It should be noted that L25 used a yes/no question and a constituent question in one turn. Only constituent questions are counted here. L22 produced one case of the '*WH_{QUE} in-situ*' structure, as in (3). All lower-intermediate informants used the '*WH_{QUE} COP S*' structure when performing the tasks. Six informants used 'WH_{QUE} AUX SV (O)' structures.

(2) L21 turn 72 in my picture have a green car. how about you?
L23 turn 55 they are drink beer. how about you?
L25 turn 28 twins? where? twins
L28 turn 20 a car? what kind of car?

(3) L22 turn 37 oh she. yes. umm she writing what?

L26 produced nine '*WH_{QUE} COP S*' structures, and seven '*WH_{QUE} AUX SV (O)*' structures, as in (4). However, L26 selected an incorrect auxiliary in one of the constituent questions, as shown in (5). This type of error was not counted as evidence of a specific construction in the analysis for the PT stages.

(4) L26 turn 55 what is the young boy's hair's colour?
turn 15 what are the two girls with hat looking for?

(5) L26 turn 51 what colour does the man's clothes?

As shown in Table 4.2b, all the intermediate informants produced 'WH_{QUE} COP S' structures. Six informants (M11, M12, M13, M14, M18 and M19) produced 'WH_{QUE} AUX SV (O)' structures. Therefore, all intermediate informants achieved the highest PT stage, that is, XP_{FOC} non-canonical word order.

Table 4.2c shows that all high-level informants used 'WH_{QUE} COP S' structures and all of them except H06 produced 'WH_{QUE} AUX SV (O)' structures. Thus, all high-level informants achieved the highest PT stage in terms of constituent question construction. Native control produced eight 'WH_{QUE} COP S' structures and five 'WH_{QUE} AUX SV (O)' structures.

Yes/No Questions

Now, let us look at the syntax distributional analysis of the 30 informants' production of yes/no questions in the 'meet the partner' and the 'spot the differences' tasks.

Table 4.3 'Meet the partner' and the 'spot the differences' tasks: yes/no questions

a. Lower-intermediate

PT stages	Lemma access	Canonical word order	QUE canonical word order	Non-canonical word order			
Structure / informant	Single words; formulas	[QUE^P SVO]	QUE [SVO]	COP_{QUE} SUBJ Predicate	$HAVE_{QUE}$ SUBJ OBJ	MOD_{QUE} SUBJ V (O)	AUX_{QUE} SUBJ V (O)
L21	5						
L22	9	3	2				
L23	13	1					
L24	2		1			3	
L25	5	2	1				
L26			1	3		3	
L27	23	2	8	6			
L28	10	4	6	1			1
L29	9	2	1	1			
L30	6	2	12	2			
Total	82	16	32	13		6	1

b. Intermediate

PT stages	Lemma access	Canonical word order	QUE canonical word order	Non-canonical word order			
Structure / informant	Single words; formulas	[QUE^{P} SVO]	QUE [SVO]	COP_{QUE} SUBJ Predicate	$HAVE_{QUE}$ SUBJ OBJ	MOD_{QUE} SUBJ V (O)	AUX_{QUE} SUBJ V (O)
M11	2		1	4			
M12	4	3	5	1			
M13	3		1	1			1
M14	8	2	1			1	
M15	3	4	1			2	
M16	5		3	1			
M17	3			1			
M18	9	5	1				
M19	5	4	7	6			
M20	2		1	2		1	1
Total	44	18	21	16		4	2

c. High

PT stages	Lemma access	Canonical word order	QUE canonical word order	Non-canonical word order			
Structure / informant	Single words; formulas	[QUE^{P} SVO]	QUE [SVO]	COP_{QUE} SUBJ Predicate	$HAVE_{QUE}$ SUBJ OBJ	MOD_{QUE} SUBJ V (O)	AUX_{QUE} SUBJ V (O)
H01	9		7	2		1	
H02	2	2	3	2		2	
H03	7		1	2		2	
H04	5	6	2			2	
H05	6		3				
H06	3	1	1	2			
H07	8	5	3			4	
H08	8	12	5	4			
H09	4	5	13				1
H10	7	3	3	3		6	
Total	59	34	41	15		17	1
NC	3		5	5		3	

As shown in Table 4.3a, the lower-intermediate informants produced many single words and formulas as shown in example (6) below. Most informants produced a small number of canonical word order structures, in which a question is indicated by rising intonation in their speech productions, as shown in (7). Next, most informants produced 'QUE canonical word order' structures as shown in example (8) below. Finally, in terms of non-canonical word order, L25, L26, L27, L28, L29 and L30 were able to produce the 'COP_{QUE} SUBJ Predicate' structure as shown in example (9) below. L24 and L26 used the 'MOD_{QUE} SUBJ V (O)' structure. Only L28 showed one case of 'AUX_{QUE} SUBJ V (O)' structure, which is the highest stage, as shown in example (10).

(6)	L21	turn 60	right corner?
	L23	turn 71	car?
	L29	turn 69	no?
	L27	turn 146	three cups?
(7)	L22	turn 5	umm in your picture you have a taxi?
	L28	turn 16	so the man in your picture does not drink coffee?
		turn 40	they eat something?
(8)	L22	turn 145	so umm do you have three car toy on on ground?
	L30	turn 13	OK. do you have a man drinks maybe coffee…
(9)	L26	turn 37	is there a fire in the corner?
	L27	turn 97	so umm is there a pair of shoes near the boy?
(10)	L28	turn 28	does somebody want umm want get in the car?

As shown in Table 4.3b, similar to the lower-intermediate informants, the intermediate informants produced a number of single words and formulas when they asked polar questions. Five informants (M12, M14, M15, M18 and M19) used 'QUE^{P} SVO' structures to communicate with their partners (11). Seven informants (M11, M12, M13, M16, M17, M19 and M20) used the 'COP_{QUE} SUBJ Predicate' structures in their speech production, as shown in (12). M13 and M20 each produced one case of the 'AUX_{QUE} SUBJ V (O)' structure (13).

(11)	M14	turn 70	cushion? You mean on sofa?
	M18	turn 59	the wall is in pink colour, right?
(12)	M11	turn 77	is glasses umm near the two children?
	M19	turn 97	is it pink purple?
(13)	M13	turn 9	have you ever raises own pets?
	M20	turn 26	ok. have you ever had any pet?

Table 4.3c shows that all the high-level informants produced a number of single words and formulas to ask yes/no questions, just like the informants of the other two levels. All of the high-level informants except H01, H03 and H05 produced canonical word order structures. All informants used the QUE canonical word order structure as well. Nine out of 10 informants produced one or more non-canonical word order question sentence(s) (i.e., the highest stage). Only H09 produced an example of the 'AUX_{QUE} SUBJ V (O)' structure as shown in (14). H09 produced 13 cases of the 'QUE [SVO]' structure, as in (15), which is

much more frequent than other high-level informants. H04 and H08, similar to the lower level informants, used many question sentences indicated by prosody (e.g., QUE^{P} SVO) rather than by using grammatical resources, as in (16). For example, H8 used 12 cases of this structure.

(14) H09 turn 120 umm does she wear a blue dress?
(15) H09 turn 1 do you have a taxi in your picture?
(16) H04 turn 74 you don't have that one?
H08 turn 63 OK. It perhaps like two coffee cups?
H09 turn 144 you have a stove in your picture?

4.1.2 Time-defined Fishfilm Task

a) Morphology: Verb Phrase

The time-defined Fishfilm task contained only one eventuality for 'eating', so it was not appropriate to use this task to identify each informant's morphological stage. Instead, for each informant the number of error-free VPs was counted out of the total of 30 VPs (N=30), followed by a frequency count for each type of VP errors made by each informant. A summary of the error types was presented in Table 3.14 in Chapter 3, but more examples of erroneous VP responses from the informants' dataset are listed in Table 4.4.

Table 4.4 Analysis of Morphology (Types of errors)

Error types		Examples
Subject-verb agreement		(L22) The pink fish eat black fish. (L25) The grey fish eat a green fish.
Lexical		The pink fish eated black fish. The pink fish ated black fish
VP agreement	Aux omission (VP no Aux)	(L22) The grey fish eaten by white fish. (L24) The white fish eaten by the blue fish.
	Selection of wrong Aux (VP aux)	(M16) A black fish be eaten a umm red fish. (H05) The green fish has eaten by a pink fish.
	Aux-verb compatibility	(L25) The black fish is eat by red fish.
Phonology (ambiguous cases only)		(L21) The red fish was /eatin/ (eating? eaten?) by blue fish.

Tables 4.5 a-b below record the frequency count for each L informant's error-free VPs and erroneous VPs in the 15 agent-cued and the 15 patient-cued eventualities respectively. The number in each set of brackets is each informant's accuracy rate.

Table 4.5 Time-defined Fishfilm task: VP morphology (Lower-intermediate)

a. Error-free VPs

	Agent-cued (N=15)				Patient-cued (N=15)			
	error-free VP	erroneous VP	Missed	Accuracy rate	error-free VP	erroneous VP	Missed	Accuracy rate
L21	13	2		(. 87)	9	6		(.60)
L22	5	10		(.33)	14	1		(.93)
L23*				(0)		27	3	(0)
L24	13	2		(.87)	13	2		(.87)
L25	6	8	1	(.40)		15		(0)
L26	13	1	1	(.87)	12		3	(.80)
L27	3	11	1	(.20)	15			(1)
L28		15		(0)	12	1	2	(.80)
L29	15			(1)	14		1	(.93)
L30		15		(0)		15		(0)
Total	68	64	3	(.45)	89	67	9	(.59)

* L23 thought the task required him to practise passives, thus, he produced passives all through the task.

b. Breakdown of erroneous VP

	Subject-verb agreement	Lexical	VP agreement			Phonology (ambiguous cases only)	Total errors
			Aux omission (VP no Aux)	Selection of wrong Aux (VP aux)	Aux-verb compatibility		
L21	2					6	8
L22	10		1				11
L23*					27		27
L24	2		2				4
L25	7				4	12	23
L26					1		1
L27	11						11
L28	16						16
L29							
L30	15				15		30
Total	63		3		47	18	131

* L23 thought the task required him to practise passives, thus, he produced passives all through the task.

As Table 4.5a shows, three informants at the lower-intermediate level (L21, L25 and L29) had higher accuracy percentages for performing the agent-cued eventualities than they had for performing the patient-cued eventualities, while L22, L27 and L28 were more accurate in the patient-cued eventualities. L23 mistakenly thought that in this task he was being asked to practise passives, and so he produced passives throughout the task regardless of the roles played by the two fish. However, the VPs he used in his utterances were inaccurate, as shown in (17). L30 did not produce any accurate VPs for either type of eventuality. L25 had six VP accurate utterances (.40 accuracy rate) when describing the agent-cued eventualities, but produced zero grammatically accurate utterances in the patient-cued eventualities. On the other hand, L28 did not produce any error-free VPs in the agent-cued eventualities, as in (18a), but achieved a .80 accuracy rate in the patient-cued eventualities, as in (18b).

(17) L23 (trial No.5) the black fish was eat by the yellow fish
(trial No.23) the black fish was eat by the grey fish
(trial No.30) the white fish was eat by the red fish
(18a) L28 (trial No. 12) the pink one eat yellow one.
(18b) (trial No.14) the pink one was eaten by red one.

Now, let us move to Table 4.5b below to look at the erroneous VPs produced by the lower-intermediate level informants. The number indicates the frequency counts of errors that each informant made on each type. A blank cell refers to no errors found for this type in the informant's speech data. L25 used '*is eating by*' in most cases where passive response was expected, as in (19). The verb form he used was wrong. This may have been due to his pronunciation, as it was difficult for the researcher to determine clearly whether the response was *eaten* or *eating*. L28 failed to produce the third person singular form throughout the task, as in (20), although his argument-grammatical function mapping of these sentences was correct. L30 did not produce any grammatically correct utterances in agent-cued or patient-cued eventualities. For example, the third person singular *–s* on verb is missing in (21a) and there is no auxiliary-verb compatibility in L30's production of passive structures (21b).

(19) L25 (trial No. 4) the pink fish is eating by the black fish
(trial No. 8) umm the red fish is eating by blue fish
(trial No. 10) the green fish is eating by pink fish
(20) L28 (trial No. 3) the pink one eat white one
(trial No.7) the red fish eat white fish
(21) L30 a. (trial No. 5) the black fish eat the green fish
(trial No. 7) the red fish eat the silver fish
b. (trial No. 6) the black fish eat by the red fish
(trial No. 10) the green fish eat by the purple fish

Table 4.6 Time-defined Fishfilm Task: VP morphology (Intermediate)
a. Error-free VPs

	Agent-cued (N=15)				Patient-cued (N=15)			
	error-free VP	erroneous VP	Missed	Accuracy rate	error-free VP	erroneous VP	Missed	Accuracy rate
M11		15		(0)	15			(1)
M12	7	8		(.47)		15		(0)
M13	2	13		(.13)	15			(1)
M14	15			(1)	15			(1)
M15	14	1		(.93)	3	11	1	(.20)
M16	12	3		(.80)	15			(1)
M17	15			(1)	15			(1)
M18	5	10		(.33)	14	1		(.93)
M19	15			(1)	14	1		(.93)
M20	15			(1)	15			(1)
Total	100	50		(.67)	121	28	1	(.81)

b. Breakdown of erroneous VP

	Subject-verb agreement	Lexical	VP agreement			Phonology (ambiguous cases only)	Total errors
			Aux omission (VP no Aux)	Selection of wrong Aux (VP aux)	Aux-verb compatibility		
M11					15		15
M12	2		5		1	15	23
M13	13						13
M14							0
M15		12					12
M16	2			1			3
M17							0
M18	2		1		8		11
M19	1						1
M20							0
Total	20	12	6	1	24	15	78

As shown in Table 4.6a, three intermediate-level informants (M12, M15 and M19) had higher percentages of error-free VPs when describing the agent-cued eventualities, while four (M11, M13, M16 and M18) had higher percentages when describing the patient-cued eventualities. M14 and M20 had at the same accuracy rate (1) for both types of eventualities. Interestingly, M11 had zero accuracy in the agent-cued eventualities, as in (22), but 100% accuracy in the patient-cued eventualities. This is because she used fixed verbal forms in the agent-cued and patient-cued eventualities. M12 had an accuracy rate of 0.47 in describing the agent-cued eventualities, but zero accuracy in the patient-cued eventualities. Examples of M12's sentences are shown in (23).

(22) M11 (trial No. 3) the pink fish eaten the white fish
(trial No. 5) the black fish eaten yellow fish
(trial No. 8) the red fish was eaten by the blue fish
(trial No. 10) the green fish was eaten by the pink fish

(23) M12 (trial No. 3) the purple fish ea eat the white fish
(trial No. 6) the black fish was eating by the red fish
(trial No. 5) the black fish eating the yellow fish
(trial No. 7) the red fish eating the white fish

M11 produced grammatically correct passive structures for patient-cued eventualities, but for the agent-cued eventualities she used the past participle form (i.e., *eaten*) of the verb *eat*. It seems that she mistakenly thought *eaten* was the past tense of *eat* (rather than *ate*). Thus, she did not make any correct responses for the agent-cued eventualities. On the other hand, M12 used the present continuous tense of the verb *eat* (i.e., *eating*) instead of the past participle

form (i.e., *eaten*) in the patient-cued mapping eventualities. This might be because it was difficult to hear clearly whether she was saying *eating* or *eaten*.

Table 4.6b shows that five intermediate-level informants made subject-verb agreement errors, as shown in (24). M15 used inappropriate verbs in forming passives (25). M18 made auxiliary-verb compatibility errors in describing the agent-cued eventualities (26).

(24) M13 (trial No.17) the blue fish eat the green fish
M16 (trial No.5) a pink fish eat a white fish
(25) M15 (trial No.6) the black fish was ate the red fish ate by the red fish
(trial No.27) the grey fish was ate by the white fish
(26) M18 (trial No.9) the white fish has eat the blue fish.
(trial No.12) the white fish is eat the black fish.

Table 4.7 Time-defined Fishfilm task: VP morphology (High)
a. Error-free VPs

	Agent-cued (N=15)				Patient-cued (N=15)			
	error-free VP	erroneous VP	Missed	Accuracy rate	error-free VP	erroneous VP	Missed	Accuracy rate
H01	15			(1)	15			(1)
H02	12	3		(.80)	15			(1)
H03	11	4		(.73)	13	2		(.87)
H04	15			(1)	15			(1)
H05	15			(1)	12	3		(.80)
H06	15			(1)		15		(0)
H07	15			(1)	15			(1)
H08	13	2		(.87)	14		1	(.93)
H09	15			(1)	15			(1)
H10	15			(1)	15			(1)
Total	141	9		(.94)	129	20	1	(.86)

b. Breakdown of erroneous VP

	Subject-verb agreement	Lexical	VP agreement			Phonology (ambiguous cases only)	Total errors
			Aux omission (VP no Aux)	Selection of wrong Aux (VP aux)	Aux-verb compatibility		
H01							0
H02	2	1					3
H03	2	3			1		6
H04							0
H05				3			3
H06						15	15
H07							0
H08	2						2
H09							0
H10							0
Total	6	4		3	1	15	29

As is shown in the Table 4.7a, five informants (H01, H04, H07, H09 and H10) h had highest accuracy rate (i.e., 1) for describing both types of eventualities. H02, H03 and H08 were more accurate in the patient-cued mappings, while H05 was more accurate when describing the agent-cued eventualities. H06 had a zero grammatical accuracy rate when she performed the patient-cued eventualities due to her pronunciation. We heard '*is being eating*', but she might have been trying to say '*eaten*' rather than '*eating*' as in (27).

(27) H06 the green fish is being is being eating by purple fish
the purple fish is being eating by red fish
the red fish is being eating by grey fish

The breakdown of erroneous VP analysis shows that H05 selected the wrong auxiliary verbs for describing some of the patient-cued eventualities, such as in trials 8, 10 and 27, as shown in (28). H02, H03 and H08 made errors in relation to subject-verb agreement (29). H03 used an incorrect past participle form of the verb *swallow* (30), which was lexically inappropriate.

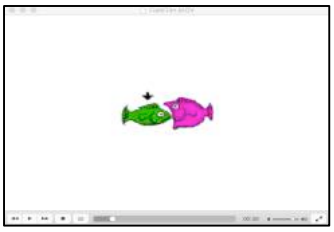
(28) H05 (trial No. 8) the red fish has eaten by a blue fish
(trial No.10) the green fish has eaten by a pink fish.
(trial No. 27) the green the grey fish has eaten by a white fish.
(29) H02 (trial No. 7) the red fish eat a grey fish.
H08 (trial No. 12) the purple fish eat the yellow fish.
(30) H03 (trial No.1) a blue fish was swallown by a green fish
(trial No.5) the black fish has swallowned a yellow fish

To conclude, the analysis of the informants' VPs showed that the high-level informants had higher accuracy rates than the informants in the other two levels. The intermediate informants were more accurate than the lower-intermediate informants. For example, the lower-intermediate informants made 63 subject-verb agreement (i.e., the third person singular form) errors, intermediate informants made 20 of these errors and high-level informants six. Moreover, the frequency counts for auxiliary-verb compatibility errors decreased as the informants' proficiency levels increased. For example, the lower-intermediate informants made 47 auxiliary-verb compatibility errors, intermediate informants made 24 errors and high-level informants made one error. The comparison across the three levels shows a significant improvement across levels.

b) Syntax: argument-function mapping

Each informant's syntactic development was analysed based on an analysis of their argument-grammatical function mappings. The analysis was based on the Lexical Mapping Hypothesis. As explained in Section 3.5, the types of responses that were counted included: 1) mappings reflecting pragmatic cues, as in (31a); 2) mappings not reflecting pragmatic cue as in (31b); 3) pragmatically incorrect utterances (31c) and; 4) missed cases (i.e., the informant produced an incomplete sentence or none).

(31) (describing an event of a pink fish eating a green fish, with an arrow on the green fish)



a. M11 (trial No. 2) the green fish was eaten by the pink fish.

b. H03 (trial No. 2) another pink fish just eat a green fish.

c. L24 (trial No. 2) the green fish eat the pink fish.

In the three examples above, M11 gives a target-like utterance reflecting pragmatic prominence, but H03 produces an active structure in the patient-cued eventuality, and L24 does not convey correct information, which is counted as a pragmatically incorrect utterance.

Table 4.8 summarises the frequency counts of the 30 informants' argument-grammatical function mappings in the time-defined Fishfilm task. The number of the pragmatically inappropriate utterance is recorded in brackets.

Table 4.8 Time-defined Fishfilm task: syntax

a. Lower-intermediate

Informant	Agent-cued (N=15) (Active-expected)			Patient-cued (N=15) (Passive-expected)		
	active	passive	missed	active	passive	missed
L21	15				15	
L22	15				15	
L23*	2	(13)			12	3
L24	15			1 (1)	13	
L25	11 (1)	(2)	1	1 (1)	13	
L26	8	6	1		12	3
L27	14		1		15	
L28	15			1	12	2
L29	15				14	1
L30	15				15	
Total	125 (1)	6 (15)	3	3 (2)	136	9

*Learner L23 thought the task was asked him to produce passive sentences. Thus, he attempted to produce passives all through the task.

b. Intermediate

Informant	Agent-cued (N=15) (Active expected)			Patient-cued (N=15) (Passive expected)		
	active	passive	missed	active	passive	missed
M11	15				15	
M12	11	4			15	
M13	15				15	
M14	15				15	
M15	15				14	1
M16	15				15	
M17	15			1	14	
M18	15				15	
M19	15			1	14	
M20	15				15	
Total	146	4		2	147	1

c. High

Informant	Agent-cued (N=15) (Active expected)			Patient-cued (N=15) (Passive expected)		
	active	passive	missed	active	passive	missed
H01	15				15	
H02	15				15	
H03	11	3 (1)		8	7	
H04	15				15	
H05	14	1			15	
H06	15				15	
H07	15				15	
H08	15				14	1
H09	15				15	
H10	15				15	
Total	145	4 (1)		8	141	1
NC	15				15	

It can be seen from Table 4.8a that six informants (L21, L22, L24, L28, L29 and L30) produced 15 active sentences in the agent-cued eventualities. Most lower-intermediate informants produced active sentences in which the agent was mapped onto SUBJ. However, some informants (L23, L25 and L26) produced passive sentences when the agent was cued (i.e., when active sentences were expected). For example, L26 produced 8 active and 6 passive structures, as in (32), when the agent was cued. Thus, these informants had difficulty locating pragmatic cues in this time-defined task, probably due to the speed of the task. Also, some informants (L25, L26 and L27) missed describing the eventuality.

(32) (describing an event of a red fish eating a grey fish, with an arrow on the red fish)
L26 The white fish was eaten by the red fish

(describing an event of a blue fish eating a green fish, with an arrow on the blue fish)
L26 The green fish was eaten by the blue fish

One informant, L23, produced passive sentences in most cases when the agent was cued. L23 confessed after performing the task that he mistakenly thought he was being asked to practise passive sentence structures. Hence, he produced passive structures in most cases. All his sentences started with the arrowed fish regardless of whether the fish was the agent or the patient, and he applied a passive grammatical frame to create his sentences. For instance, he produced example (33a) when he was describing an eventuality in which the pink fish was the role fish. The role fish was a target fish which had an arrow above its head. The pink (purple) fish was an agent. Compare this example with (33b) produced by the NS. It is evident that L23 was not capable of non-canonical argument-grammatical function mapping in this time-defined Fishfilm task.

(33) a. L23 the pink fish was eat by the white fish
b. NS the purple fish eats the white fish

L25 produced 11 active sentences, 1 missed case and 3 sentences starting with the role fish regardless of whether the fish was the agent or the patient, and applied passive grammatical frames, which was pragmatically incorrect, as in (34).

(34) (describing an event of a pink fish eating a white fish, with an arrow on the pink fish)
L25 The pink fish is eating by white fish

(describing an event of a red fish eating a grey fish, with an arrow on the red fish)

L25 The white fish is eating red fish

For the patient-cued eventualities, performance varied among members of the lower-intermediate group. Four informants (L21, L22, L27 and L30) produced passive structures for all 15 patient-cued trials, in ways which were faithful to the pragmatic information. Three informants faithfully produced passive structures but failed to describe some patient-cued eventualities: L23 and L26 missed three times and L29 once. Three other informants, L24, L25 and L28, mostly produced passive structures but also produced active sentences (twice with L24 and L25, and once with L28). L28 also failed to describe the patient-cued eventualities twice. The results above indicate that not all lower-intermediate informants were able to incorporate pragmatic cues to convey pragmatically appropriate information using appropriate syntactic frames – that is, their choices of active or passive voice were inappropriate. The problem for the informants of this group may have been the speed of the task. They had nine seconds to describe an eventuality. In this time they had to process

information and create sentences accordingly. In fact, four informants of the group were unable to describe one or more eventuality.

Most of the informants in the intermediate-level group produced pragmatically faithful structures in which they used active structures when the agent was cued and passive structures when the patient was cued. However, when the agent was cued, M12 produced passive structures four times, as in (35). For the patient-cued eventualities, M17 and M19 each produced active structures once. Like the lower-intermediate informants but with lower frequencies, one informant from this group (M15) failed to describe one of the eventualities.

(35) (describing an event of a black fish eating a yellow fish, with an arrow on the black fish)
M12 The yellow fish was eating by the black fish

The high-level informants' performances with the time-defined Fishfilm task seemed to be similar to those of the intermediate group at first glance. However, closer analysis revealed that the high-level informants produced more accurate responses than the intermediate-level informants in terms of the pragmatic appropriateness of their syntactic structures. Almost all high-level informants were able to produce pragmatically appropriate structures in response to whether the cue was on the fish playing the agent or the patient role. When the cue was on the agent, the agent was mapped onto SUBJ (resulting sentence is active). There were exceptions: Once when the cue was on the patient, H05 mapped the patient onto SUBJ (resulting sentence was passive) and once H08 failed to describe an eventuality. On three occasions when the agent was cued, H03 produced passive structures as in (36a) and H03 produced one passive structure regardless of whether the fish was agent or patient as in (36b). H03 produced seven out of 15 passive structures when the patient was cued.

(36a) (describing an event of a blue fish eating a green fish, with an arrow on the blue fish)
H03 Another green fish was eaten by the blue fish

(36b) (describing an event of a grey fish eating a blue fish, with an arrow on the grey fish)
H03 The blue fish was swallown another grey fish

While performing the Fishfilm task, H03 used a range of verbs to describe eventualities, such as *eat*, *is swallowing*, *had* and so forth as in (37). However, other informants preferred to use one verb *eat* throughout the task.

(37) H03 (trial No. 1) a blue fish was swallown by a green fish
(trial No. 7) the red fish is eating a grey fish
(trial No. 9) a green fish now just had a blue fish

From the above analysis, it can be seen that almost all informants, except for L23, were able to map agent onto SUBJ when the cue was on the agent, though they did so to different degrees. The low-intermediate level informants produced 125 active structures, the intermediate-level informants 146 and the high-level informants 145 active structures. All the informants were able to map patient onto SUBJ when the cue was on patient – again, to different degrees. The low-intermediate level informants produced 136 passive structures, the medium-level informants 147 and the high-level informants 141 passive structures.

4.2 Written Profiling Task

The aim of the written profiling tasks was to identify the 30 informants' morphological and syntactic stages from a PT perspective. The distributional analysis of each informant's morphological and the syntactic stages is presented in the two subsections below.

4.2.1 Morphology

Table 4.9 summarises the 30 informants' productions of morphological items which are listed in PT. The number before the slash (i.e., /) refers to the frequency counts of the morphological form and the number after the slash refers to the total number of contexts. It should be noted that the numbers of contexts are different across informants even if they translated the same sentence. The reason may be that different informants used different morphological forms in translating the same sentence, as in (38).

(38) L30 the population of this country <u>increase</u> again this year.
M15 the population of this country <u>has increased</u> this year.
H02 the population in this country <u>increased</u> again this year.

The informants' distributional analysis of PT developmental stages is listed in Appendix I.

Table 4.9 Translation task: morphology

a. Lower-intermediate

PT stages	Category					Noun phrasal (NP)		Verb Phrasal (VP)			Inter-phrasal	
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Have + V-ed/V-en	Be + V-ed/V-en	3sg-*s*	has/does
L21		2/2	4/6		1/2			0/2	2/2	0/5	5/10 >1	
L22	2	1/4	1/7		0/1					0/5	0/11	
L23		3/5	7/10		4/4					2/5	1/6	
L24	1	8/8	5/5		1/2				1/1	5/5	1/8	
L25		2/3	6/7		3/3					4/5	4/13	
L26	2	4/5	4/4		3/3			2/2	3/3	9/9	1/6	
L27		10/10	7/8		4/4 >1				1/1	3/6	0/4	
L28		4/5	5/7		0/1					2/5	1/10	
L29		5/5	6/7		3/3			1/1		3/6	6/10	
L30		1/5	2/8		1/1					3/5	0/10	

b. Intermediate

PT stages	Category					Noun phrasal (NP)		Verb Phrasal (VP)			Inter-phrasal	
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Have + V-ed/V-en	Be + V-ed/V-en	3sg-*s*	has/does
M11		0/3	2/4		1/3				2/2	4/5	0/11	1/1
M12		5/5	11/11		3/3			1/1	7/8	7/7	4/4	
M13		7/9	3/8		2/2				1/2	5/6	0/3 >1	2/2
M14	2	9/9	10/10		4/4				0/1	5/5	2/2	
M15		6/6	8/8	1/1	4/4				2/2	7/7	8/8	
M16		5/5	10/11	1/1	3/3			1/1	7/8	7/7	4/4	
M17	2	2/2	4/4		3/3			1/1		7/8	12/14	
M18		4/4	2/2		3/3			2/3	7/7	6/6	7/12	
M19	1	4/4	5/7		1/1					5/5	1/11	
M20		6/7	5/8		1/2					3/5	0/2	

c. High

PT stages	Category					Noun phrasal (NP)		Verb Phrasal (VP)			Inter-phrasal	
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Have + V-ed/V-en	Be + V-ed/V-en	3sg-*s*	has/does
H01	1	7/7	7/7	1/1	5/6				1/1	5/5	7/7	1/1
H02	2	8/8	10/10	5/5	3/3					5/5	3/4	
H03	2	7/7	7/7	6/6	7/7				1/1	6/6	5/6	1/1
H04		6/6	9/9	4/4	3/3			1/1	1/1	2/3	7/7	1/1
H05	2	5/5	1/1	1/1	6/6				14/15	5/6	3/5	15/15
H06	1	3/3	8/8	4/4	5/6				1/1	5/6	5/5	2/2
H07	1	10/10	7/7	5/5	4/4				2/2	5/5	4/4	2/2
H08		9/9	10/10	4/4	5/5					5/6	2/4	
H09	1	4/4	1/1	4/4	5/5				11/12	4/5	6/6	12/12
H10	1	11/11	7/7	6/6	3/3				5/5	5/5	2/2	5/5
Control		14/14	7/7	3/3	3/3		1/1		1/1	5/5	4/4	1/1

Table 4.9a shows that L22 was at the stage of category procedure. L21, L25 and L29 were at the inter-phrasal stage, while the other six informants were at the VP procedure stage. In contrast, the results from the 'meet the partner' and 'spot the differences' tasks showed no

informants of this level had reached the inter-phrasal stage. A closer look at their performances shows that most informants produced the passive *be + V-ed/V-en* morphological structure as in (39), except for L21 and L22. L21 failed to produce any morphological structures in the passive voice, but he used the third person singular form five times out of the ten contexts as in (40). The other two informants who used the third person singular form were L25 and L29, as in (41).

(39) L23 the lamb has been eaten by the wolf
L26 the lamb was eaten by the wolf
L28 the lamp was eaten by a wolf
L21 Woolf ate the sleep
L22 The woof eat the sheep

(40) L21 the cat catches a beatuifly
Lili shows her new clothes to her mother
The shop opens at 9:00 morning every day

(41) L25 Mother washs clothes
Lily gives her mother to one gift
L29 A cat catches butterfly
Lili gives her mother a present

M11, M13, M19 and M20 were at the stage of VP procedure, and the other seven medium-level informants were at the inter-phrasal stage. As we may recall, M20 was the only medium-level informant who was able to produce the third person singular form in the 'meet the partner' and 'spot the differences' tasks. However, M20 did not show any evidence of using the third person singular form in the translation task, as in (42). M12, M14, M15, M16, M17 and M18 did not show evidence of the use of the third person singular form in the oral profiling tasks, but this form emerged in their performance of the written translation task, as in (43).

(42) M20 Lily open the door
Lily force herself to study hard

(43) M17 Lily gives her mum a gift
Lily shows mum her new uniform
Mum asks me to clean up room

All the 10 high-level informants showed evidence of the use of the third person singular form in the written translation task. Thus, we can say that the high-level informants were able to

produce morphological structures belonging to inter-phrasal procedures in both the written and spoken tasks.

4.2.2 Syntax: Argument-function Mapping

Each informant's production of canonical mapping and non-canonical mapping is explored here. In the non-canonical mapping category, lexically non-canonical and structurally non-canonical forms are examined. The informants' frequency for correct mappings were counted. Table 4.10 gives some examples of translations which are faithful/not faithful to the source Chinese text.

Table 4.10 Examples of mappings

Mappings		Faithful to the source text	Not faithful to the source text
Canonical	Transitive	(Control) Lily broke the vase. (Control) Lily opened the door.	(L26) The flower holder was broken by Lily. (L26) The door was opened by Lily.
	Ditransitive	(Control) Mum bought lily a book. (Control) Lily gave her mum a gift.	(L25) Mother give Lily bought a book. (H03) Lily received a gift from her mom.
Lexically non-canonical	Intransitive	(Control) The population of the country increased again this year. (Control) The examination will finish next Wednesday.	(L22) The country increase population in this year. (L23) Next week Wednesday finish text.
	Transitive (Psych verb)	(Control) I feel bored because I have nothing to do. (Control) I am interested in children's stories. (Control) He refused to go home, so his mum was worried.	(L26) I feel boring because I have nothing to do. (L28) I'm interesting in fair tale.
Structurally non-canonical	Passive	(Control) Lily was chosen by her teacher to participate in the math competition. (Control) A big fish in the house was given away to the cat's friend by the cat. (Control) My book was taken home by Lily.	(L23) Lily is her teacher choose to go to the math contest. (L25) A big fish at home give his friend the cat. (L28) Lily take my book to her home.
	Causative & causative-passive	(Control) Lily forces herself to study hard. (Control) The boss makes the workers work from morning to evening.	(L21) Lili study very hard. (L23) Lily is force yourself to study. (M20) The worker work from light time moni morning to at night.

In this task, the informants were asked to translate the source sentences into English in a way that gave the best equivalence in English (see Appendix C). We can see from Table 4.10 that L26 provided two passive structures when the task was to translate an active structure from Chinese to English with certain transitive verbs (e.g., *the door was opened by Lily*). Thus, the

mapping he gave in English was not pragmatically faithful to the original sentence in Chinese. In the intransitive case, L22 and L23 used the intransitive verbs *increase* and *finish* as transitive and created canonical order sentences (i.e., SVO). Thus, they produced inappropriate mappings. When asked to use transitive psych verbs to express ideas, a number of informants (e.g., L26 and L28) did not produce appropriate mappings with transitive psych verbs. For example, when L26 was asked to translate into English the Chinese words for the feeling of boredom, he used *feel boring*. As for informants' structurally non-canonical mappings, L23, L25 and L28 produced active structures instead of the required passive structures. Regarding informants' mappings involving causative sentences, a number of lower-intermediate level informants failed to describe a causative relationship. For instance, the utterance L21 used (*Lili study very hard*) did not convey idea that Lily made herself do something. Thus, the sentence did not include the required causality.

Table 4.11 below records the results of the 30 informants' argument-function mapping analysis. The frequency counts of correct mappings are entered before the slash (i.e., /) and the total number of contexts is recorded after the slash.

Table 4.11 Translation task: syntax

a. Lower-intermediate

	Canonical		Non-canonical			
			Lexically non-canonical		Structurally non-canonical	
	Transitive (n=7)	Ditransitive (n=5)	Intransitive (unaccusative) (n=5)	Transitive (Psych verb) (n=5)	Passive (n=5)	Causative & causative-passive (n=5)
L21	7/7	5/5	2/5	0/5	0/5	2/5
L22	7/7	5/5	3/5	2/5	0/5	2/5
L23	7/7	5/5	4/5	2/5	2/5	3/5
L24	7/7	5/5	4/5	0/5	5/5	2/5
L25	7/7	3/5	2/5	0/5	3/5	1/5
L26	7/7	5/5	3/5	2/5	5/5	4/5
L27	7/7	5/5	4/5	5/5	5/5	4/5
L28	7/7	5/5	3/5	2/5	4/5	1/5
L29	7/7	5/5	4/5	5/5	3/5	5/5
L30	7/7	5/5	4/5	2/5	3/5	3/5

b. Intermediate

	Canonical		Non-canonical			
			Lexically non-canonical		Structurally non-canonical	
	Transitive (n=7)	Ditransitive (n=5)	Intransitive (unaccusative) (n=5)	Transitive (Psych verb) (n=5)	Passive (n=5)	Causative & causative-passive (n=5)
M11	7/7	5/5	3/5	0/5	5/5	5/5
M12	7/7	4/5	4/5	4/5	5/5	3/5
M13	7/7	5/5	5/5	4/5	5/5	4/5
M14	7/7	5/5	5/5	3/5	5/5	4/5
M15	7/7	4/5	5/5	4/5	5/5	3/5
M16	7/7	5/5	4/5	4/5	5/5	4/5
M17	7/7	5/5	5/5	2/5	5/5	4/5
M18	7/7	5/5	3/5	3/5	5/5	5/5
M19	7/7	5/5	5/5	3/5	5/5	3/5
M20	7/7	5/5	5/5	2/5	5/5	4/5

c. High

	Canonical		Non-canonical			
			Lexically non-canonical		Structurally non-canonical	
	Transitive (n=7)	Ditransitive (n=5)	Intransitive (unaccusative) (n=5)	Transitive (Psych verb) (n=5)	Passive (n=5)	Causative & causative-passive (n=5)
H01	7/7	5/5	5/5	4/5	5/5	5/5
H02	7/7	5/5	4/5	5/5	3/5	5/5
H03	7/7	4/5	5/5	4/5	5/5	5/5
H04	7/7	5/5	5/5	4/5	3/5	5/5
H05	7/7	5/5	5/5	5/5	5/5	5/5
H06	7/7	5/5	5/5	5/5	4/5	4/5
H07	7/7	5/5	5/5	4/5	5/5	4/5
H08	7/7	5/5	4/5	5/5	4/5	4/5
H09	7/7	5/5	5/5	5/5	4/5	5/5
H10	7/7	5/5	5/5	5/5	5/5	5/5
Control	7/7	5/5	5/5	5/5	5/5	5/5

As we may recall, when a learner produces two correct target structures in different contexts, the learner is considered to have acquired the rule, and the PT usual emergence criterion has been satisfied. It can be seen from Table 4.11 that all informants were able to produce canonical structures. They produced transitive sentences with 100% accuracy rates, except L26, who produced two passives in translating transitive sentences. Moreover, all informants were able to translate ditransitive sentences using correct mappings, and they were all able to cope with structures with intransitive verbs as well. Three lower-intermediate informants (L21, L24 and L25) and one intermediate informant (M11) were not able to translate sentences with transitive psych verbs appropriately into English, so they were not considered to have acquired the rule of using psych verbs. With regards to structurally non-canonical mapping, L21 and L22 were not able to translate passive structures into English correctly, while others produced two or more passive structures correctly in five responses. L25 and

L28 did not show enough evidence for the emergence of causative or causative-passive structures. Other informants were able to produce at least two causative structures. It is interesting to note that only M20 produced three cases that are structurally similar to causative–passive structure in the translation task, as in (44). The use of this structure is considered to be a higher developmental stage than other passive constructions.

(44) M20 a. I was asked to clean the room by my mother.
b. I was asked to give Lily a new to read by my teacher.
c. The children was asked to wash hand by their mum.

In conclusion, when the informants performed the written translation task, three lower-intermediate level informants, six intermediate-level informants and all high-level informants were able to use the third person singular form, which is a rule belonging to the highest morphological stage. Moreover, all of them were able to cope with the original sentences in the non-defaulting mapping stage but L21 and L22 had problems in forming passives, and L21, L24, L25 and M11 were not able to use transitive psych verbs correctly.

4.3 Quasi-experimental Tasks

The aim of the quasi-experimental tasks was to examine whether each informant's competence and performance would vary when tasks were designed by manipulating ± *here-and-now* variables, ± *planning time* variables and ± *few elements* variables.

4.3.1 Topic and Comments Tasks (- *here-and-now*)

As we may recall from Chapter 3, the 'topic and comments' task was more complex than the 'meet the partner' and 'spot the differences' tasks, because the informants did not have any pictures presented to them as a visual aid in the 'topic and comments' task. Thus, this task is considered as '- *here-and-now*' in terms of Robinson's task complexity classification (Robinson, 2007, 2009, 2011a). The informants had to ask questions based on abstract ideas in order to perform the task. Now, let us take a look at their morphological and syntactic stages in this task.

a) Morphology

The morphological distributional analysis method for the 'topic and comments' task follows the same steps as the 'meet the partner' and 'spot the differences' tasks. Table 4.12 presents

each informant's PT morphological developmental stages. The informants' implicational analysis of PT developmental stages is presented in Appendix J.

Table 4.12 'Topic and comments' task: morphology

a. Lower-intermediate

PT stages	Lexical			Noun phrasal (NP)			Verb Phrasal (VP)			Inter-phrasal		
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Modal + V	Have + V-ed/V-en	3sg-*s*	has/does
L21			0/1	1/6	2/2		3/4		2/2		0/3	
L22		0/4	0/4	1/1	1/2	2/3	0/3	0/1		0/1	0/5	0/1
L23			0/2	0/6	1/2	0/1	1/2	1/2	2/2		0/3	
L24	8	2/2	4/8	14/14	9/9 >1	8/9	3/5	1/3	10/10		0/2	1/1
L25				0/5	2/4	0/3			2/3		0/3	0/1
L26	3	1/1	2/4	4/4	2/2	4/4	1/2	1/2	7/7	1/1	0/1	1/2
L27			0/1	2/4	2/5	1/1	0/1		7/9	1/1	0/2	
L28	1	0/2	0/2	2/3	2/2	2/2	2/5	0/1	0/1	0/1	0/4	0/1
L29	7	3/4	1/4	2/5 >1	10/12 >1	2/3	5/6	2/2	9/10	0/1	0/2	1/1
L30	2	1/2	1/5	1/5 >1	8/8	4/9	3/4				0/3	0/2

b. Intermediate

PT stages	Lexical			Noun phrasal (NP)			Verb Phrasal (VP)			Inter-phrasal		
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Modal + V	Have + V-ed/V-en	3sg-*s*	has/does
M11	1	0/1	0/3	0/4	10/10	1/3	1/1	0/2	3/3		0/4	0/3
M12		3/3	4/10	1/19	8/10 >2	3/4	2/4	2/5	5/5		0/3	
M13	5	6/11	8/12	3/14	13/16 >2	2/3	8/10	0/2	11/11	1/2	2/9 > 1	0/1
M14	8	0/3	0/5	2/10	12/12	4/5	0/1	0/1	2/2		0/2	0/2
M15		3/3	4/11	1/8	7/8 > 2	3/4	2/3	2/5	6/6		0/2	0/3
M16	1	0/3	0/6	1/9	9/9	4/5	0/1	0/1	3/3		0/3	0/2
M17	1		2/5	3/6	1/2	2/2	2/3	1/1	7/7	1/1	3/5	1/2
M18	5		1/5	1/9	6/6	4/5	3/3	3/4	7/7		0/3	0/2
M19	1	0/2	2/6	5/8	11/12 >1		9/11	1/1	7/7	1/2	0/3	0/1
M20	4	5/7	3/5	11/15	13/19 >1	1/1	2/3	2/2	7/7		2/4	2/5

c. High

PT stages	Lexical			Noun phrasal (NP)			Verb Phrasal (VP)			Inter-phrasal		
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Modal + V	Have + V-ed/V-en	3sg-*s*	has/ does
H01	4	2/3	2/2	4/4	5/5 >2	3/3	2/2	6/6	5/5	1/1	5/7	
H02	3	5/5	5/5	5/6	13/14	3/3	5/5	1/1	5/5		4/4	2/2
H03	3	4/8	4/5	14/19	25/25	6/7	17/19	5/5	26/26	2/2	2/2 >1	3/3
H04	2	3/3	6/6	4/4	5/7 >1	6/6	8/8	1/1	14/14	0/1	7/8	2/2
H05	5	3/3	1/1	7/7	8/8 >1	4/4	4/5	8/8	4/4	3/3	6/7	3/3
H06	2		3/3	5/6	4/5		5/5		4/4	1/1	5/6	1/1
H07	2	3/3	8/8	7/7	16/17	5/5	5/5	7/7	4/4	3/3	6/6	3/3
H08	5	4/4	6/6	6/9	4/4	2/2	5/5	2/3	11/11	1/1	2/3	3/3
H09	4	1/1	3/6	1/2	10/10	1/1	0/2	3/3	8/8	3/3	3/3	3/3
H10	6	10/11	11/12	11/14	19/20	7/7	10/10	6/7	18/18	0/1	5/5 >1	3/3
NC	5	6/6	9/9	5/5	4/4	6/6	5/5	3/3	5/5	3/3	11/11	5/5

Table 4.12a shows that all lower-intermediate informants were able to produce 'plural-*s* without agreement' (Lexical procedure) responses in the 'topic and comments' task. Also, all of them except L25 produced plural *–s* + numeral quantifiers and/or plural *–s* + other quantifiers (NP procedure), as shown in example (45). However, examples of these morphological structures by L23 and L27 were so scarce that they do not satisfy the emergence criterion to be placed at the NP procedure stage. L25 did not produce any morphological structures involving NP procedure. There were three contexts for plural -*s* + numeric quantifier for which L25 failed to provide *–s* on nouns, as shown in example (46). L23, L25 and L27, who were not qualified to be at the NP procedure stage, were able to produce structures involving VP procedures. According to PT, the acquisition of structures strictly follows a developmental trajectory, and a learner cannot acquire the higher stage structures without acquiring the lower stage structures. The responses of these three informants in producing VP procedure structures without producing NP procedure structures may appear to contradict the PT. However, these responses may have been due to low frequencies of obligatory contexts. In fact, these three informants were able to produce the NP processing procedures in the 'meet the partner' and 'spot the differences' tasks presented above. Thus, the small number of obligatory contexts that L23, L25 and L27 produced may be the reason for this.

(45) Plural-*s* lexical and plural-*s* phrasal

L24 Turn 16 I drive my <u>cars</u> around the city and go shopping with <u>some friends</u>

Turn 56 what <u>languages</u> are you spoken speaking?

Turn 92 do you want to marry umm <u>five years</u> in the future umm the next five years in the future

L25	Turn 38	three people is my favorite friends
	Turn 78	umm which pets do you like?
L26	Turn 63	so many kinds, like noodles. dumplings. rice and so on
	Turn 67	I used to play basketball with my classmates and study with them
	Turn 83	so many times. oh we usually play basketball three times a week

(46) L25's three contexts of plural *-s* + numeric quantifier

Turn 28	five teacher
Turn 32	no twelve teacher
Turn 58	umm about twenty. umm. week.. twenty week

L22, L28 and L30 had reached the NP procedure stage of morphological development. All the other lower-intermediate informants had reached the VP procedure stage. No informants from this level had reached the highest morphological stage (i.e., inter-phrasal procedure) in the 'topic and comments' task.

Three intermediate informants (M20, M17 and M13) were able to produce structures involving inter-phrasal procedures (i.e., the third person singular form). The other seven intermediate informants had attained the stage of VP procedure in their morphological development. It is interesting to note that according to the results of the 'meet the partner' and 'spot the differences' tasks, only M20 was able to show enough evidence of the emergence of the third person singular *–s* marking on verbs. It is worth pointing out, however, that there were no obligatory contexts of the third person singular form in M17's speech data for the 'meet the partner' and 'spot the differences' tasks. Therefore, we can say that the absence of evidence for M17's acquisition of the third person singular form was due to a lack of context rather than a lack of competence. As for M13, she provided the third person singular *–s* on verbs once (out of five contexts) in the 'meet the partner' and 'spot the differences' tasks, and twice (out of nine contexts), as shown in example (47), in the 'topic and comments' task. Thus, M13 seems to have problems of accuracy with this morphological marking.

(47) 'Meet the partner' and 'spot the differences' tasks

M13	turn 38	umm in my picture, umm firstly, I found in the left corner, umm there exists a swift (switch?).

'Topic and comments' task

M13	turn 63	yeah. It depends on the period of my life.

turn 95 she gets two part-time job, and she can handle it, and I think I can do it well as her

All high-level informants were able to produce morphological forms of the highest inter-phrasal stage (i.e., the third person singular form, see Table 4.12c). They produced more cases of morphological forms than informants in the other two levels. For example, M20 produced the third person singular form twice out of four obligatory contexts while H01 produced the same structure five times out of seven. This suggests that as the informants' developmental stages became higher, they increased the frequency of their rule application (improved accuracy).

b) Syntax: Interrogatives

The distributional analysis of the informants' production of question formation in the 'topic and comments' task is similar to the analysis for the 'meet the partner' and 'spot the differences' tasks. Let us first take a look at the analysis of the constituent questions and then the yes/no questions.

Constituent questions

Table 4.13 'Topic and comments' task: constituent questions
a. Lower-intermediate

PT stages	Lemma access	Canonical word order	XP_{FOC} canonical word order	XP_{FOC} non-canonical word order		
Structure / informant	Single words; formulas	WH_{QUE} in-situ	WH_{QUE} SVO	WH_{QUE} COP S	WH_{QUE} MOD SV (O)	WH_{QUE} AUX SV (O)
L21				3		3
L22		2	4	1		1
L23		1				7
L24				2	1	6
L25				1	1	2
L26	1					6
L27	1		1	3	3	5
L28						2
L29	1			2	2	6
L30	2			2	6	1
Total	5	3	5	14	13	39

b. Intermediate

PT stages	Lemma access	Canonical word order	XP_{FOC} canonical word order	XP_{FOC} non-canonical word order		
Structure / informant	Single words; formulas	WH_{QUE} in-situ	WH_{QUE} SVO	WH_{QUE} COP S	WH_{QUE} MOD SV (O)	WH_{QUE} AUX SV (O)
M11				2		2
M12	3	1	3		2	3
M13				4		3
M14	2			2		2
M15	1	1	1	1		2
M16	2			3		3
M17	1			4		2
M18			2	2		3
M19				3		2
M20			1	2	1	3
Total	9	2	7	23	3	25

c. High

PT stages	Lemma access	Canonical word order	XP_{FOC} canonical word order	XP_{FOC} non-canonical word order		
Structure / informant	Single words; formulas	WH_{QUE} in-situ	WH_{QUE} SVO	WH_{QUE} COP S	WH_{QUE} MOD SV (O)	WH_{QUE} AUX SV (O)
H01	1			2		6
H02	2		1	4	1	6
H03		1	2		2	5
H04				2	1	3
H05	1		1	2	1	6
H06	1			4	2	5
H07	1			3		3
H08			3	3		3
H09	2		2	1	1	3
H10				5		1
Total	8	1	9	26	8	41
NC	2			5	3	7

As shown in Table 4.13a, all lower-intermediate informants were able to produce the highest stage structures (i.e., XP_{FOC} non-canonical word order) in order to ask constituent questions, including WH_{QUE} Cop S, WH_{QUE} MOD SV (O), and WH_{QUE} AUX SV (O) structures, as shown in (48).

(48) L27 turn 61 what's your country of birth?
turn 81 so umm who will stay with you on weekend
turn 87 umm who do you admire in your family?
L25 turn 86 last weekend what do you do?

However, some lower-intermediate informants (L24, L28 and L30) produced structures as shown in (49). In these cases, the informants consistently produced copular verbs at the second position even when the predicate involved a lexical verb. These cases do not constitute evidence of the acquisition of WH_{QUE} AUX SV (O) construction. It is clear from these cases that lower-intermediate informants had problems with selecting auxiliary verbs

when forming interrogative sentence. This is consistent with the findings in Kawaguchi's (2016) study regarding the acquisition of question sentences among Japanese L1 learners of English as a second language.

(49)	L24	turn 88	what is job umm will you want to find?
	L28	turn 57	where are you come from?
	L30	turn 34	what's you usually did with your friends?

All intermediate informants attained the highest XP_{FOC} non-canonical word order stage as they all produced 'WH_{QUE} AUX SV (O)' structures, as in (50). Also, it is worth pointing out that they did not make errors in the selection of auxiliary verbs, unlike the lower-intermediate informants.

(50)	M14	turn 65	what did you do last weekend?
	M16	turn 15	which period of your old school days do you mostly remember?
	M18	turn 23	what kind of friends do you have?

All high-level informants produced the 'WH_{QUE} AUX SV (O)' structures, as in (51). Moreover, the frequency of production of this structure by these informants was far greater than it was in the two lower groups. For example, all the high-level informants except H10, and six informants at the lower-intermediate level, produced at least three 'WH_{QUE} AUX SV (O)' structures, while all the informants at the intermediate level uttered two to three 'WH_{QUE} AUX SV (O)' structures. Furthermore, the high-level informants produced more 'WH_{QUE} COP S' and 'WH_{QUE} MOD SV (O)' structures, as in (52), than the other two groups of informants.

(51)	H04	turn 100	how often do you umm call her or make video contact?
	H09	turn 120	why do you admire her?
(52)	H10	turn 294	so umm what umm subject would you like to take?

The informants of the three levels were all able to produce the highest 'XP_{FOC} non-canonical word order' structure (i.e., WH_{QUE} AUX SV (O) structure). The H informants produced a total number of 41 examples of this type of structure, while the M informants produced 25 and L informants 39.

Yes/No Questions

Now, let us look at the 30 informants' production of yes/no questions in the 'topic and comment' task.

Table 4.14 'Topic and comments' task: yes/no questions

a. Lower-intermediate

PT stages	Lemma access	Canonical word order	QUE canonical word order	Non-canonical word order			
Structure / informant	Single words; formulas	[QUE^{P} SVO]	QUE [SVO]	COP_{QUE} SUBJ Predicate	$HAVE_{QUE}$ SUBJ OBJ	MOD_{QUE} SUBJ V (O)	AUX_{QUE} SUBJ V (O)
L21			6				
L22	3	4	1				
L23	5	1	2				
L24		1	2			1	
L25	5	2	3				
L26	2		5	3			2
L27	5		4				
L28			3		3		1
L29	5	4		1			
L30	3	4	6				
Total	28	16	32	4	3	1	3

b. Intermediate

PT stages	Lemma access	Canonical word order	QUE canonical word order	Non-canonical word order			
Structure / informant	Single words; formulas	[QUE^{P} SVO]	QUE [SVO]	COP_{QUE} SUBJ Predicate	$HAVE_{QUE}$ SUBJ OBJ	MOD_{QUE} SUBJ V (O)	AUX_{QUE} SUBJ V (O)
M11	3	1	6	3		1	
M12	2	1	3				
M13		1		3	1	4	
M14	2		2			1	
M15	3		4			3	
M16	1	1	4				
M17		1	3	1		1	1
M18	1	1	7	1			
M19	2	1	7		1		
M20	1		1	2		4	2
Total	15	7	37	10	2	14	3

c. High

PT stages	Lemma access	Canonical word order	QUE canonical word order	Non-canonical word order			
Structure / informant	Single words; formulas	[QUE^{P} SVO]	QUE [SVO]	COP_{QUE} SUBJ Predicate	$HAVE_{QUE}$ SUBJ OBJ	MOD_{QUE} SUBJ V (O)	AUX_{QUE} SUBJ V (O)
H01		1	4	2		3	
H02	2	2	5	1			
H03	4	3	10	2		5	1
H04	1	1	9			3	
H05		2	3				1
H06	1		2	1		1	
H07	1	1	4	2		2	
H08	3	1	3	5			1
H09	6	5	4	2		1	
H10	3	2	3	2		2	
Total	21	18	47	17		17	3
NC	4	3	8	1		2	2

It can be seen from Table 4.14a that single words/formulas (Lemma access), as in (53), canonical word order questions (54) and QUE canonical word order questions (55) were widely used by most L informants. Furthermore, L24, L26, L28 and L29 used non-canonical word order structures. For example: the 'COP_{QUE} SUBJ Predicate' structure appeared in L26's and L29's speech data, the '$HAVE_{QUE}$ SUBJ OBJ' structure was used by L28, the 'MOD_{QUE} SUBJ V (O)' structure was used by L24, and the 'AUX_{QUE} SUBJ V (O)' structure, a non-canonical word order, was used by L26 and L28 in this task, as in (56).

(53)	L22	turn 49	teacher?
	L27	turn 47	in future?
		turn 109	one week?
(54)	L30	turn 18	ahh, training football. You are the player of your school team?
		turn 40	you friends give some you umm congratulation to come to Australia?
(55)	L21	turn 98	umm do you want to buy a car in the future?
		turn 102	do you have some plans in your umm in your future?
(56)	L26	turn 37	does your father retire?
	L28	turn 80	have you been to opera house last week last weekend?

The intermediate-level informants produced the 'QUE [SVO]' structure, as in (57) more frequently in the 'topic and comments' task than in the 'meet the partner' and 'spot the differences' tasks. Two informants (M17 and M20) used the 'AUX_{QUE} SUBJ V (O)' structure, as in (58). Most informants in this group also produced examples of the 'COP_{QUE} SUBJ Predicate' and 'MOD_{QUE} SUBJ V (O)' structures in this task, as in (59) and (60).

(57)	M17	turn 74	and did you go out with your friend?
	M18	turn 33	ok. do you have many friends in your high school?
(58)	M17	turn 88	does he give you a lot of support or buy some…
	M20	turn 84	ok, so does everyone else in your family umm just like you admire your mum?
(59)	M11	turn 31	are your friends in Chinese or Australia?
(60)	M20	turn 90	would you spend more time for shopping during your holiday?

Three informants (H03, H05 and H08) showed the emergence of the 'AUX$_{QUE}$ SUBJ V (O)' structure (i.e., non-canonical order) in the 'topic and comments' task. It is important to point out that the high-level informants also produced other question sentences belonging to the highest stage. These include: 'QUE [SVO]', 'COP$_{QUE}$ SUBJ Predicate' and 'MOD$_{QUE}$ SUBJ V (O)' word order questions.

As the above syntax distributional analysis of the 'meet the partner' and 'spot the differences' tasks (+ *here-and-now*) (see Table 4.2 and Table 4.3) and the 'topic and comments' task (- *here-and-now*) (see Table 4.13 and Table 4.14) reveals, almost all informants, regardless of their level, frequently used rising intonations to ask questions in performing these tasks. In the 'topic and comments' task, the informants tended to produce WH-questions to seek information from their partners. The reason behind this might be the different contexts the two tasks involved. For instance, the 'topic and comments' task required each informant to ask his/her partner at least five questions for each given topic (e.g., your last weekend). In order to get as much information as they could, the informants tended to use WH-questions when performing this task, such as *what did you do last weekend?*, *why do you admire your father?, what kind of friends do you like?*, and so forth. In contrast, the aim of the 'meet the partner' and 'spot the differences' tasks was to get the partners to know each other first before the pair worked together to find out the differences between the two pictures. In order to achieve this aim, in most cases each informant told his/her partner about his/her picture and asked if it was the same as the partner's picture. The partner provided short answers (e.g., *Yes*. *Right*. *I have that too*). Thus, this task elicited more yes/no questions, rather than constituent questions. This observation in the current study is consistent with Pienemann's (1998) study in which the 'topic and comments' task generated more WH-question structures than the picture differences tasks, as the latter tasks required more confirmation checks in yes/no question form between learners.

4.3.2 *Planning Time*: Self-paced Picture Description (+ *planning time*)

This task is considered to be cognitively less demanding than the time-defined picture description task (- *planning time*), according to Robinson's Triadic Componential Framework (2007a, 2011b).

a) Morphology: Verb Phrase

The accuracy analysis adopted in this task is the same as the approach to analysing the time-defined Fishfilm task (see Table 4.4). Firstly, the rate of each informant's error-free VPs was calculated. Secondly, the number of each type of VP error was counted for each informant. Table 4.15 summarises the lower-intermediate informants' accuracy analysis for the self-paced picture description task (+ *planning time*).

Table 4.15 Self-paced picture description task (+ *planning time*): VP morphology (Lower-intermediate)

a. Error-free VPs

	Agent-cued (N=15)				Patient-cued (N=15)			
	error-free VP	erroneous VP	Missed	Accuracy rate	error-free VP	erroneous VP	Missed	Accuracy rate
L21	5	10		(.33)	12	2	1	(.80)
L22	2	13		(.13)		15		(0)
L23	6	7	2	(.40)		10	5	(0)
L24	6	9		(.40)	8	7		(.53)
L25	2	13		(.13)	6	9		(.40)
L26	14	1		(.93)	6	8	1	(.40)
L27	9	6		(.60)	5	10		(.33)
L28	4	11		(.26)	5	10		(.33)
L29	14	1		(.93)	12	1	2	(.80)
L30	6	9		(.40)	5	10		(.33)
Total	68	80	2	(.45)	59	82	9	(.39)

b. Breakdown of erroneous VP

	Subject-verb agreement	Lexical	VP agreement			Phonology (ambiguous cases only)	Total errors
			Aux omission (VP no Aux)	Selection of wrong Aux (VP aux)	Aux-verb compatibility		
L21	10	1			1		12
L22	13		4		11		28
L23	11	2			4		17
L24	9	3			4		16
L25	10				12		22
L26		1			8		9
L27	3	6			7		16
L28	8	2	2		9		21
L29		2					2
L30	8	3	4		4		19
Total	72	20	10		60		162

As Table 4.15a shows, six informants in the lower-intermediate level achieved a high accuracy rate in describing the agent-cued eventualities. L22 and L23 failed to produce any error-free VPs in the patient-cued eventualities. L21, L24, L25 and L28 were more accurate in describing the patient-cued eventualities than in describing the agent-cued eventualities. The 10 informants' overall accuracy rate in performing the age-cued eventualities (.45) was slightly higher than their accuracy rate when performing the patient-cued eventualities (.39).

The two rates show that lower-intermediate informants made fewer VP errors in producing active structures than in producing passive structures.

Table 4.15b shows the breakdown of erroneous VP responses for each informant. Eight lower-intermediate informants made errors in using the third person singular form, as in (61). Eight informants used lexically inappropriate verb forms in describing events, as in (62), and nine informants made auxiliary-verb compatibility errors, as in (63). In addition, three informants omitted auxiliary verbs in their descriptions, as in (64).

(61) (L24) the elder play the piano
(62) (L27) umm the TV was umm stole by the thief
(63) (L22) the subway stop by the policeman
(64) (L30) the bus stopped by the policeman

Table 4.16 Self-paced picture description task (+ *planning time*): VP morphology (Intermediate)

a. Error-free VPs

	Agent-cued (N=15)				Patient-cued (N=15)			
	error-free VP	erroneous VP	Missed	Accuracy rate	error-free VP	erroneous VP	Missed	Accuracy rate
M11	5	10		(.33)	6	7	2	(.40)
M12	6	9		(.40)	5	10		(.33)
M13	10	5		(.67)	11	4		(.73)
M14	15			(1)	13	2		(.87)
M15	12	3		(.80)	10	5		(.67)
M16	15			(1)	10	5		(.67)
M17	15			(1)	9	6		(.60)
M18	15			(1)	10	5		(.67)
M19	11	4		(.73)	11	3	1	(.73)
M20	13	2		(.87)	9	6		(.60)
Total	117	33		(.78)	94	53	3	(.63)

b. Breakdown of erroneous VP

	Subject-verb agreement	Lexical	VP agreement			Phonology (ambiguous cases only)	Total errors
			Aux omission (VP no Aux)	Selection of wrong Aux (VP aux)	Aux-verb compatibility		
M11	8	2			7		17
M12	8		1	2	8		19
M13	2	6			1		9
M14		2					2
M15	1	5			2		8
M16					5		5
M17					6		6
M18		3			2		5
M19	2	3			2		7
M20	1	3	1		3		8
Total	22	24	2	2	36		86

As shown in Table 4.16a, seven intermediate informants achieved higher accuracy rates in describing the agent-cued eventualities than in describing the patient-cued eventualities. On the other hand, M11 and M13 had slightly higher VP accuracy rates when describing the patient-cued eventualities than when describing the agent-cued eventualities. M19 did not show any difference in accuracy rate (.73) when describing the two types of eventualities. The 10 intermediate informants were more accurate in producing active structures (.78) than passive structures (.63).

The analysis of intermediate informants' erroneous VPs shows that these informants mainly made errors concerning the third person singular form, as in (65); the use of wrong verb form, as in (66); and aux-verb compatibility, as in (67). One informant, M12, selected the wrong auxiliary verb when describing events, as in (68). M12 and M20 omitted auxiliary verbs once each, as in (69).

(65) (M11) the girl touch the rabbit
(66) (M13) the colour ball was catched by a dog
(67) (M12) the microwave was steal by a man
(68) (M12) the ball was be..was be bake was be broken by a wood
(69) (M12) the mouse eating the cheese
(M20) A wall just painted by a woman with red colour

Table 4.17 Self-paced picture description task (+ *planning time*): VP morphology (High)

a. Error-free VPs

	Agent-cued (N=15)				Patient-cued (N=15)			
	error-free VP	erroneous VP	Missed	Accuracy rate	error-free VP	erroneous VP	Missed	Accuracy rate
H01	15			(1)	13	2		(.87)
H02	14	1		(.93)	13	2		(.87)
H03	14	1		(.93)	12	3		(.80)
H04	15			(1)	6	9		(.40)
H05	15			(1)	13	2		(.87)
H06	15			(1)	6	9		(.40)
H07	15			(1)	15			(1)
H08	14	1		(.93)	13	2		(.87)
H09	14	1		(.93)	15			(1)
H10	15			(.93)	15			(1)
Total	146	4		(.97)	121	29		(.81)
NC	15			(1)	15			(1)

b. Breakdown of erroneous VP

	Subject-verb agreement	Lexical	VP agreement			Phonology (ambiguous cases only)	Total errors
			Aux omission (VP no Aux)	Selection of wrong Aux (VP aux)	Aux-verb compatibility		
H01					2		2
H02		1			2		3
H03		3			1		4
H04		2			7		9
H05		1			1		2
H06		6			3		9
H07							0
H08		1			2		3
H09		1					1
H10							0
Total		15			18		33
NC							0

Table 4.17a shows that seven high-level informants achieved higher accuracy rates when describing agent-cued eventualities than they did when describing patient-cued eventualities. H07 uttered 15 error-free VPs for each eventuality (1.0) in describing the two types of eventualities. H09 and H10 had 14 accurate utterances (.93) when performing the agent-cued eventualities and 15 accurate utterances (1.0) in describing the patient-cued eventualities. The 10 high-level informants had higher accuracy rates when producing active structures (.97) than when producing passive structures (.81).

We can see from the analysis of erroneous VP responses that high-level informants did not make any subject-verb agreement errors. The main errors this group of informants made were in the use of wrong verb forms, as in (70), and in aux-verb compatibility, as in (71).

(70) (H06) the pencil <u>was brokened by</u> a hand
(71) (H04) a basket of flower <u>was holding by</u> a rabbit

To conclude, the lower-intermediate informants made 72 errors on subject-verb agreement, the intermediate informants made 22 errors, and the high-level informants made no errors. Regarding the aux-verb compatibility (VP agreement), lower-intermediate informants made 60 errors, intermediate informants 36 errors, and high-level informants 18 errors. It is evident that there was a significant improvement at the higher two levels. As for the informants' errors concerning choosing the wrong verb form (e.g., *shooted*, *catched*), a strong and positive improvement was not found at the higher levels. For instance, lower-intermediate informants made 20 errors, intermediate informants 24 errors and high-level informants 15

errors. It needs to be mentioned that this category of verb forms is not related to PT stages; rather, they are lexically defined.

b) Syntax: Argument-function mapping

Table 4.18 summarises the 30 informants' syntactic stages in the self-paced picture description task (+ *planning time*). The numbers in brackets refer to the numbers of mappings which conveyed incorrect information.

Table 4.18 Self-paced picture description task (+ *planning time*): syntax

a. Lower-intermediate

Informant	Agent-cued (N=15) (Active expected)			Patient-cued (N=15) (Passive expected)		
	active	passive	missed	active	passive	missed
L21	15				14	1
L22	15			(1)	14	
L23	15			9 (2)	4	
L24	15				15	
L25	15			2 (1)	12	
L26	15			2	12	1
L27	15				15	
L28	15			1	14	
L29	15			1	12	2
L30	15			2	13	
Total	150			17 (4)	125	4

b. Intermediate

Informant	Agent-cued (N=15) (Active expected)			Patient-cued (N=15) (Passive expected)		
	active	passive	missed	active	passive	missed
M11	15			2 (1)	10	2
M12	15			2	13	
M13	15				15	
M14	15			1	14	
M15	15				15	
M16	15				15	
M17	15				15	
M18	15				15	
M19	15			(1)	14	
M20	15				15	
Total	150			5 (2)	141	2

c. High

Informant	Agent-cued (N=15) (Active expected)			Patient-cued (N=15) (Passive expected)		
	active	passive	missed	active	passive	missed
H01	15				15	
H02	15				15	
H03	15			1	14	
H04	15			1	14	
H05	15				15	
H06	15			3	12	
H07	15				15	
H08	15				15	
H09	15				15	
H10	14	1			15	
Total	149	1		5	145	
NC	15				15	

We can see from Table 4.18 that almost all informants, 29 out of 30, produced 15 active voice structures which were pragmatically compatible. The only exception was H10 who produced one passive structure out of 15 when an active structure was expected. Therefore, we can say that in this self-paced task all informants regardless of their proficiency level were able to cope with active structures reflecting pragmatic cues by mapping agents onto subjects, a task which requires canonical mapping.

With regard to the patient-cued eventualities, there were some differences according to proficiency level, although all informants except L23 produced more than 10 passive structures out of 15. L23 produced four passive structures. Three informants at the lower-intermediate level (L21, L26 and L29) and one at the intermediate level failed to describe at least one patient-cued eventuality. All high proficiency level informants performed this task successfully.

4.3.3. *Planning Time*: Time-defined Picture Description (- *planning time*)

a) Morphology: Verb Phrase

Tables 4.19 to 4.21 present the VP analysis according to the level of the informants. For each informant the numbers in the columns record their: error-free VPs, erroneous VPs, missed cases when they performed the agent-cued and patient-cued eventualities. The numbers in brackets show the informants' accuracy rates for the agent-cued and patient-cued responses. The breakdown of each informant's erroneous VPs is presented below as well. The numbers in Table 4.19b, Table 4.20b and Table 4.21b indicate the frequency of each type of error that the informant made. A blank cell shows that no such errors were found in the informant's speech data.

Table 4.19 Time-defined picture description task (- *planning time*): VP morphology (Lower-intermediate)

a. Error-free VPs

	Agent-cued (N=15)				Patient-cued (N=15)			
	error-free VP	erroneous VP	Missed	Accuracy rate	error-free VP	erroneous VP	Missed	Accuracy rate
L21	2	8	5	(.13)	9	3	3	(.60)
L22	2	10	3	(.13)	1	10	4	(.07)
L23	4	5	6	(.27)	1	4	10	(.07)
L24	4	8	3	(.27)	6	6	3	(.40)
L25	5	10		(.33)	5	8	2	(.33)
L26	11	2	2	(.73)	2	12	1	(.13)
L27	7	8		(.47)	6	7	2	(.40)
L28	1	14		(.07)	5	8	2	(.33)
L29	6	3	6	(.40)	6	1	8	(.40)
L30	1	14		(.07)	4	10	1	(.27)
Total	43	82	25	(.29)	45	69	36	(.30)

b. Breakdown of erroneous VP

	Subject-verb agreement	Lexical	VP agreement			Phonology (ambiguous cases only)	Total errors
			Aux omission (VP no Aux)	Selection of wrong Aux (VP aux)	Aux-verb compatibility		
L21	8	3					11
L22	9				11		20
L23	5	4					9
L24	7	1	1		5		14
L25	6	3			9		18
L26		4			10		14
L27	6	4			5		15
L28	8	2	2		10		22
L29	2				2		4
L30	11	2	4		7		24
Total	62	23	7		59		151

It can be seen from Table 4.19a that the number of lower-intermediate informants who produced error-free VPs was quite low for both agent-cued and patient-cued eventualities. In fact, only one, L26, achieved a VP accuracy rate of more than 50% with agent-cued eventualities, and only L21 achieved a VP accuracy rate of more than 50% with patient-cued eventualities. Overall, the 10 lower-intermediate informants had a slightly higher accuracy rate in producing passives (.30) than in producing actives (.29).

The analysis of erroneous VP shows that all lower-intermediate informants except L26 made errors in using the third person singular form, as in (72). They also chose inappropriate verb forms to describe events, as in (73). In addition, all informants except L21 and L23 made aux-verb incompatibility errors in describing eventualities, as in (74).

(72) L21 a man take money

L30 the man umm take take a baby

(73) L26 the green bottle was hitten by ball
L27 a bread was ate by the man
L30 the thief stolen a lot of money from a box

(74) L22 the horse is played a ball
L26 a girl is kissing by a man
L28 the car was stop by a policeman
L30 the woman kiss is kiss by a man

Table 4.20 Time-defined picture description task (- *planning time*): VP morphology (Intermediate)

a. Error-free VPs

	Agent-cued (N=15)				Patient-cued (N=15)			
	error-free VP	erroneous VP	Missed	Accuracy rate	error-free VP	erroneous VP	Missed	Accuracy rate
M11	6	6	3	(.40)	7	4	4	(.47)
M12	8	6	1	(.53)	5	9	1	(.33)
M13	11	4		(.73)	8	7		(.53)
M14	6	5	4	(.40)	8	6	1	(.53)
M15	14	1		(.93)	8	5	2	(.53)
M16	15			(1)	9	6		(.60)
M17	13	2		(.87)	11	4		(.73)
M18	13	2		(.87)	10	5		(.67)
M19	6	6	3	(.40)	8	3	4	(.53)
M20	11	4		(.73)	11	4		(.73)
Total	103	36	11	(.69)	85	53	12	(.57)

b. Breakdown of erroneous VP

	Subject-verb agreement	Lexical	VP agreement			Phonology (ambiguous cases only)	Total errors
			Aux omission (VP no Aux)	Selection of wrong Aux (VP aux)	Aux-verb compatibility		
M11	3	3	2		2		10
M12	4	1			10		15
M13	3	3			5		11
M14	4	5			2		11
M15		4			2		6
M16					6		6
M17	1	1			4		6
M18		2	1		4		7
M19	5	4					9
M20	2	4		1	1		8
Total	22	27	3	1	36		89

As shown in Table 4.20a, six intermediate informants had a higher accuracy rate in describing the agent-cued eventualities than in describing the patient-cued eventualities. Another three informants (M11, M14 and M19) showed higher accuracy rates in performing patient-cued eventualities. M20 had an equal accuracy percentage (.73) in performing the two

types of eventualities. Overall, the 10 intermediate informants were more accurate in producing active structures (.69) than in producing passive structures (.57).

The analysis of erroneous VP responses, as Table 4.20b presents, shows that seven intermediate informants made mistakes in using the third person singular form in their descriptions of eventualities. Nine intermediate informants had difficulty forming the past participle of certain verbs, and produced incorrect verb forms, as in (75). In addition, almost all informants made aux-verb compatibility errors, as in (76).

(75) M15 a ball was threw umm by a man player
(76) M12 the woman was kiss by a boy

Table 4.21 Time-defined picture description task (- *planning time*): VP morphology (High)

a. Error-free VPs

	Agent-cued (N=15)				Patient-cued (N=15)			
	error-free VP	erroneous VP	Missed	Accuracy rate	error-free VP	erroneous VP	Missed	Accuracy rate
H01	15			(1)	14	1		(.93)
H02	14	1		(.93)	13	2		(.87)
H03	14	1		(.93)	12	3		(.73)
H04	14	1		(.93)	12	3		(.80)
H05	15			(1)	12	3		(.80)
H06	14		1	(.93)	7	8		(.47)
H07	13		2	(.87)	14	1		(.93)
H08	13	1	1	(.87)	11	4		(.73)
H09	13		2	(.87)	11	3	1	(.73)
H10	13	2		(.87)	14	1		(.93)
Total	138	6	6	(.92)	120	29	1	(.80)
NC	15			(1)	15			(1)

b. Breakdown of erroneous VP

	Subject-verb agreement	Lexical	VP agreement			Phonology (ambiguous cases only)	Total errors
			Aux omission (VP no Aux)	Selection of wrong Aux (VP aux)	Aux-verb compatibility		
H01					1		1
H02		1			2		3
H03		3			1		4
H04		1	1		2		4
H05		1			2		3
H06					8		8
H07					1		1
H08		2			3		5
H09		1	1		1		3
H10		2			1		3
Total		11	2		22		35
NC							0

Eight high-level informants (H01, H02, H03, H04, H05, H06, H08 and H09) were more accurate in describing the agent-cued eventualities than in the patient-cued eventualities. H07 and H10 both had a slightly higher accuracy rates (.93) in the patient-cued eventualities than in the agent-cued eventualities (.87). Overall, the 10 high-level informants had a higher accuracy rate in producing active structures (.92) than passive structures (.80).

High-level informants, such as H03, H08 and H10, used incorrect past participle forms (e.g. *shooted*) of a certain verb (e.g., *shoot*) in describing eventualities, as in (77). Also, all informants made auxiliary-verb compatibility errors, as in (78).

(77) H05 the bird has been sho. shooted by an arrow
H06 the flyer is being hitted by a arrow

(78) H07 a ball is kicking by a boy
H09 the man the basketball is shoot by the man

The above examples show that the lower-intermediate informants made 62 errors in using the third person singular form, the intermediate informants made 22 errors, and the high-level informants did not make any subject-verb agreement errors. Moreover, all informants at all the three levels made aux-verb compatibility errors (VP agreements). Lower-intermediate informants made 59 errors, intermediate informants 36 errors, and high-level informants 22 errors. In addition, on seven occasions lower-intermediate informants did not provide auxiliary verbs where they are necessary, intermediate informants three times and high-level informants twice. All these numbers suggest that informants improve when they go to a higher level. Moreover, all levels of informants chose inappropriate verb forms (e.g., *hitted*) when they described events, with lower-intermediate informants making 23 errors, intermediate informants 27 errors and high-level informants 11 errors. No significant improvement was observed across levels in regard to this lexically-defined error type.

b) Syntax: Argument-function Mapping

Table 4.22 records the 30 informants' argument-grammatical function mappings in the 15 agent-cued and 15 patient-cued eventualities. The numbers of utterances that conveyed wrong information are listed in brackets.

Table 4.22 Time-defined picture description task (- *planning time*): syntax

a. Lower-intermediate

Informant	Agent-cued (N=15) (Active expected)			Patient-cued (N=15) (Passive expected)		
	active	passive	missed	active	passive	missed
L21	10		5		12	3
L22	12		3	(1)	10	4
L23	8	(1)	6	2 (2)	1	10
L24	12		3		12	3
L25	15			1 (1)	11	2
L26	13		2	1	13	1
L27	15				13	2
L28	15				15	
L29	9		6	6 (2)	3	4
L30	15			2	12	1
Total	124	(1)	25	12 (6)	102	30

b. Intermediate

Informant	Agent-cued (N=15) (Active expected)			Patient-cued (N=15) (Passive expected)		
	active	passive	missed	active	passive	missed
M11	12		3		11	4
M12	13	(1)	1		14	1
M13	15			(1)	14	
M14	10	(1)	4	2	12	1
M15	15				13	2
M16	15			3	12	
M17	15			1	14	
M18	15			2	13	
M19	11	1	3	1 (1)	9	4
M20	15				15	
Total	136	1 (2)	11	9 (2)	127	12

c. High

Informant	Agent-cued (N=15) (Active expected)			Patient-cued (N=15) (Passive expected)		
	active	passive	missed	active	passive	missed
H01	15			1	14	
H02	15				15	
H03	15			2	13	
H04	15				14	1
H05	15			1	14	
H06	13	1	1	2	13	
H07	15				15	
H08	15				15	
H09	15				14	1
H10	15				15	
Total	148	1	1	6	142	2
NC	15				15	

As seen from Table 4.22a, regarding agent-cue eventualities, all the lower-intermediate informants produced at least eight active structures out of 15 contexts. Six informants failed to describe several events. L21 failed to describe five eventualities. L23 and L29 each failed

to describe six eventualities, and L23 produced one structure which conveyed incorrect information, as in (79).

(79) (describing an eventuality of a robber stealing money)
L23 the thief is stool by the money

Regarding the passive-cued eventualities, eight lower-intermediate informants produced 10 or more passive structures. L23 produced one passive structure successfully, as in (80), but he failed to describe 10 eventualities, as in (81). L23 used four active structures to describe the patient-cued eventualities, as in (82). Among the four active structures that L23 produced, two of which conveyed wrong information, as in (83). Similar to L23, L29 produced three passives and eight active structures (containing two pragmatically incorrect utterances) and missed four eventualities. In addition, all lower-intermediate informants except one (L28) failed to describe at least one eventuality.

(80) (describing an eventuality of a ball breaking a bottle)
L23 the bottle was broken by the ball

(81) (describing an eventuality of a boy playing a guitar)
L23 the guitar is playing...

(82) (describing an eventuality of a painter painting a fence)
L23 the wall before is the white colour but the man is painting red colour
(describing an eventuality of a woman cuddling a cat)
L23 the cat was in lady's hand

(83) (describing an eventuality of a boy kicking a ball)
L23 the football shooting the man

(describing an eventuality of a man eating a hamburger)
L23 the hungry jack is going to the man's now

As we may recall, L23 produced four passive structures in the self-paced picture description task (see Table 4.18) and one passive structure in the time-defined picture description task. The difference between the frequency counts for instances in which passive structures were expected in the two tasks indicates that L23 was able to produce passives, but the ± *planning time* variables affected his syntactic performance.

Each intermediate informant produced over 10 actives out of 15 contexts and they produced a total of 136 active structures. Four informants failed to describe one or more agent-cued

eventualities. When describing the agent-cued eventualities, M12 and M14 produced one structure each which conveyed incorrect information, as shown in (84).

(84) (describing an eventuality of a horse kicking a ball)
M14 a horse is hitten by a football

The total number of passive structures produced by this group of informants was 127 and each informant uttered nine or more passives. Five informants missed at least one patient-cued eventuality.

All high-level informants produced 13 or more active structures out of 15 contexts in describing the agent-cued eventualities. The total number of active structures produced by the ten informants was 148 out of 150 contexts. The ten informants produced a total number of 142 passives, with 13 or more passive structures per informant. Four informants missed one or two agent-cued eventualities, but only two informants missed one patient-cued eventuality each.

In conclusion, the number of structures faithful to the pragmatic information increased as the level of proficiency level of the informants increased, and the number of missed cases decreased as the proficiency level increased. For instance, in the time-defined picture description task (- *planning time*) lower-intermediate informants produced 102 pragmatically appropriate passive structures, intermediate informers produced 127 and high-level informants produced 142.

4.4 Chapter Summary

This chapter has presented the results for each set of tasks. The results of the profiling tasks were analysed to identify the informants' morphological and syntactic stages. The informants' morphological and syntactic stages in the three quasi-experimental tasks were also analysed. Discussion around each research question is presented in the next chapter.

Chapter 5 Discussion

In the previous chapter, the results for each set of tasks were presented. This chapter integrates all the results for a discussion of performance, competence and task modality. As we may recall, the small differentiation between lower-intermediate informants (IELTS scores 4-4.5) and intermediate informants (IELTS scores 5-5.5) is not sufficient to make a distinctive proficiency difference. Moreover, some informants of lower-level have a larger vocabulary size than the informants of higher-levels. For example, L30's vocabulary size is larger than that of M20 and H05. Thus, in order to make extreme differentiation among the three proficiency levels and be able to answer the research questions precisely, results for the five most representative informants for each level are selected for this discussion. These informants are the lowest five of the lower-intermediate level (L21-L25), the middle five of the intermediate level (M13-M17) and the highest five of the high level (H06-H10). Section 5.1 addresses the informants' morphological performance and morphological stages across tasks. Section 5.2 addresses each informant's syntactic performance and syntactic stages across tasks. Section 5.3 addresses the issue of the two task modes, speaking and writing. Finally, Section 5.4 concludes the main findings concerning each research question. Chapter 6 will answer each research question based on the discussion in Chapter 5.

5.1 Morphology

Morphological rule application, that is, the application of a particular morpheme in the obligatory context, was used to measure the informants' performances across tasks. To investigate competence across tasks, each informant's morphological developmental stage as defined by PT was compared across tasks.

5.1.1 Performance

a) (± *Here-and-Now*) 'Meet the Partner' and 'Spot the Differences' Tasks and 'Topic and Comments' Task

Table 5.1 compares the 15 informants' rule applications of the pasted *–ed* form, the noun plural form and the third person singular form between the 'meet the partner' and 'spot the differences' tasks (+ *here-and-now*) and the 'topic and comments' task (- *here-and-now*). Rule application analysis for all 30 informants' is presented in Appendix K. As Table 5.1

shows, most informants provided the past *–ed* form and the third person singular form less than five times. According to Pienemann (1998), when the application of a particular morpheme is less than 5 occurrences, the calculation of rule application rate becomes less meaningful (e.g., 1/2 = 0.5, 2/2 = 1). Thus, due to the low reliability it would involve, in Figure 5.1, the rule application of such instances is not presented when the occurrence of a given morphological structure is below 5 times.

Table 5.1 Rule application comparison with ± *here-and-now* variables

		'Meet the partner' and 'spot the differences' tasks				'Topic and comments' task			
	vocabulary size	past-*ed*	pl *–s* (lexical)	pl *–s* (phrasal)	3rd person singular	past-*ed*	pl *–s* (lexical)	pl *–s* (phrasal)	3rd person singular
L21	3,700		7/8 (.89)	2/7 (.29)					
L22	3,800		11/11 (1)	3/6 (.50)	0/8 (0)			2/6 (.33)	
L23	4,500		3/5 (.60)	8/9 (.89)					
L24	4,600		11/11 (1)	8/9 (.89)			9/9 (1)	11/14 (.79)	
L25	4,600		8/8 (1)	7/7 (1)	0/5 (0)				
M13	5,900	4/5 (.80)	13/16 (.81)	14/15 (.93)	1/5 (.20)	6/11 (.55)	13/16 (.81)	10/13 (.77)	2/9 (.22)
M14	6,300			6/9 (.67)			12/12 (1)	4/6 (.67)	
M15	6,600		9/14 (.64)	5/7 (.71)			7/8 (.89)	5/7 (.71)	
M16	7,200		11/14 (.79)	10/12 (.83)			9/9 (1)	4/6 (.67)	
M17	7,200		7/8 (.89)	7/7 (1)				4/5 (.80)	3/5 (.60)
H06	8,300		11/12 (.92)	11/11 (1)			4/5 (.80)	5/5 (1)	5/6 (.83)
H07	9,400		15/15 (1)	19/19 (1)			16/17 (.94)	10/10 (1)	6/6 (1)
H08	10,200		15/19 (.79)	6/7 (.86)				7/7 (1)	
H09	10,600		14/15 (.93)	11/14 (.79)			10/10 (1)		
H10	10,800		19/20 (.95)	12/13 (.92)		10/11 (.91)	19/20 (.95)	17/17 (1)	5/5 (1)
NS	13,700		16/16 (1)	8/8 (1)	8/8 (1)	6/6 (1)		11/11 (1)	11/11 (1)

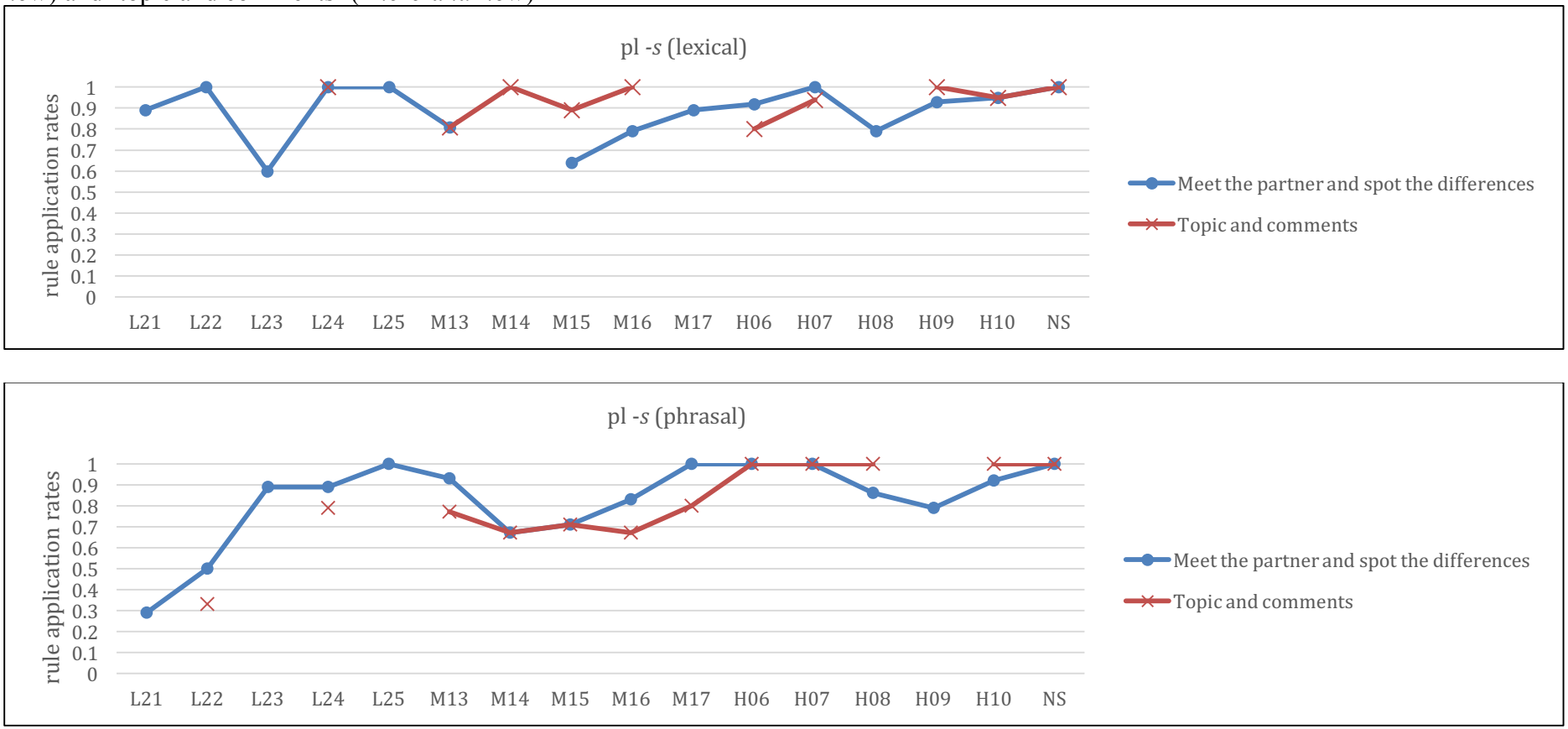
The number before the slash ('/') indicates frequency count of application of the morphology while the number after the slash shows the context for that morphological structure. The number in the bracket indicates the rate of application.
* M11 produced 'looks' three times.

Figure 5.1 compares two ± *here-and-now* tasks in terms of the rate of application of plural *–s* (lexica morphology) and plural *–s* with agreement (phrasal morphology) for each informant. It can be seen that lower-intermediate informants, except for L24, did not provide many plural *–s* (lexical) forms with the 'topic and comments' task (- *here-and-now*). Higher application rates of the plural *–s* (lexical) can be found when the intermediate informants performed the same task. However, when performing the 'meet the partner' and 'spot the difference' tasks (+ *here-and-now*), the informants of the lower-intermediate and intermediate levels tended to have higher application rates for plural *–s* (phrasal) than when they performed the 'topic and comments' task (- *here-and-now*). The reason might be that the lower-intermediate informants had difficulty processing morphological encoding as the cognitive load of the task was increased and the processing (agreement within NP) demand became heavier at the same time when they performed the 'topic and comments' task (- *here-*

and-now). This result lends support to Skehan's (1998, 2014) Limited Capacity Hypothesis, which states that learners' accuracy tends to decrease as tasks become more difficult. A trade-off effect between accuracy and complexity is observed for the two levels as they process plural *–s* (phrasal) morphemes. As for the high-level informants, the results for the rule application do not show much difference between the two tasks. In addition, higher application rates for the two morphological forms (i.e., plural *-s* (lexical) and plural *-s* (phrasal)), can be observed from the informants of high-level than from the informants of the other two levels, especially when they performed the 'topic and comments' task (- *here-and-now*), a more cognitively complex task. These results lend support to the hypothesis that the high informants possess more automated processing (Coppieters, 1987; Cranshaw, 1997; Montrul & Slabakova, 2003; Kawaguchi & Ma, 2012).

When the informants performed the tasks manipulated ± *here-and-now* variables, the different application rates of plural *–s* the informants demonstrated suggest that task complexity has influenced their performance. Task sequence should be considered when teachers and educators design syllabus or when they use tasks in an L2 classroom. Robinson (2009) states tasks should be sequenced in an order from simple tasks to complex tasks for learners to perform. Performing in this type of sequence rather than other types of sequences, language learners can gradually achieve their language development. The results of this study confirm Robinson's statement on task sequence for syllabus design. The 'meet the partner' and 'spot the difference' tasks (+ *here-and-now*) accompanies a higher application rate than that of the 'topic and comments' task (- *here-and-now*). If we gradually increase the complexity of a task, learners will automate their processing procedure, like the high informants of this study.

Figure 5.1 Rule application rates of a lexical and a phrasal morpheme in the two tasks: 'meet the partner' & 'spot the differences' (+ *here-and-now*) and 'topic and comments' (- *here-and-now*)



b) (± *Planning Time*) Self-paced Picture Description Task and Time-defined Picture Description Task

Another variable for task complexity that we tested was ± *planning time*. Figure 5.2 presents the 15 most representative informants' application rates for VP constructions when they performed the agent-cued and patient-cued eventualities for the self-paced picture description task (+ *planning time*) and the time-defined picture description task (– *planning time*). Each value in these two figures is based on Tables 4.15–4.17 and Tables 4.19–4.21 of Chapter 4. Figure 5.3 summarises VP accuracy rates according to the informant proficiency level.

As Figure 5.2 shows, most informants were more accurate in producing both active and passive structures when planning time was provided than when planning time was withdrawn. The study confirms that learners' accuracy rates improve when they have planning time (Ellis & Barkhuizen, 2005; Skehan, 2014; Yuan & Ellis, 2003). Figures 5.3a and 5.3b show group values according to the three different levels (i.e., lower-intermediate, intermediate and high levels). We can see a difference in accuracy rates between the three levels. The accuracy rates for the informants in the lower-intermediate level are far lower than for the informants in the other two levels, while the high-level informants were the most accurate. The trend shows that the informants' performances improved as their language competence developed. Figures 5.3a and 5.3b also show the results for the groups of informants when they performed the two tasks that manipulated ± *planning time* variables. For lower-intermediate informants there was a relatively small gap between the VP construction accuracy rates across different cognitive complexities for the two tasks, while for intermediate and high-level informants the accuracy rate gaps were bigger. This suggests that informants from higher proficiency levels can benefit more from having planning time. This result is consistent with studies (Tavakoli & Skehan, 2005; Wiggleworth, 1997) investigating the interaction of planning conditions on L2 performance and learners' proficiency levels. The high-proficiency learners benefit more from having planning time when performing tasks.

The beneficial effect of planning time on L2 learners' task performance is that learners can conceptualise and encoding language and grammatical information in an easy pace, thus, they can perform tasks with the most confidence (Foster, Tonkyn & Wigglesworth, 2000; Philp, Oliver & Mackey, 2006; Wigglesworth & Elder, 2010). Providing planning time to task performers can be adopted in L2 classroom for language assessment (Bachman, 2000; Brown & Hudson, 1998; Graves & Xu, 2000; Wigglesworth, 1997). For example, when learners

practise the tasks of VP constructions (e.g., the self-paced picture description task, the time-defined picture description task), the amount of planning time provided to learners can be gradually reduced by the classroom teacher. The teacher can record his/her students' performance when they have carried out tasks under different planning time conditions. Afterwards, the teacher can assess each student's performance of VP constructions and gain a clear picture of what achievement each student arrives at.

Figure 5.2 Accuracy analysis of VP in self-paced task (+ *planning time*) and time-defined task (*-planning time*)

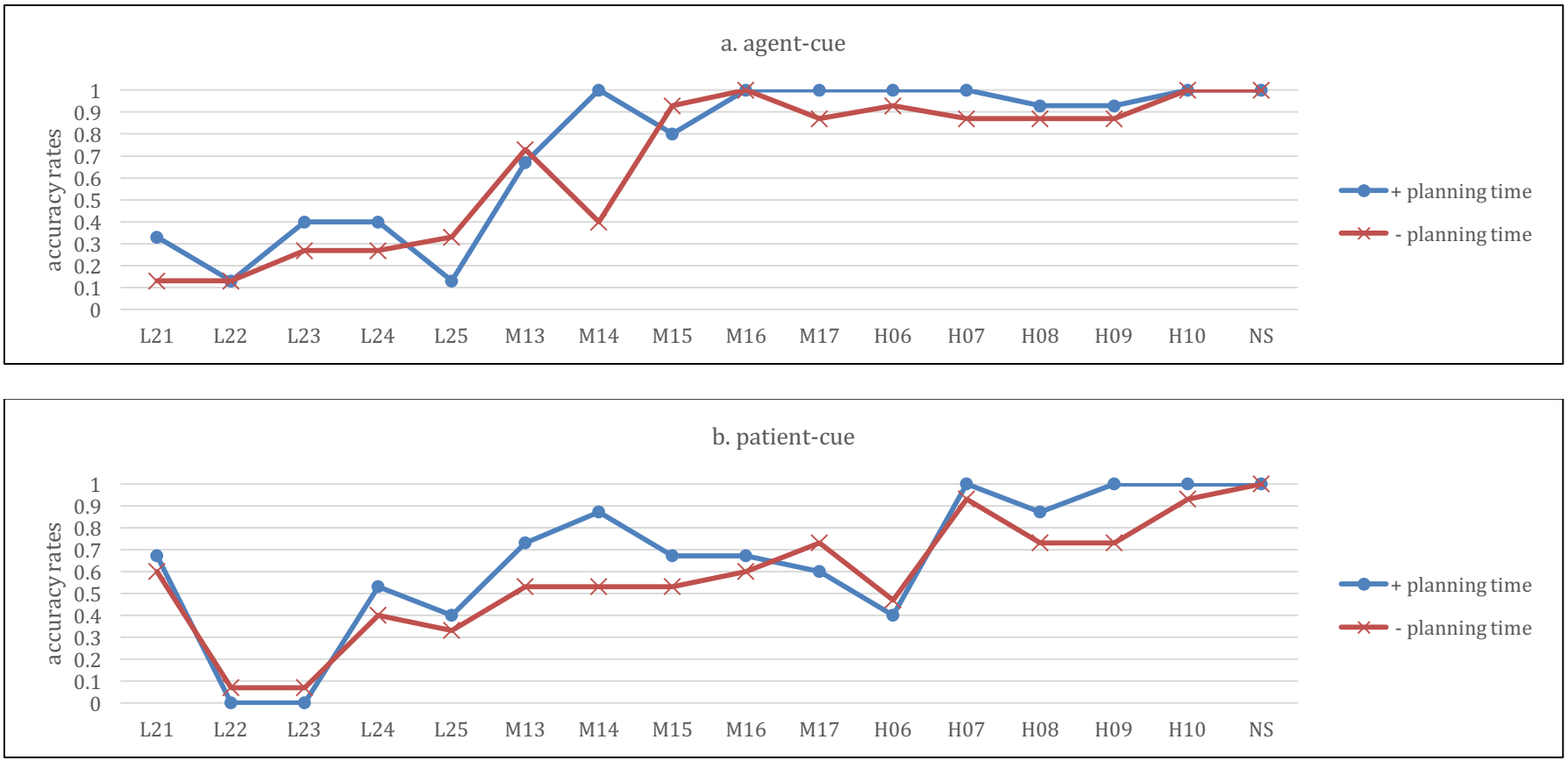
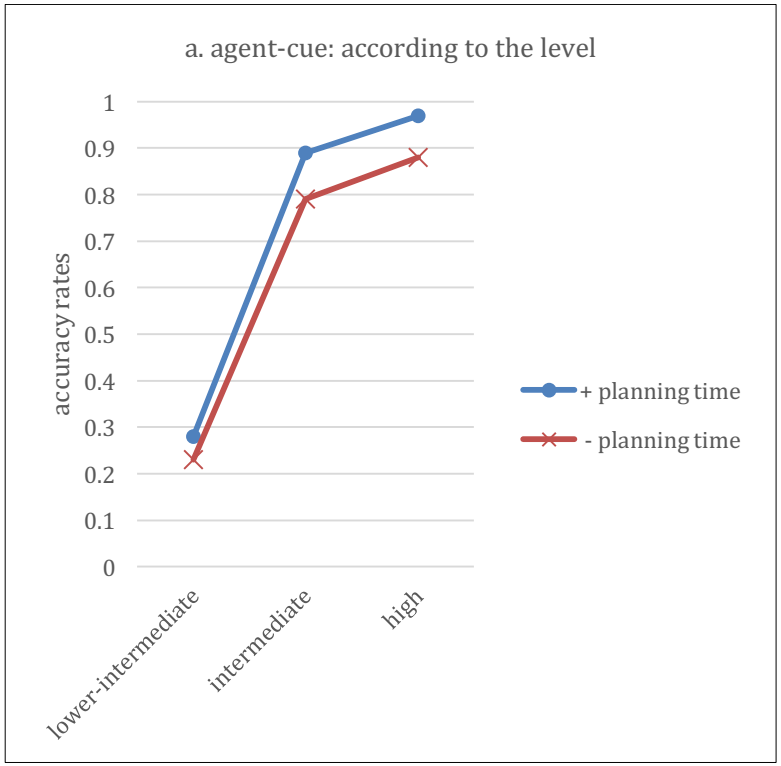
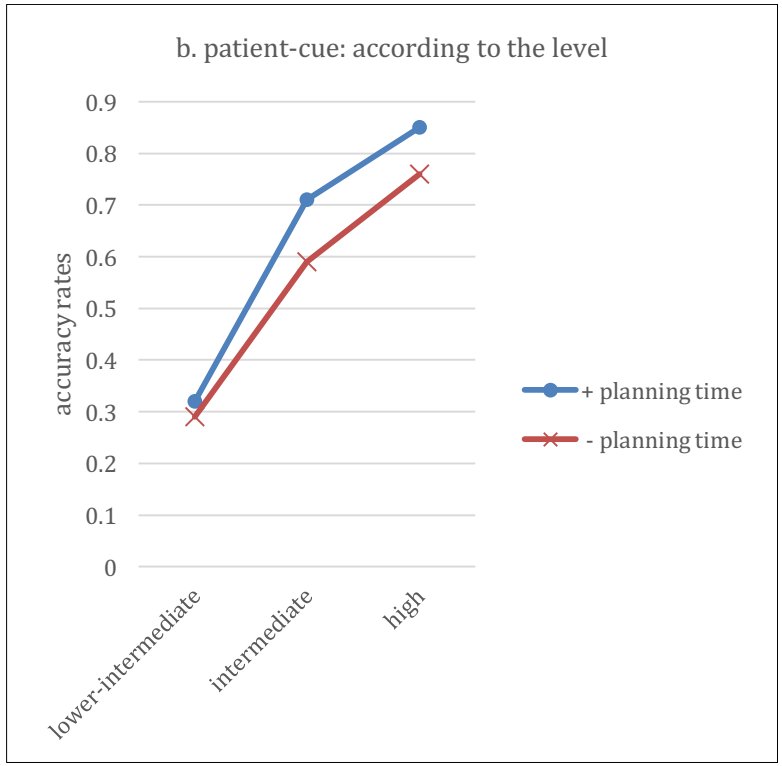


Figure 5.3 Accuracy analysis of VP (± *planning time*) according to the level





5.1.2 Competence

a) (± *Here-and-Now*) 'Meet the Partner' and 'Spot the Differences' Tasks and 'Topic and Comments' Task

Based on the results presented in Table 4.1 and Table 4.12 in Chapter 4, Table 5.2 was created by applying PT emergence criteria. In this study, a learner's 'competence' is defined by their PT stages. In the table, '+' indicates that a particular morphological stage was acquired while '-' indicates the stage was not acquired based on PT's acquisition criterion. It needs to mention that not all structures at a given stage need to emerge. For example, if a learner shows the application of "be + V-ing" or "modal + V" in his/her speech data, but the structure of "have + V-ed" has not emerged, we can still state that this learner reaches the VP stage defined by PT.

Figure 5.4 shows the 15 informants' morphological stages measured by PT across tasks.[13] Almost all informants remained at exactly the same morphological stage when they performed the two cognitively different tasks of ± *here-and-now* variables, except for M13 and M17 (one stage apart), which may be within an error margin. This result provides evidence to support PT's Steadiness Hypothesis, which predicts that a learner's IL system will remain stable across tasks as long as the tasks test the same skill type. The results of this study relating to L2 morphology show that the informants' IL competence did not vary but their performances did. It is also noticed that most lower-intermediate and intermediate informants remained at the VP stage and the high-level informants were at the inter-phrasal stage. The developmental stages of the informants across the three levels also provide evidence to support Pienemann's (2002) procedural skill hypothesis, which proposes that the acquisition of an L2 'is based on the acquisition of the procedural skills needed for the processing of the language' (p. 43).

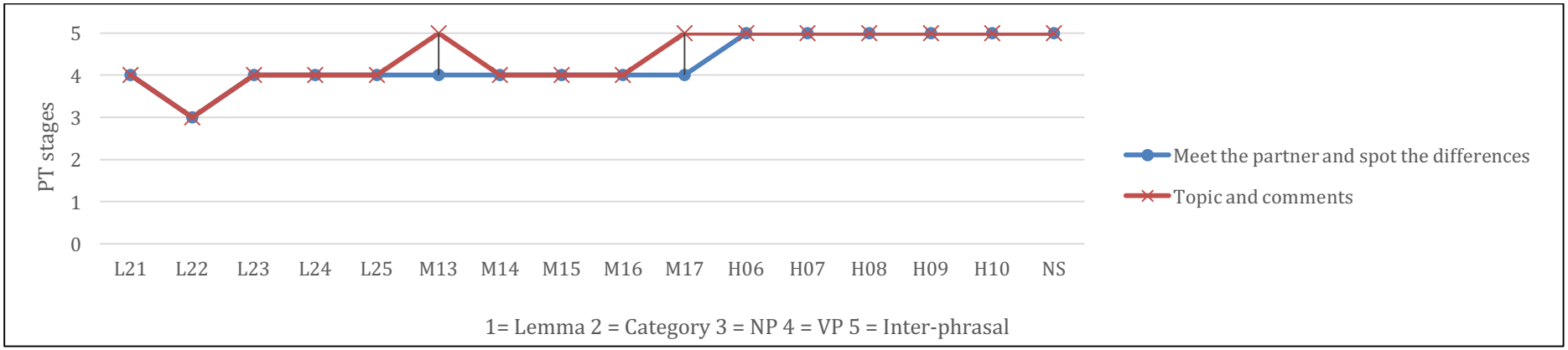
[13] See Appendix L for the all 30 informants' morphological stages.

Table 5.2 Informants' PT stages of morphology: 'meet the partner' and 'spot the differences' tasks (+ *Here-and-Now*) and 'topic and comments' task (- *Here-and-Now*)

'Meet the partner' and 'spot the differences' Task					
	Lemma access	Category procedure	NP procedure	VP procedure	Sentence procedure
L22	+	+	+	-	-
L21	+	+	+	+	-
L23	+	+	+	+	-
L24	+	+	+	+	-
L25	+	+	+	+	-
M13	+	+	+	+	-
M14	+	+	+	+	-
M15	+	+	+	+	-
M16	+	+	+	+	-
M17	+	+	+	+	-
H06	+	+	+	+	+
H07	+	+	+	+	+
H08	+	+	+	+	+
H09	+	+	+	+	+
H10	+	+	+	+	+
NS	+	+	+	+	+

'Topic and Comments' Task					
	Lemma access	Category procedure	NP procedure	VP procedure	Sentence procedure
L22	+	+	+	-	-
L21	+	+	+	+	-
L23	+	+	+	+	-
L24	+	+	+	+	-
L25	+	+	+	+	-
M14	+	+	+	+	-
M15	+	+	+	+	-
M16	+	+	+	+	-
M13	+	+	+	+	-
M17	+	+	+	+	+
H06	+	+	+	+	+
H07	+	+	+	+	+
H08	+	+	+	+	+
H09	+	+	+	+	+
H10	+	+	+	+	+
NS	+	+	+	+	+

Figure 5.4 PT morphological stages across 'Meet the partner' and 'spot the differences' task (+ *here-and-now*) and 'topic and comments' task (- *here-and-now*)



5.2 Syntax

5.2.1 Performance

The 15 informants' syntactic performance results in terms of voice alternation (i.e., active and passive voice) according to the pragmatic cue are summarised separately for each variable. Tomlin's Fishfilm (1995), used in the current study, shows that English native speakers produce active voice when the agent is cued, and passive voice when the patient is cued. This seems to be pragmatically appropriate.

a) (± *Planning Time*) Self-paced Picture Description Task and Time-defined Picture Description Task

The creation of Figures 5.5a-b is based on the results presented in Table 4.18 and Table 4.22 of Chapter 4. They compare the frequency counts of pragmatically appropriate mapping (i.e., active, passive) when the informants performed the self-paced picture description task (+*planning time*) and the time-defined picture description task (–*planning time*). Most of the informants, at each level, produced appropriate responses to the pragmatic cue when planning time was provided. For instance, L23 failed to describe six agent-cued eventualities and 10 patient-cued eventualities when performing the –*planning time* task, while he achieved 100% correct performance with +*planning time* task. The results of this study confirm that planning time is conducive to learners' language production (Robinson, 2009; Ellis & Yuan, 2003). The results offer insight to L2 educators and syllabus designers. When we design tasks targeting syntactic structures (e.g., question formation, passive), planning time can be a factor to be considered into task-based instruction.

Figure 5.6a (agent-cue) and 5.6b (patient-cue) summarise the pragmatically appropriate mappings according to proficiency level. As can be seen, performance improved according to proficiency level, which is consistent with the results of previous studies using the same task (e.g., Kawaguchi & Di Biase, 2012; Wang, 2010). As the informants' proficiency levels increase, there was a decrease in the gap between the + *planning time* and – *planning time* variable. However, the planning time condition did not affect the high-level informants, as they had reached the 'ceiling'. Lower-intermediate and intermediate informants did not automatised the processing procedure of their IL, so planning time played a critical role in their performance, especially the production of passive structures. The results suggest that planning time can become one of the factors to assess their IL. For instance, if students can

produce target passive structures under the planning time condition, like the informants of this study, L2 educators and language teachers may focus on accelerating students' processing of passive structures by progressively withdrawing the planning time until students can automatise the process.

Figure 5.5 Comparisons of frequency counts on pragmatically appropriate mappings in self-paced task (+ *planning time*) and time-defined task (-*planning time*)

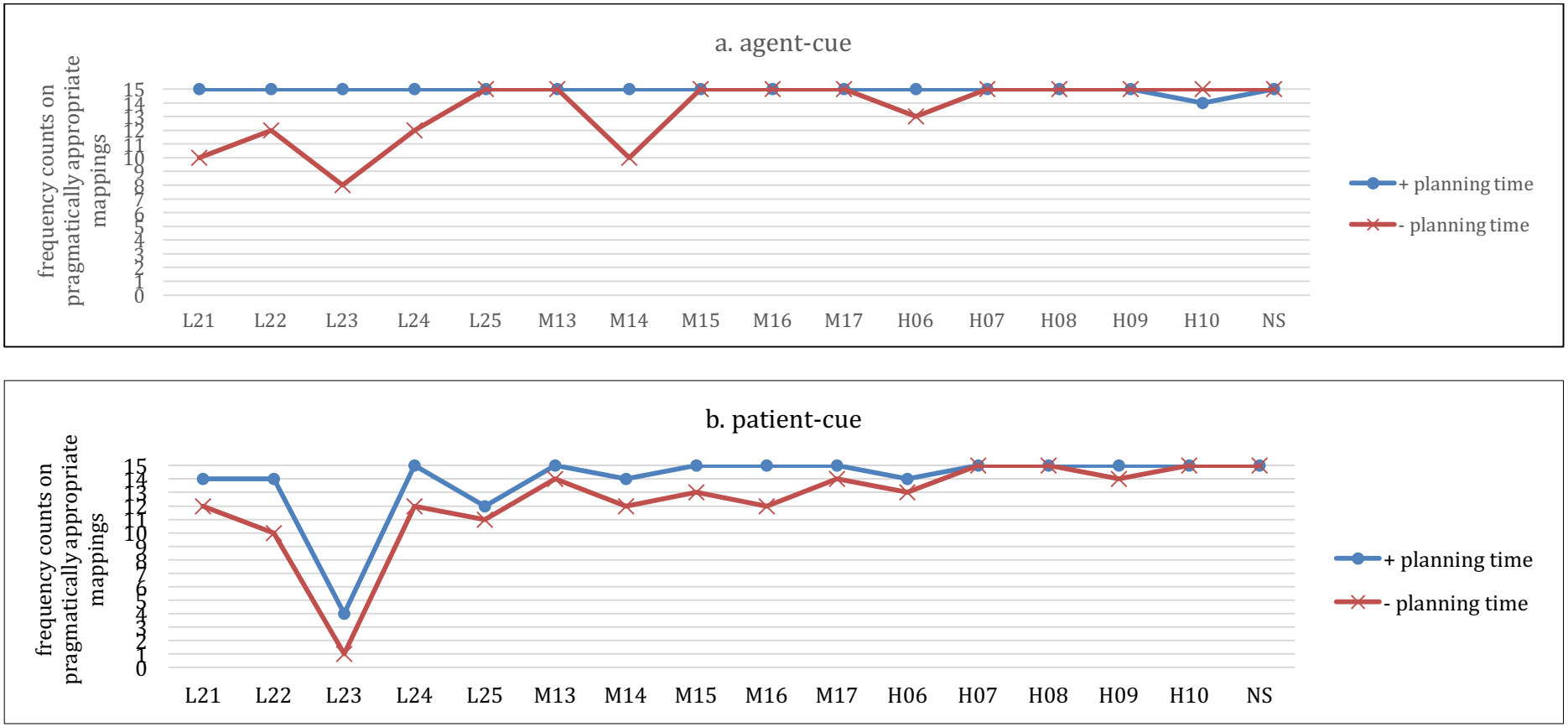
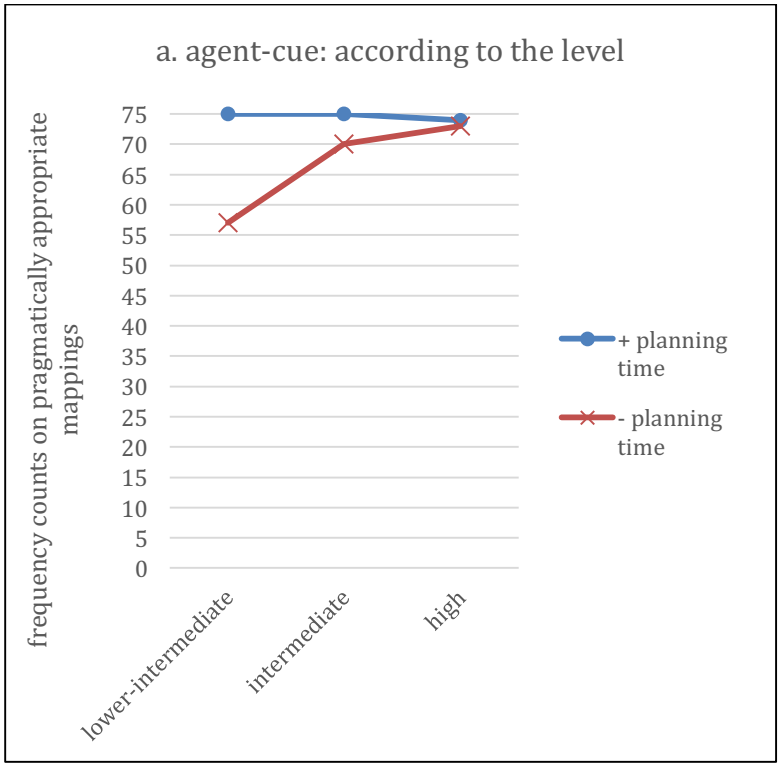
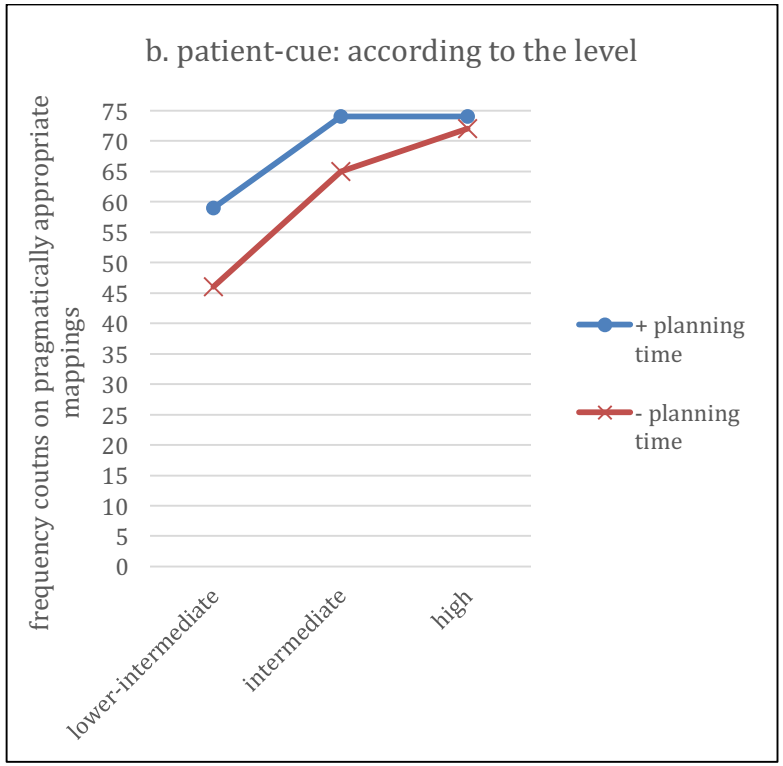


Figure 5.6 Frequency counts on pragmatically appropriate mappings (± *planning time*) according to the level





b) (± *Few elements*) Time-defined Fishfilm Task and Time-defined Picture Description Task

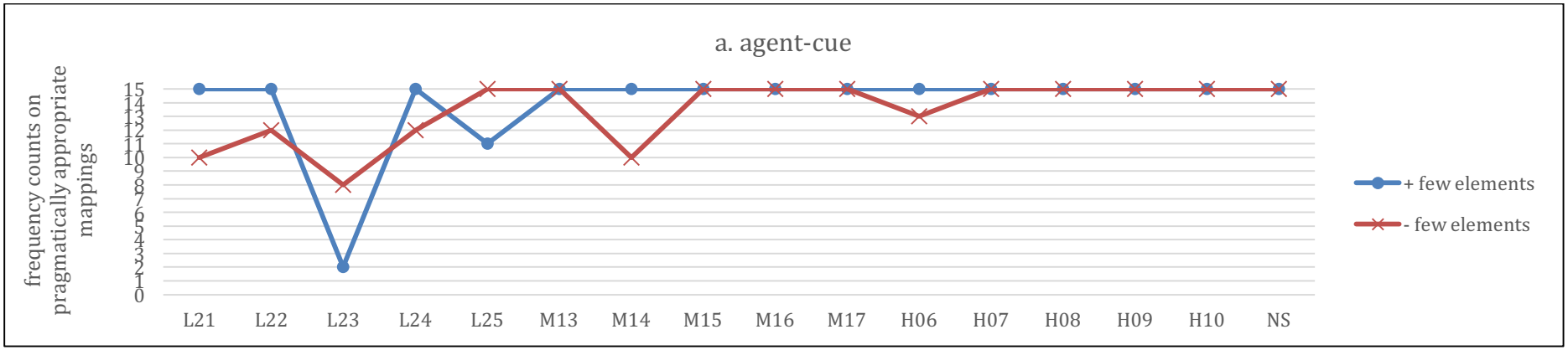
Figures 5.7a-b are based on the results of Table 4.8 and Table 4.22 of Chapter 4. Figures 5.7a-b compare the frequency of mappings according to the pragmatic cue (i.e., active, passive) in the performance of the Fishfilm task (+*few elements*) condition, and the picture description task (–*few elements*). Most informants produced appropriate mappings under the + *few elements* condition. The task for the –*few elements* condition may be more difficult because it involves many more agents (e.g., child, cat, robber, etc.) than the Fishfilm task (i.e., only fishes) hence, the informants had to process more information within the same time frame. Again, the performance of the lower-intermediate informants was more negatively affected. For instance, L23 failed to describe 10 out of 15 patient-cued eventualities in the (–*few elements*) picture description task, while he only missed 3 eventualities in the (+*few elements*) task. This result supports Skehan's (1998, 2014) Limited Capacity Hypothesis which states that a trade-off effect will be observed as tasks become more difficult.

Figures 5.8a-b summarise the informants' frequency of appropriate mapping under the ± *few elements* conditions according to proficiency level. All informants, regardless of their levels, produced a higher number of appropriate structures when performing the task with the + *few elements* variable than when performing it with the –*few elements* variable. It was also observed that the informants at all three levels did not show major performance gaps when they performed the agent-cued eventualities of the two tasks of cognitively different complexity (i.e., ± *few elements*). However, a larger performance gap was observed when the lower-intermediate and intermediate informants performed the patient-cued eventualities of the two tasks. High-level informants showed native-like performances in which they were not affected by the ± *few elements* condition or the agent/patient-cues. From a PT perspective, the expression of agent-cued eventualities is a stage 2 construction, and all the informants were able to show stable performance with this pair of variables. The expression of patient-cued eventualities is a construction of stage 4, and the lower-intermediate and intermediate informants showed variable performances with ± *few elements* variables. Thus, the performance gap is expected.

The results of the current study also confirm Robinson's (2009) statement on task sequence when we design syllabus or carry out task-based language assessment. The informants produced less appropriate target structures as the task become complex. If we gradually

increase task complexity along ± *few elements* variables, that is, performing the Fishfilm task (+*few elements*) first, followed by the picture description task (–*few elements*), we will find L2 learners eventually develop their performance on passive structures, just like the performance shown by the high informants of this study.

Figure 5.7 Comparisons of frequency counts on pragmatically appropriate mappings in time-defined Fishfilm task (+ *few elements*) and time-defined picture description task (- *few elements*)



* L23 thought the time-defined Fishfilm task (+ *few elements*) was a practice of passives structures.

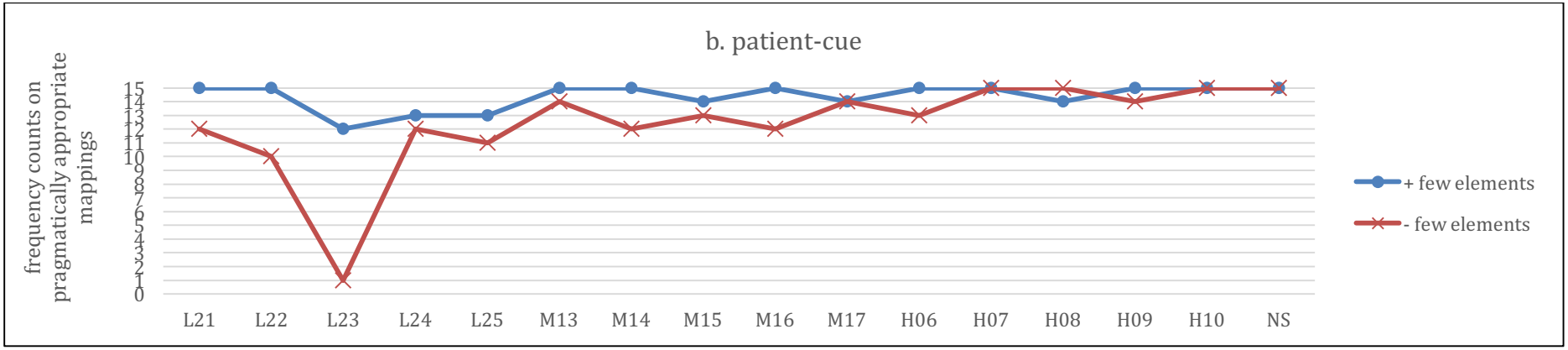
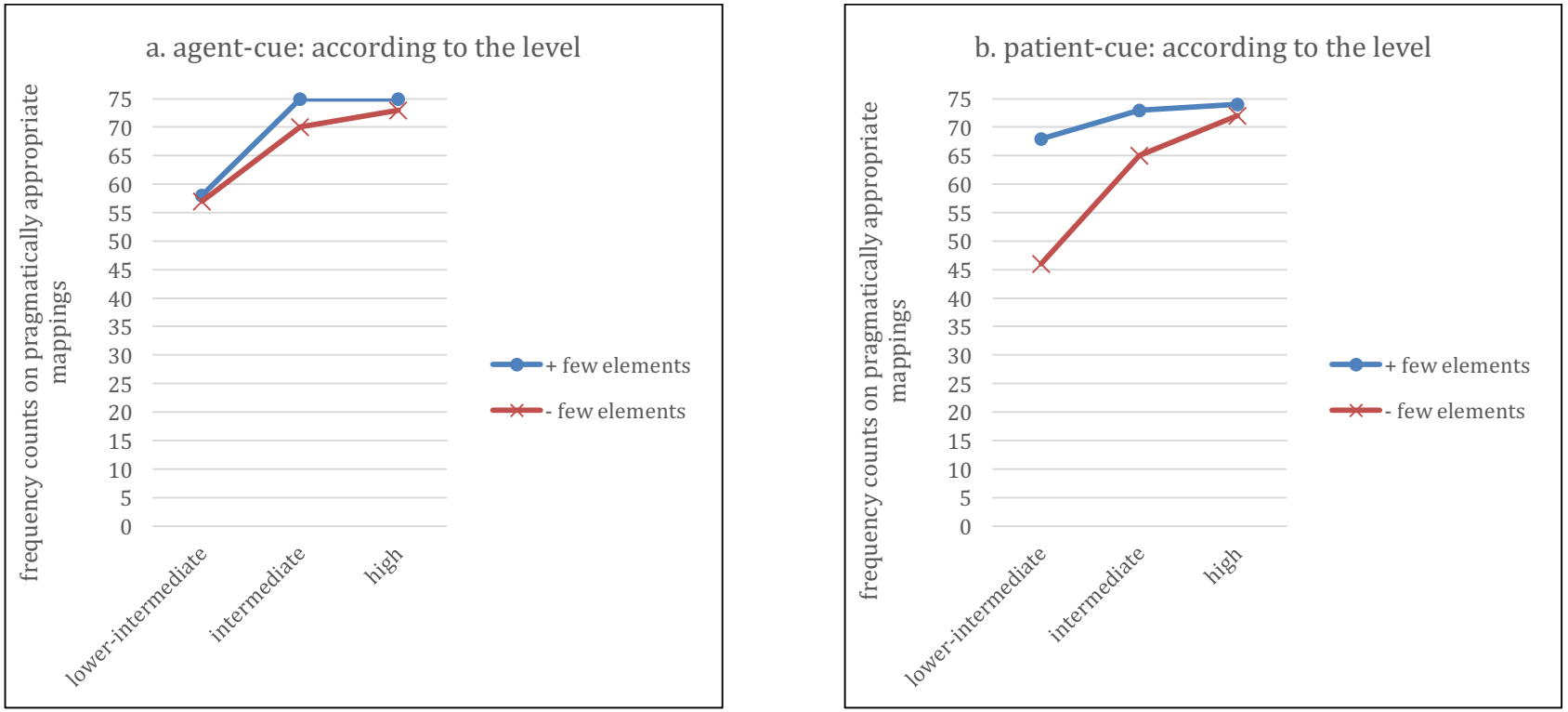


Figure 5.8 Frequency counts on pragmatically appropriate mappings (± *few elements*) according to the level



5.2.2 Competence

In order to answer the research question whether L2 competence varies when learners undertake tasks of different cognitive complexity (i.e., ± *here-and-now;* ± *planning time*), this sub-section compares the 15 informants' L2 competence of using syntactic structures (i.e., constituent questions, yes/no questions, active structures and passive structures) under different task complexity.

a) (± *Here-and-Now*) 'Meet the Partner' and 'Spot the Differences' Task and 'Topic and Comments' Task

Figures 5.9a and 5.9b were created by incorporating the results summarised in Tables 4.2–4.3 and Tables 4.13–4.14 in Chapter 4. Figures 5.9a-b below show a comparison of syntactic stages when the 15 informants performed the 'meet the partner' and 'spot the differences' tasks (+ *here-and-now*) and the 'topic and comments' task (- *here-and-now*).

Constituent Questions

As shown in Figure 5.9a, all 15 informants were able to produce non-canonical word order structures (e.g., WH_{QUE} MOD SVO, WH_{QUE} AUX SVO) when they performed the two tasks. The ± *here-and-now* variables did not affect the informants' IL competence as defined by PT.

Yes/No Questions

As shown in Figure 5.9b, all informants, except for L21 and L23 achieved at the same PT syntactic stages in performing two tasks of different cognitive complexity. However, these two learners' different stages achieved in the two tasks are mainly due to limited data: their results do not indicate non-acquisition of higher stages. A close examination suggests that both L21 and L23 stuck to the fixed patterns of yes/no questions throughout the + *here-and-now* task. In fact L21 and L23 were paired to perform the task and they first described their respective pictures and then they mostly confirmed information given by the interlocutor using single words (e.g., *cat?*, *girl?*) and phrases in canonical word order (e.g., *you have a man?*, *you have a bottle?*) to check information.

b) (± *Planning time*) Self-paced Picture Description Task and Time-defined Picture Description Task

Figure 5.10 presents the syntactic stage comparisons of the 15 informants when they performed the self-paced picture description task (+ *planning time*) and the time-defined

picture description task (- *planning time*). The informants' developmental stages hypothesised for L2 English syntax of the two tasks are based on the results of Table 4.18 and Table 4.22 in Chapter 4. All informants remained at the same stage based on the Lexical Mapping Hypothesis when performing the two tasks. The results suggest that the ± *planning time* variables did not affect the informants' L2 syntactic competence as defined by PT.

To conclude, all the above PT syntactic stage comparisons under the ± *here-and-now* and ± *planning time* variables support Pienemann's (1998) Steadiness Hypothesis, which states that learners' L2 competence is steady between tasks with different cognitive loads. We may recall the variationists (e.g., Douglas, 1986; Ellis, 1987; Tarone, 1988) argue that L2 learners' IL varies across tasks. It is not clear whether this variability is meant to refer to accuracy in performance (i.e., variable performance) or to acquired knowledge (i.e., variable competence). If it is the latter, the variationists' viewpoint regarding variable competence is not supported by the results of this study.

Figure 5.9a Syntactic stages: constituent questions (± *here-and-now*)

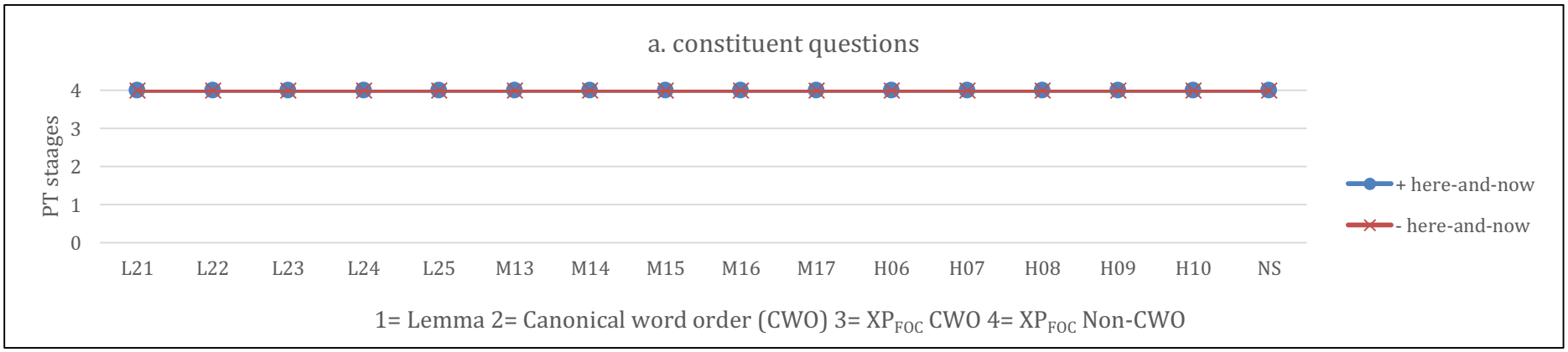


Figure 5.9b Syntactic stages: Yes/No questions (± *here-and-now*)

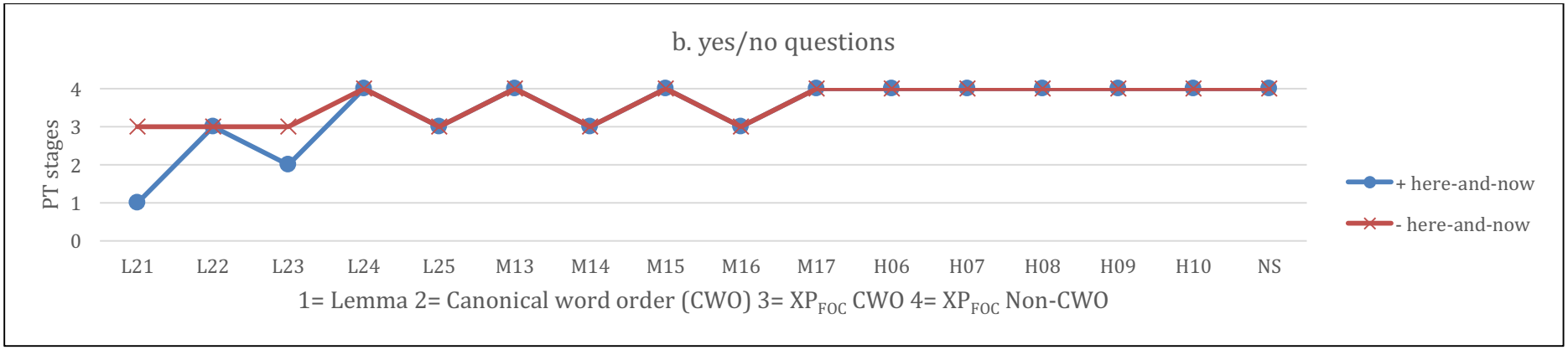
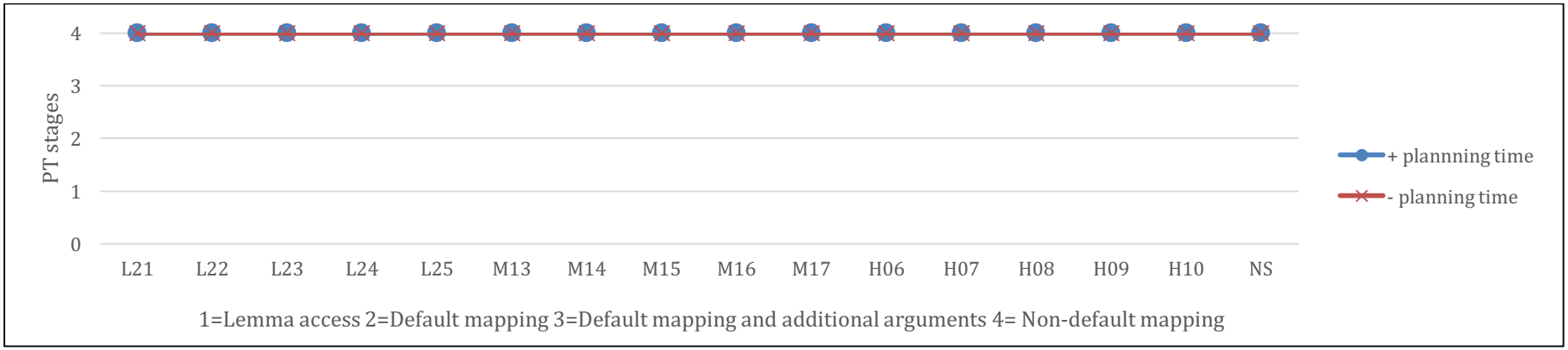


Figure 5.10 Syntactic developmental stages: Lexical Mapping Hypothesis (± *planning time*)



5.3 Task Modality

In order to answer the question of whether an L2 learner's competence as defined by PT varies according to task modality (i.e., speaking vs. writing), this section compares the 15 informants' morphological and syntactic stages.

5.3.1 Morphology

Figure 5.11 presents the morphological stage comparisons between the two task modes, that is, the written mode (i.e., translation task) and the speaking mode (i.e., 'topic and comments' task). Each informant's stage listed in the figure below is based on Table 4.9 and Table 4.12 in Chapter 4. As shown in Figure 5.11, task modality does not affect the high-level informants' developmental stages as they reach the highest stages in both modalities, but most lower-intermediate and intermediate informants (e.g., L21, L22, L25, M14, M15 and M16) reached higher morphological stages in the written mode than in the speaking mode. The reason for this difference might be that speaking is quite spontaneous, while writing involves planning (Akinnaso, 1982; Chafe, 1982; Emmitt et. al., 2010; Grabe & Kaplan, 1996). The informants had more time to attend to form when they did the translation task, so they were more likely to attain a higher morphological developmental stage.

5.3.2 Syntax

Figure 5.12 was created by incorporating results recorded in Table 4. 11 and Table 4.18 of Chapter 4. This figure compares the informants' syntactic stages in the written mode (i.e., translation task) and in the speaking mode (i.e., the self-paced picture description task). The comparison indicates that no informants showed any syntactic stage difference between the two task modes. All reached the highest syntactic stages measured by the Lexical Mapping Hypothesis. Also, their syntactic stages, especially for the lower-intermediate and intermediate informants, were higher than their morphological stages.

To conclude, the results are consistent with Kawaguchi's (2015, 2016) and Håkansson and Norrby's (2007) studies, which find that both oral development and written development follow the PT hierarchy. Task modality affects L2 learners' morphological stages but not their syntactic stages. When L2 educators use tasks in a classroom or syllabus designers design teaching and learning materials, they may take task modes into consideration. The results of this study show that the informants of low proficiency levels display two different

morphological developmental stages in speaking and writing tasks. If a student showed the use of the 3rd person singular form in a writing task, it would not suggest that he/she can also apply the rule in the speaking task. Thus, L2 educators should notice such difference for a precise language assessment and then facilitate the student learn by choosing a proper task mode.

Figure 5.11 Morphological stage: translation task (written) and 'topic and comments' task (speaking)

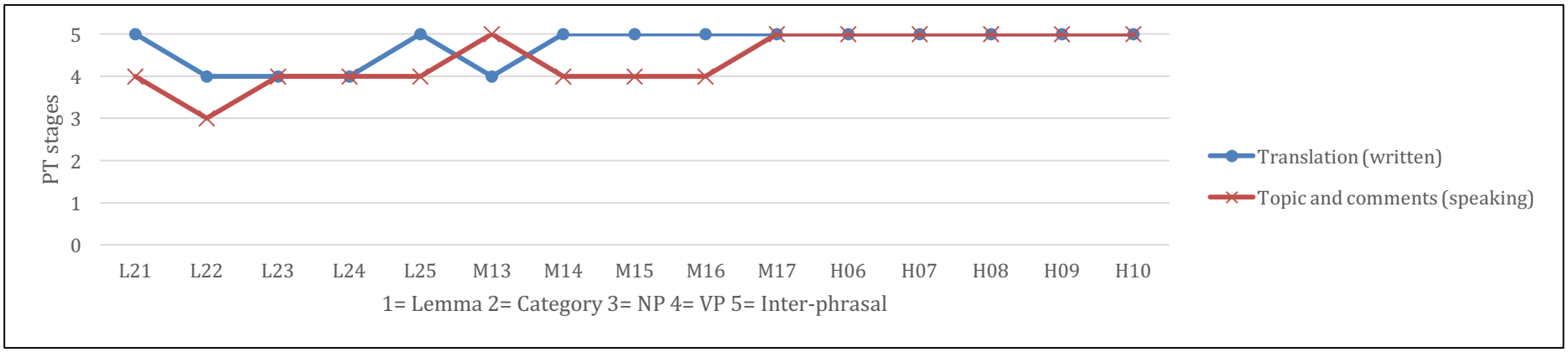
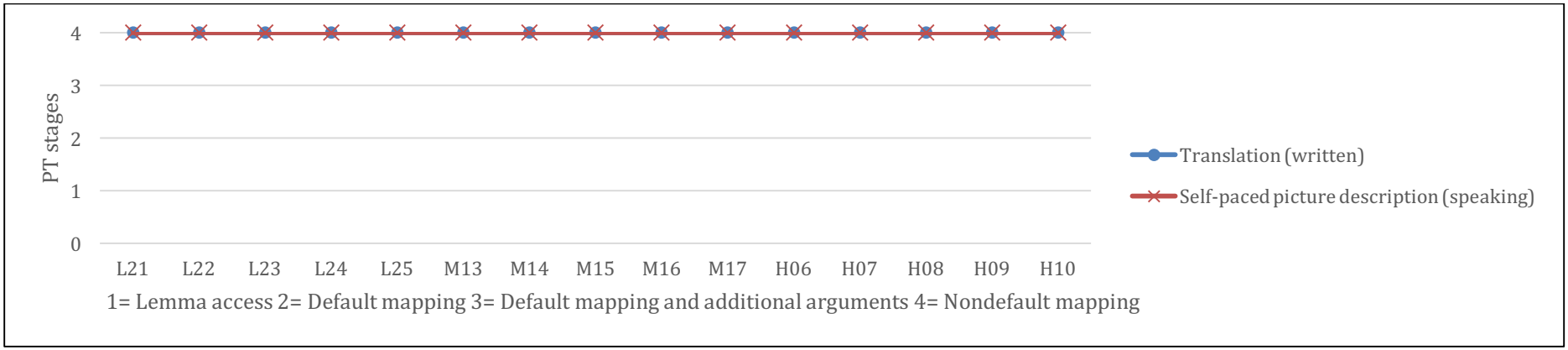


Figure 5.12 Syntactic stage: translation task (written) and self-paced picture description task (speaking)



5.4 Summary

This chapter answered the three research questions posited in this thesis. Firstly, it investigated whether a learner's L2 competence as defined by PT varies according to task complexity variables. The comparisons of the informants' morphological and syntactic stages reveal that each informant's IL competence remained steady across tasks.

Secondly, as it was hypothesised, the informants' performances did vary according to each task complexity variable. Specifically, when the informant performed the two tasks manipulated using the ± *planning time* variables, the informant showed greater syntactic complexity and accuracy in the simple task when planning time was given. When they performed tasks that were manipulated using the ± *here-and-now* variables, most informants tended to be more accurate with the task with + *here-and-now* features. They also produced more syntactic structures with pragmatically appropriate mappings when the task contained few elements. All these results suggest that learners trade between complexity and accuracy as tasks become more complex in terms of cognitive load.

The third research question was to examine whether informants' competence as defined by PT varied according to task modality. The results show that informants' syntactic competence, did not vary between different modalities. Further, lower L2 informants' morphological competence varied between written and spoken modalities, but high-level informants were not affected by task modality.

Chapter 6 Conclusion

This chapter concludes my investigation into whether or not English L2 learners' competence, as defined by PT, varies when they perform tasks with different degrees of cognitive complexity. My conclusion is presented in three sections. Section 6.1 presents the major findings and responds to each research question. Section 6.2 summarises the implications of this study, including the theoretical implications for Processability Theory, the Interlanguage Hypothesis and the Cognition Hypothesis, as well as pedagogic implications for task-based language teaching and learning, and some practical applications for English L2 language assessment. Some implications are also noted for the quality of ESL/EFL education in Australia and Mainland China. Section 6.3 outlines the limitations of the thesis and offers some suggestions for future research.

6.1 Summary of Major Findings

The major findings for each research question are summarised separately below:

(Q1) Does L2 competence vary when learners undertake tasks of different cognitive complexity?

It was hypothesised that the learner's L2 competence, as defined by PT, will not vary according to task complexity variables (i.e., ± *planning time,* ± *few elements* and ± *here-and-now*). This claim is based on the Steadiness Hypothesis (Pienemann, 1998), according which learners' IL competence does not change across communicative tasks provided the tasks involve the same skill. The results of this study provide support for the Steadiness Hypothesis. That is, regardless of proficiency levels, the informants' morphological and syntactic developmental stage, did not change when performing tasks of different cognitive complexity. Hence the answer to Q1 is no. That is, the hypothesis is supported.

(Q2) Do L2 learners' performances vary according to the cognitive complexity of the tasks undertaken?

It has been hypothesised that an L2 learner's performance of tasks (in terms of syntactic complexity and grammatical accuracy) will vary with the complexity of the tasks (i.e., ± *planning time,* ± *few elements* and ± *here-and-now*). In tasks designed along ± *few elements* variables, informants, especially lower-intermediate level (L) and intermediate level (M) informants, produced a greater number of expected structures in the time-defined Fishfilm

task (+ *few elements*) than they did in the time-defined picture description task (- *few elements*). When the two tasks were manipulated in relation to the ± *planning time* variable, the L informants tended to produce a greater number of expected structures and had higher VP accuracy rates in the self-paced picture description task (+ *planning time*) than in the time-defined picture description task (- *planning time*). This trend was more obvious when informants produced passive constructions. However, the high-level (H) informants who are closer to ceiling did not show much variation in the production of expected structures between the two tasks. For the two tasks in which the ± *here-and-now* variable was manipulated, the plural –s (phrasal) was the only structure that has shown meaningful outcomes. All L and M informants, except two, supplied more plural –s (phrasal) responses in the 'meet the partner' and 'spot the differences' tasks (+ here-and-now) than they did in the 'topic and comments' task (- here-and-now). Again, the H informants did not show much difference in rule application between the two tasks. in

The above results provide support to Robinson's Cognition Hypothesis (2009, 2011a) in regard to resource-dispersing variables (e.g., ± *planning time*). Robinson claims that when task complexity increases in response to manipulation of resource-dispersing variables, learners' grammatical accuracy, complexity and fluency decrease. For example, the results confirm that when the L and M informants performed the self-paced picture description task (- *planning time*), their grammatical accuracy and complexity decreased. With regard to increasing task complexity in response to manipulation of resource-directing variables (e.g., ± *here-and-now*, ± *few elements*), Robinson states that learners' grammatical accuracy and complexity will increase. The results of this study show, the opposite trend: the L and M informants were more accurate with the time-defined Fishfilm task (+ *few elements*) and the 'meet the partner' and 'spot the differences' task (+ *here-and-now*) than they were with the time-defined picture description task (- *few elements*) and the 'topic and comments' task (- *here-and-now*). Thus, the hypothesis of a trade-off effect was supported by the L and M informants: as the cognitive load became heavier in tasks, these informants' grammatical accuracy and the range of expected structures decreased. The reason may be that the L and M informants had not automatised some processing components of the language. Much of the time available for processing may have been used for conceptualising and formulating speech, so that accuracy and/or structural choices were sacrificed in order to complete the more complex tasks. However, the H informants were close to ceiling and they could therefore

process the language automatically, much like native speakers. Thus, the task complexity variables did not seem to affect the H informants' performances when tasks were difficult.

(Q3) Does the L2 learner's competence as defined by PT vary according to task modality?
It was hypothesised that a learner's L2 competence may vary according to task modality (i.e., whether they are speaking or writing), because the two task modalities involve different processing skills. The results show that among the 15 most representative informants, three L informants (L21, L22 and L25) and three M informants (M14, M15 and M16) reached higher morphological developmental stages in the written translation task than they did in the spoken 'topic and comments' task. L23, L24 and M17 remained at the same developmental stages across the two modalities. The results support the hypothesis that the informants' L2 competence may have varied across speaking and writing tasks, because these tasks elicit different processing skills. However, the H informants did not show any morphological developmental stage differences across task modalities. They may have reached ceiling, so development was not observed. As for the syntactic developmental stages measured by the Lexical Mapping Hypothesis, all three levels of informants were all able to produce passive structures regardless of task modality.

6.2 Implications of the Study

Theoretical Implications

This study investigates whether L2 competence as defined by PT varies according to task complexity variables as defined by Cognition Hypothesis. The results bridge a gap between two unrelated theories. Firstly, this thesis contributes to PT's Steadiness Hypothesis by taking task complexity variables into consideration. Regardless of differences in cognitive complexity, the basic nature of a learner's IL system or competence remains stable across communicative tasks, provided they elicit the same skill type in production. Secondly, this thesis adds valuable support to Skehan's Limited Capacity Hypothesis and Robinson's Cognition Hypothesis by bringing to bear an independent and specific measurement, that is, a learner's stage of development at processability perspective. This study also contributes to the Interlanguage Hypothesis by exploring the nature of a possible IL linguistic system by taking Robinson's task classification criteria into consideration. In particular, interlanguage variability was found in learners' performances, but their IL competence remained steady when the tasks they performed tasks were manipulated using complexity variables.

Pedagogical Implications

The findings from this study support the pedagogical claims of PT and the Cognition Hypothesis. That is, PT posits that formal language teaching should be based on a natural acquisition sequence. The Cognition Hypothesis suggests that to facilitate L2 learning, the order of tasks should be sequenced from simple to complex. The connection of these two theories provides L2 educators with a deeper understanding of task design. It provides support for adopting a processability-oriented pedagogical approach in conjunction with task classification criteria. Gradually presenting learners with tasks involving higher degrees of cognitive load may facilitate their L2 processing and promote automatisation.

The findings show that L2 learners of low level may exhibit different developmental rates depending on whether they are performing speaking tasks and writing tasks. Thus, the findings offer guidance for L2 teachers and educators in selecting the proper task mode for specific pedagogical purposes.

Practical Implications

Firstly, in terms of both a local and a global perspective, peoples' demand for instruction in English continues to grow and will continue to increase in Australia, in Mainland China, and in other parts of the world. The findings of this study offer some insight into quality ESL/EFL education in relation to task design, task selection and task sequencing.

Secondly, in terms of English L2 assessment, the findings show that incorporating structures involving complex syntax (e.g., passives, causatives, XP adjunction discourse) when L2 educators design tasks can offer insights into the state of L2 learners' language processing skills. A current learner's developmental trajectory from a processability perspective, in conjunction with their IELTS score, may help L2 educators gain a clearer understanding of their interlanguage competence.

Finally, the study may provide inspiration to L2 textbooks and learning materials markets. It offers some directions for developers in designing effective teaching and learning materials by considering factors such as task types, learners' L1 background, learners' proficiency levels, task selection, task performance sequences and so forth.

6.3 Limitations and Suggestions for Further Research

This study has a number of important limitations. Firstly, the small sample size of each English proficiency group makes it difficult to assess the significance of the findings. A trend generalised from a small sample may not accurately reflect the situation for the whole population. However, the most representative learners of the three levels (i.e., the lowest five from lower-intermediate level, the middle five from the intermediate level and the highest five from the high level) were selected to compare differences in performance. This selection makes the comparison possible to overcome the relatively small differences. Furthermore, to answer the research questions, the current study has employed a range of tasks, including Fishfilm task, on-line picture description task, 'spot the differences' and 'meet the partner' task, 'topic and comments' task, vocabulary size task and translation task. All the tasks are widely used in studies investigating learners' language performance and competence. The wide range of tasks used in this study can help gain a comprehensive understanding of the informants' L2 performance and competence, and this comprehensive understanding of each informant helps overcome the small sample size in each proficiency level. Secondly, this study only includes learners from three proficiency levels: the lower-intermediate level (IELTS score range 4-4.5), the intermediate level (IELTS score range 5-5.5), and the high level (IELTS score 7+). It is difficult to find learners of lower-level proficiency in Australia, because the Australia government requires overseas students to meet corresponding English proficiency standard to pursue further study in Australia. Thirdly, All the participants in this study were adult Chinese ESL learners in Australia. They were all studying in Australian tertiary institutions or preparing to study in tertiary institutions at the point of data collection. Thus, their English learning was more academically driven and they were quite advanced compared to most English learners in China. For L2 learners from other language backgrounds or other L2 learning situations, such as EFL classes, career development classes or immigration English survival classes, the results might be different.

In terms of research design, firstly, the instructions given to the informants in the 'spot the differences' task should have made it clear that they were being asked to use sentence structures suitable for asking questions. Some of the lower-intermediate informants used single words or rising intonation at the end of SVO structures to check information or ask for clarification from their partners. These informants did not show higher syntactic developmental stages when they performed the 'meet the partner' and 'spot the difference'

tasks due to unclear task instructions and follow-up by the researcher. Task instructions could have been made more direct by asking learners to produce more targeted information. Secondly, when the researcher investigated L2 competence across modalities, the written translation task and the oral 'topic and comments' task were used to make comparisons. A speaking version of the translation task may have offered a more appropriate comparison between task modes. Thirdly, only three of Robinson's task complexity variables were used.

This study points out some possible directions for further research. Firstly, the design of the active-passive alternation tasks only induced passive structures. Learners' skills in creating other structures as defined in PT, such as complex predicates or indirect questions and evaluative structures, could also be examined using Robinson's task complexity variables. Thus, a fuller understanding of PT in conjunction with task complexity issues could provide valuable empirical evidence related to both PT and Robinson's Cognition Hypothesis.

Also, the finding shows that tasks featuring both Robinson's task complexity variables and PT's task type may help with learners to progress in their language processing from emergence to automatisation. More evidence is needed to confirm this finding.

Another potential area for further research is the connection between Robinson's task complexity variables and the Interlanguage Hypothesis. This study supports Robinson's (2003) argument about factors that cause learners' style shifting. These factors include not only the attention paid to L2 language form, but also cognitive cost and participant factors, such as developmental stages.

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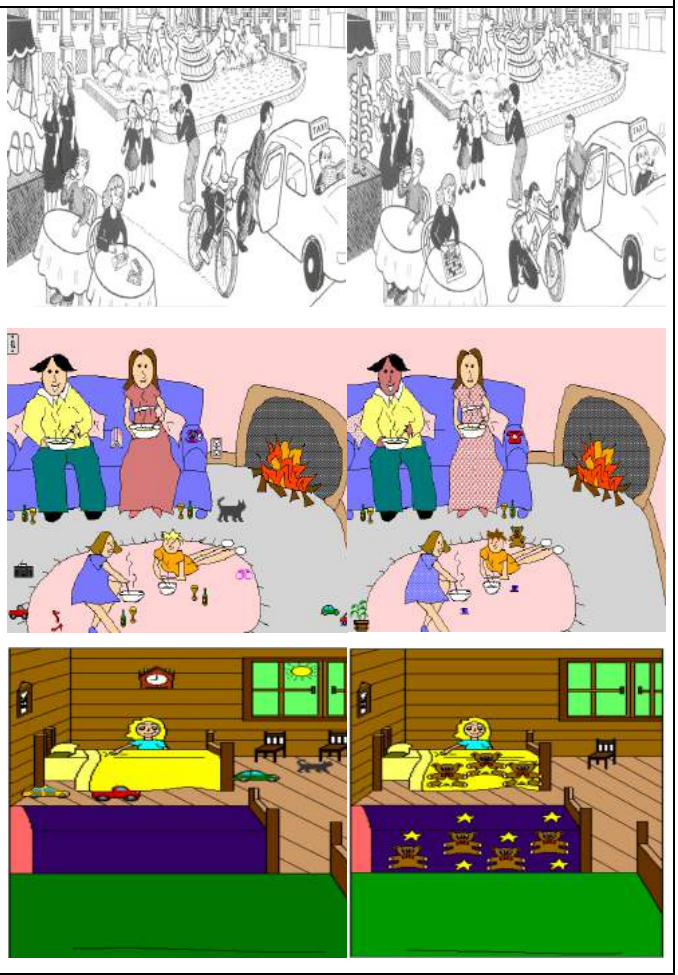
Appendix A: Five EAP courses offered at WSU College

EAP courses	Description	Entry
EAP1	Provides a bridge between general English skills and academic skills in reading, listening, speaking and writing. During the course, students concentrate on basic grammar and sentence structure, leading to more complex texts.	IELTS (Academic) 3.5+
EAP2	Provides students with a foundation in academic writing, reading, listening and speaking skills through general coursework, oral presentations, factual reports and regular assignments.	IELTS (Academic) 4.5+
EAP3	Consolidates students' understanding of a range of academic texts and builds on the skills developed in the EAP 2 course.	IELTS (Academic) 5.0+ (with a 5.0 in Writing)
EAP4	Extends students' proficiency in academic English, with opportunities to strengthen their language and critical literacy skills in preparation for tertiary study.	IELTS (Academic) 5.5+ (with a 5.0 in Writing)
EAP5	Allows students to further develop their language skills in academic writing, reading, listening and speaking to a competent level. It is excellent preparation for the university environment. Students who successfully complete EAP 5 do not need to take any further English language tests to gain entry to their study at UWS.	ELTS (Academic) 6.0+ (with a 5.0 in all areas)

Appendix B ‘Meet the Partner’ and ‘Spot the Differences’ Tasks

‘Meet the partner’ picture	‘Spot the differences’ pictures
Instruction Use the key words on the worksheet to ask questions to your partner, and you are required to generate one question from each key word. Find out as much information as you can from your partner.	**Instruction** You and you partner are going to look at three sets of pictures, but there are some differences between your pictures and your partner’s. You need to find out these differences with your partner. In order to find out these differences, you are encouraged to either describe your own picture or ask your partner questions in English. You will start the Street Scene picture first, followed by Wet Picnic picture and Goldilocks picture. Your speech production will be recorded during the task.
	

Appendix C Translation Task

Instruction
You are about to do a translation task from Chinese to English. You are required to translate 32 sentences to its best equivalence in English. The English verb you are going to use in each sentence has been provided to you. Please complete this task in 40 minutes.

说明

你将做一个从中文句子翻译到英文句子的练习。这个练习一共有 32 个句子。请你把每一句话翻译成对等的英文句子。每一句话中要用到的英文动词已经列了出来供你使用。 请在 40 分钟之内完成这个翻译练习。

No.	Chinese sentences	Verbs	English Translation[14]
1	这个国家的人口今年又增加了。	increase	The population of the country increased again this year.
2	妈妈洗了衣服。	wash	Mum washed the clothes.
3	妈妈让我把房间收拾干净。	clean	Mum asked me to tidy up the room.
4	莉莉打碎了花瓶。	break	Lily broke the vase.
5	听了他的故事，我很惊讶。	shock	I was surprised when I heard his story.
6	莉莉送给了她的妈妈一个礼物。	give	Lily gave her mum a gift.
7	莉莉把球传给了我。	pass	Lily passed the ball to me.
8	妈妈让她的孩子饭前洗手。	wash	Mum asked her kid to wash their hands before dinner.
9	小猫捉了一只蝴蝶。	catch	The cat caught a butterfly.
10	小孩长大了。	grow	The kid has grown up.
11	我没有事情做感到很无聊。	bore	I feel bored because I have nothing to do.
12	因为他拒绝回家，所以他的妈妈很担忧。	worry	He refused to go home, so his mum was worried.
13	妈妈买了水果和牛奶。	buy	Mum bought some fruits and milk.
14	老师让我给莉莉读这则新闻。	read	The teacher asked me to read the news to Lily.
15	莉莉被她的老师选中去参加数学比赛了。	choose	Lily was chosen by her teacher to participate in the math competition.
16	商店每天早上 9 点开门。	open	The shop opens at 9am every day.
17	他昨天踢了球。	play	He kicked a ball yesterday.
18	莉莉昨天吃了一块蛋糕。	eat	Lily ate a piece of cake yesterday.
19	老板让工人们从早上工作到晚上。	work	The boss makes the workers work from morning to evening.
20	小羊被狼吃掉了。	eat	The lamb was eaten by the wolf.

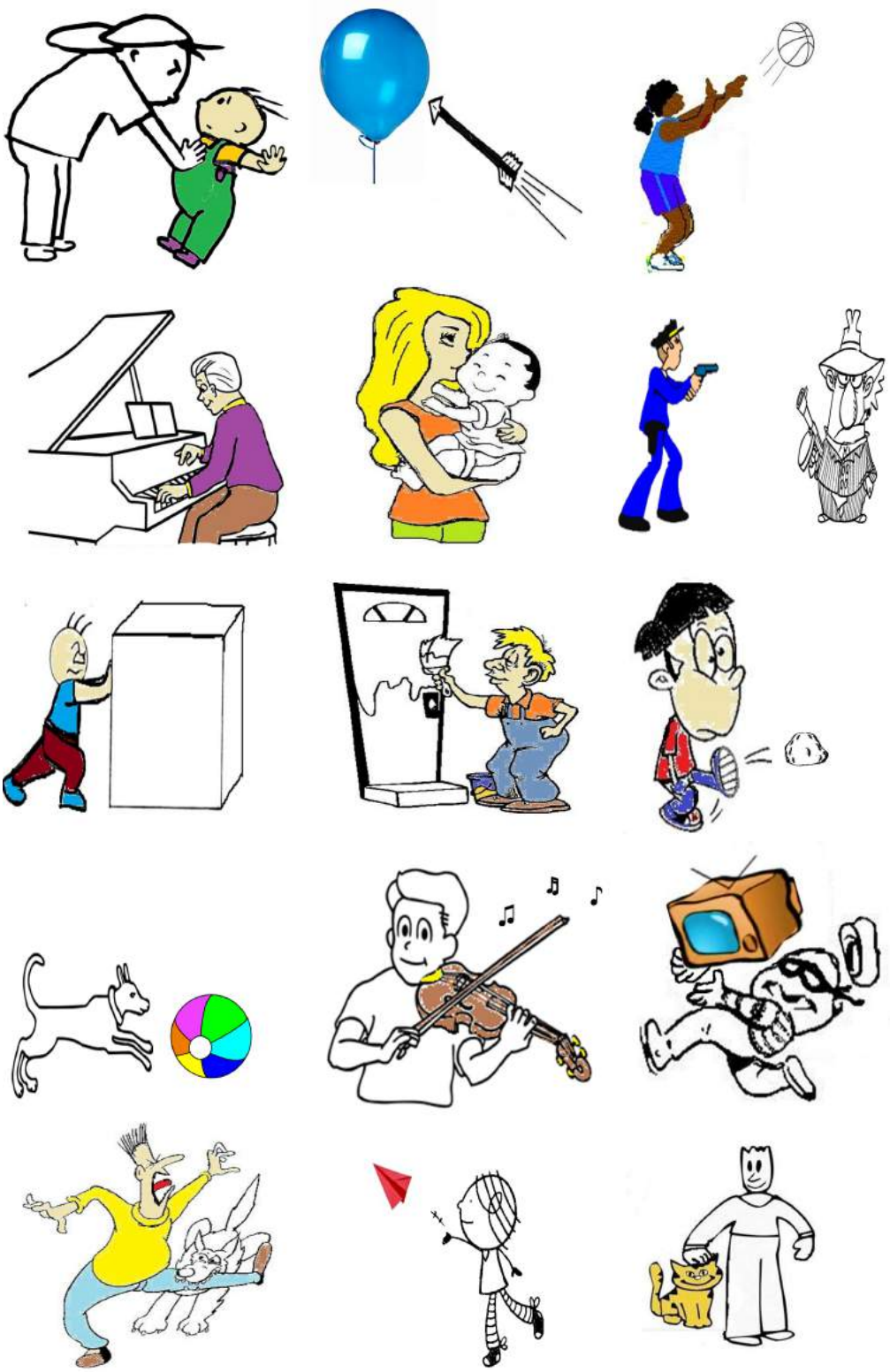
[14] This English translation is provided by a professional translator.

21	莉莉给妈妈展示了她的新校服。	show	Lily showed her mum the new school uniform.
22	妈妈给莉莉买了一本书。	buy	Mum bought lily a book.
23	我的书被莉莉带回她家了。	take	My book was taken home by Lily.
24	我对童话故事很感兴趣。	interest	I am interested in children's stories.
25	水在 0 摄氏度结冰。	freeze	Water freezes at 0 degree.
26	我对于他的解释很困惑。	confuse	I was confused at his explanation.
27	莉莉强迫自己努力学习。	study	Lily forces herself to study hard.
28	莉莉告诉了她的妈妈一个秘密。	tell	Lily told her mum a secret.
29	莉莉打开了门。	open	Lily opened the door.
30	家里的一条大鱼被小猫送给了它的朋友。	give	A big fish in the house was given away to the cat's friend by the cat.
31	考试下周三结束。	finish	The examination will finish next Wednesday.
32	杯子被亮亮打碎了。	break	The glass was broken by Liangliang.

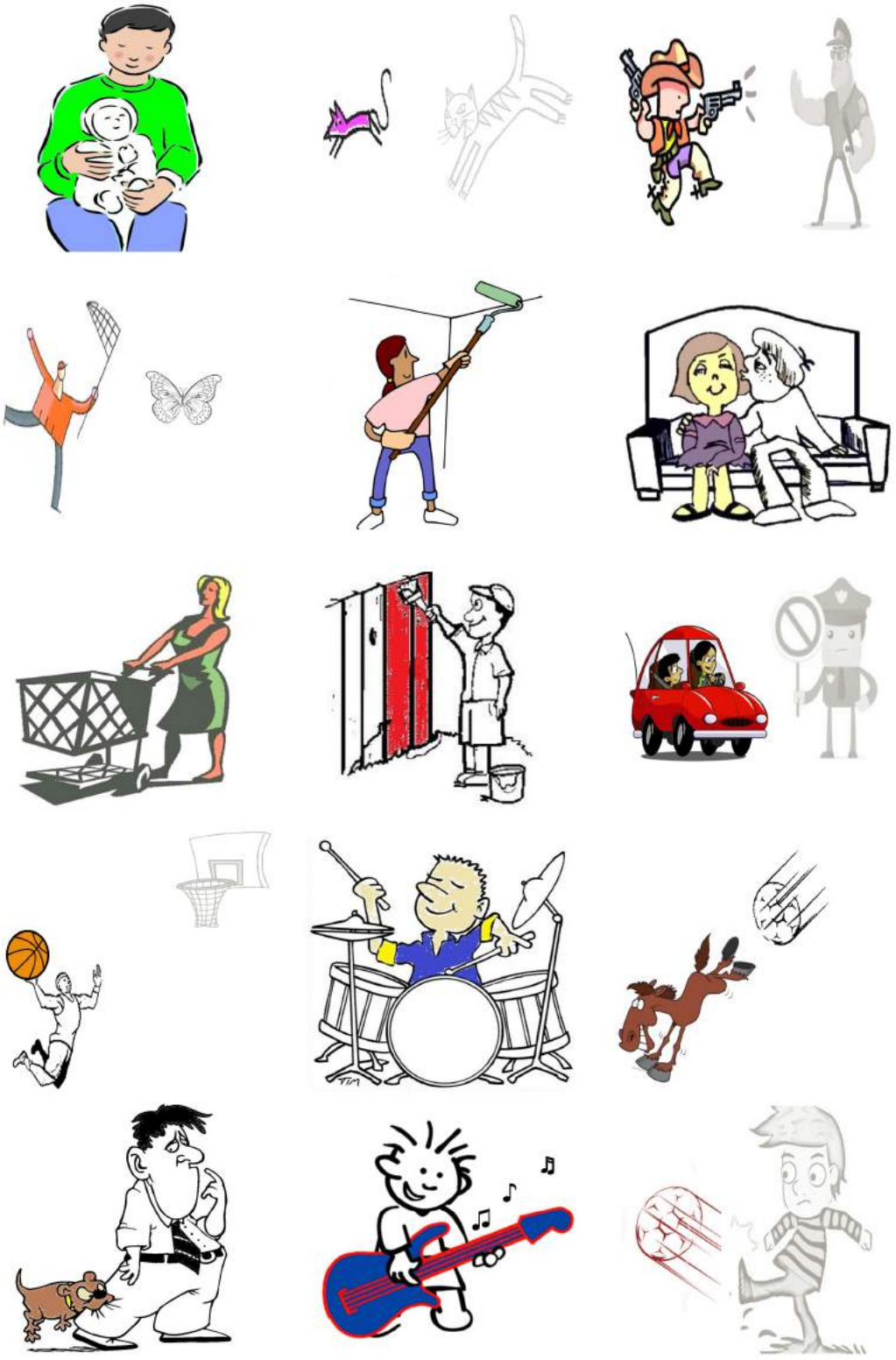
Appendix D ‘Topic and Comments’ Task

Instruction	
Using the following topics to ask questions to your partner. Ask at least 5 questions for each topic to get as much information as you can from him/her. And your partner needs to answer them one by one. See below for the three topics	
Worksheet A	**Worksheet B**
1. Old school days	1. Last weekend
2. Friends	2. A person you admire in your family
3. Your future 5-year plan	3. Your next holiday plan

Appendix E Sample pictures of the self-paced picture description task



Appendix F Sample pictures of the time-defined picture description task



Appendix G Di Biase's (2000) set of transcription conventions

Transcription Conventions

1. Decide first the **speaker notation (or code)** for each participant in the conversation e.g.:
C = facilitator/researcher.
T = your informant (keep confidentiality by giving him/her a fictitious name/code)
Use upper case (capital letters) for the speaker codes which are UNLIKELY to appear in the actual production text e.g., avoid using 'I' as code for a speaker in an English text, as it will be confused with the first person pronoun. Avoid 'A' because it may be confused with articles etc.
2. After typing in the speaker code enter only a tab (i.e. press the <tab> key on the computer's keyboard). No other characters (only a **tab** character) should be written between the speaker code and the beginning of turn for that speaker. This allows the computer to identify unambiguously each turn and speaker.
After the first speaker notation and tab are entered, start transcribing what you hear on the tape player. Continue writing on a linear basis from left to right until the end of **turn** of that speaker.
But what is a **turn**?

> **Turn** here refers to a normally continuous (including pauses) utterance of a speaker, until the Interlocutor (i.e. the other participant in the interaction) either takes his/her turn where he/she judges to be the end of the first speaker's utterance or interrupts the first speaker's utterance in order to take his/her turn.

3. At the end of the turn press the **return key.** Then, again (new speaker) write **speaker notation**, **tab key**, write turn and hit the **return key** at the end of the turn. E.g.:
C what did you say your name was? I did not hear what you said the first time
T it's difficult to spell
4. There should be **no punctuation marks except for question marks** when the speaker appears to indicate a question (e.g. by rising intonation) as in example above.
5. **No capital letters** except for **proper names** of people and places and the pronoun for the first person singular 'I' and the expression OK. e.g.
C are you OK now?
(notice that there is no capital letter at the beginning of turns and no full stop at the end)
6. **Pauses** are indicated by one dot (corresponding roughly to a hesitation pause or a pause usually represented by a comma in ordinary writing) or two dots if it is a longish pause (corresponding roughly to a full stop pause in ordinary writing). If there is a pause longer than those two, just write (long pause) in brackets. e.g.
T um . he um want to buy a .. computer but he lost money and . um (long pause) I don't know
7. Standardise **discourse/feedback sounds marking** (i.e. assign the same string of characters to the same marking) e.g. hesitation (um, uh, er), confirmation and back channelling cues (mhm), clarification requests (mm?), mild surprise (oh). In general it is best to use strings of characters that are NOT likely to be part of the text, such as 'a'.
8. Write **numerals** in words (not figures).
9. Syllables which cannot be transcribed because the transcriber can not hear or understand them are placed inside round brackets with an (X) for the unclear syllable or word and three Xs for longer stretches (XXX).
Also any other **comment by the transcriber** or any element that does not belong to the text produced by the informant or the interviewer will be enclosed in brackets e.g.
T this one? (informant points to a picture on the wall)

10. Avoid any special formatting or special characters whatever (e.g. do not use diacritics, avoid accented vowels) in your transcript and make one copy of it (SAVE AS) Text Only (for analysis) and one with numbered turns (for reference, after you paste it on X-cel - see the section on 'Processing your transcript' below).
N.B. It is a good idea to **make a backup copy** of all your research files in a different disk.
The following is a short example of a transcription
(T = Informant; C = Researcher)

C OK so er the first thing we'll do this morning is look at some pictures

T mhm

C and I'm going to ask you to tell me a story .. about the pictures here we have uh some pictures from a store .. with

T a store?

C a shopkeeper

T oh

C and we have some things that he does .. everyday and I'd like you to tell me the story of what he does.. in a day

T (long pause) first hes . he clean er . her shop his shop er before open .. mm. and then he . mm look (X) goods or things

C mhm

Appendix H 'Meet the Partner' and 'Spot the Differences' Tasks: Distributional Analysis of PT Morphological Developmental Stages

PT stages	Category					Noun phrasal (NP)		Verb Phrasal (VP)			Inter-phrasal	
Structure/ Informant	-ing	past-*ed*	irregular past	aux copula past	plural *–s* (without agreement)	plural *-s* + numeric quantifiers	plural *-s* + other quantifiers	be + V-ing	modal + V	have + V-ed/V-en	3sg -*s*	has/ does
L30		1/1			10/10	2/3	1/3	0/5			0/5	1/1 >1
L28	1		1/1		5/5	2/2	3/6	0/1			0/3	1/1 >1
L22			1/1		11/11	3/5	0/1	1/4	1/2		0/8	0/1
L23					3/5	8/8	0/1	3/4	3/3		0/1	0/2
L25	1				8/8	7/7		2/2			0/5	
L26	10	1/1	1/1	1/1	12/13	8/9	10/10	8/9	10/10	1/1		
L29					11/11 >1	9/9 >1	3/3	9/9		1/1	0/1	
L21					7/8	2/7		2/4	1/1		0/2	1/1
L24	2			1/2	11/11 >1	4/5 >1	4/4	2/4	7/7		1/4	
L27	2		1/1		16/16 >1	5/9	3/3	14/16	1/1		1/1	0/4
M19	3	1/1	1/1		13/14	4/5	3/4	3/3			0/5	0/2
M14	2		1/1			5/7	1/2	2/3	1/1		0/3	0/1
M15	3		7/7 >4	0/1	9/14	5/5	0/2	5/8			0/4	0/1
M12	3	1/1	12/12		5/6	5/7	2/4	6/7	2/2	2/2	0/1	
M18	11	0/1	1/2		12/16 >1	8/11	3/3	11/11	2/2			0/3
M17	4	1/1			7/8	5/5	2/2	8/8	3/3			1/2
M16	10	3/3	8/8	1/1	11/14	7/9	3/3	10/10		1/1	0/2	1/3
M13	4	4/5	3/3 >1	1/1	13/16 >1	7/7	7/8	6/7	3/3	1/2	1/5	0/1
M11	2				6/6	2/2 >1	0/1	2/3			3*/9	
M20	3		2/2		17/19	4/8	1/1	11/11	2/2	2/2	3/3	
H01	2	3/3		1/1	7/7	9/10	3/3	13/13	4/4		3/3	1/1
H02	7	1/1			12/14	13/13	2/3	6/6	6/6		3/5	
H03	2	1/1	2/2	8/8	5/8	10/10	7/7 >1	11/11	7/7	1/1		
H04	8	2/2	2/2		11/13	10/11 >1	6/7	8/8	6/6		4/4	1/1
H05	6	2/2		1/1	9/10	14/14	5/6	11/11	2/2			
H06	5		2/2		11/12	7/7	4/4	6/7	2/2		3/3	2/2
H07	11	2/2	1/1	13/15	15/15	2/2	17/17	8/8			3/3	
H08	4	2/2	2/2	3/3	15/19	6/7		6/7		1/1	2/3	
H09	10		1/1	16/17	14/15	9/10	2/4	8/8	2/2			3/3
H10	9	2/3	4/4	15/17	19/20	9/9	3/4	14/14	15/15		3/3	1/1
NC	6	3/3	2/2		16/16	5/5	3/3	12/12	8/8	2/2	8/8	5/5

* M11 produced 'looks' three times, and it is not met the morphological emergence criteria.

Appendix I Translation Task: Distributional Analysis of PT Morphological Developmental Stages

PT stages	Category					Noun phrasal (NP)		Verb Phrasal (VP)			Inter-phrasal	
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Have + V-ed/V-en	Be + V-ed/V-en	3sg-s	has/ does
L22	2	1/4	1/7		0/1					0/5	0/11	
L30		1/5	2/8		1/1					3/5	0/10	
L27		10/10	7/8		4/4 >1				1/1	3/6	0/4	
L28		4/5	5/7		0/1					2/5	1/10	
L23		3/5	7/10		4/4					2/5	1/6	
L24	1	8/8	5/5		1/2				1/1	5/5	1/8	
L26	2	4/5	4/4		3/3			2/2	3/3	9/9	1/6	
L21		2/2	4/6		1/2			0/2	2/2	0/5	5/10 >1	
L25		2/3	6/7		3/3					4/5	4/13	
L29		5/5	6/7		3/3			1/1		3/6	6/10	
M20		6/7	5/8		1/2					3/5	0/2	
M11		0/3	2/4		1/3				2/2	4/5	0/11	1/1
M19	1	4/4	5/7		1/1					5/5	1/11	
M13		7/9	3/8		2/2				1/2	5/6	0/3 >1	2/2
M14	2	9/9	10/10		4/4				0/1	5/5	2/2	
M12		5/5	11/11		3/3			1/1	7/8	7/7	4/4	
M16		5/5	10/11	1/1	3/3			1/1	7/8	7/7	4/4	
M15		6/6	8/8	1/1	4/4				2/2	7/7	8/8	
M18		4/4	2/2		3/3			2/3	7/7	6/6	7/12	
M17	2	2/2	4/4		3/3			1/1		7/8	12/14	
H01	1	7/7	7/7	1/1	5/6				1/1	5/5	7/7	1/1
H02	2	8/8	10/10	5/5	3/3					5/5	3/4	
H03	2	7/7	7/7	6/6	7/7				1/1	6/6	5/6	1/1
H04		6/6	9/9	4/4	3/3			1/1	1/1	2/3	7/7	1/1
H05	2	5/5	1/1	1/1	6/6				14/15	5/6	3/5	15/15
H06	1	3/3	8/8	4/4	5/6				1/1	5/6	5/5	2/2
H07	1	10/10	7/7	5/5	4/4				2/2	5/5	4/4	2/2
H08		9/9	10/10	4/4	5/5					5/6	2/4	
H09	1	4/4	1/1	4/4	5/5				11/12	4/5	6/6	12/12
H10	1	11/11	7/7	6/6	3/3				5/5	5/5	2/2	5/5
Control		14/14	7/7	3/3	3/3		1/1		1/1	5/5	4/4	1/1

Appendix J 'Topic and Comments' Task: Distributional Analysis of PT Morphological Developmental Stages

PT stages	Lexical					Noun phrasal (NP)		Verb Phrasal (VP)			Inter-phrasal	
Structure / Informant	-ing	Past-ed	irregular past	aux copula past	plural –s (without agreement)	plural-s + numeric quantifiers	plural-s + other quantifiers	Be + V-ing	Modal + V	Have + V-ed/V-en	3sg-*s*	has/does
L22		0/4	0/4	1/1	1/2	2/3	0/3	0/1		0/1	0/5	0/1
L28	1	0/2	0/2	2/3	2/2	2/2	2/5	0/1	0/1	0/1	0/4	0/1
L30	2	1/2	1/5	1/5 >1	8/8	4/9	3/4				0/3	0/2
L25				0/5	2/4	0/3			2/3		0/3	0/1
L21			0/1	1/6	2/2		3/4		2/2		0/3	
L23			0/2	0/6	1/2	0/1	1/2	1/2	2/2		0/3	
L26	3	1/1	2/4	4/4	2/2	4/4	1/2	1/2	7/7	1/1	0/1	1/2
L27			0/1	2/4	2/5	1/1	0/1		7/9	1/1	0/2	
L29	7	3/4	1/4	2/5 >1	10/12 >1	2/3	5/6	2/2	9/10	0/1	0/2	1/1
L24	8	2/2	4/8	14/14	9/9 >1	8/9	3/5	1/3	10/10		0/2	1/1
M11	1	0/1	0/3	0/4	10/10	1/3	1/1	0/2	3/3		0/4	0/3
M14	8	0/3	0/5	2/10	12/12	4/5	0/1	0/1	2/2		0/2	0/2
M12		3/3	4/10	1/19	8/10 >2	3/4	2/4	2/5	5/5		0/3	
M18	5		1/5	1/9	6/6	4/5	3/3	3/4	7/7		0/3	0/2
M15		3/3	4/11	1/8	7/8 >2	3/4	2/3	2/5	6/6		0/2	0/3
M16	1	0/3	0/6	1/9	9/9	4/5	0/1	0/1	3/3		0/3	0/2
M19	1	0/2	2/6	5/8	11/12 >1		9/11	1/1	7/7	1/2	0/3	0/1
M20	4	5/7	3/5	11/15	13/19 >1	1/1	2/3	2/2	7/7		2/4	2/5
M17	1		2/5	3/6	1/2	2/2	2/3	1/1	7/7	1/1	3/5	1/2
M13	5	6/11	8/12	3/14	13/16 >2	2/3	8/10	0/2	11/11	1/2	2/9 >1	0/1
H01	4	2/3	2/2	4/4	5/5 >2	3/3	2/2	6/6	5/5	1/1	5/7	
H02	3	5/5	5/5	5/6	13/14	3/3	5/5	1/1	5/5		4/4	2/2
H03	3	4/8	4/5	14/19	25/25	6/7	17/19	5/5	26/26	2/2	2/2 >1	3/3
H04	2	3/3	6/6	4/4	5/7 >1	6/6	8/8	1/1	14/14	0/1	7/8	2/2
H05	5	3/3	1/1	7/7	8/8 >1	4/4	4/5	8/8	4/4	3/3	6/7	3/3
H06	2		3/3	5/6	4/5		5/5		4/4	1/1	5/6	1/1
H07	2	3/3	8/8	7/7	16/17	5/5	5/5	7/7	4/4	3/3	6/6	3/3
H08	5	4/4	6/6	6/9	4/4	2/2	5/5	2/3	11/11	1/1	2/3	3/3
H09	4	1/1	3/6	1/2	10/10	1/1	0/2	3/3	8/8	3/3	3/3	3/3
H10	6	10/11	11/12	11/14	19/20	7/7	10/10	6/7	18/18	0/1	5/5 >1	3/3
NC	5	6/6	9/9	5/5	4/4	6/6	5/5	3/3	5/5	3/3	11/11	5/5

Appendix K The 30 Informants' Rule Application Rates for Tasks with ± *here-and-now* Variables

	'Meet the partner' and 'spot the differences' tasks				'Topic and comments' task			
	past-*ed*	pl –*s* (lexical)	pl –*s* (phrasal)	3rd person singular	past-*ed*	pl –*s* (lexical)	pl –*s* (phrasal)	3rd person singular
L21		7/8 (.89)	2/7 (.29)	0/2 (0)		2/2 (1)	3/4 (.75)	0/3 (0)
L22		11/11 (1)	3/6 (.50)	0/8 (0)	0/4 (0)	1/2 (.50)	2/6 (.33)	0/5 (0)
L23		3/5 (.60)	8/9 (.89)	0/1 (0)		1/2 (.50)	1/3 (.33)	0/3 (0)
L24		11/11 (1)	8/9 (.89)	1/4 (.25)	2/2 (1)	9/9 (1)	11/14 (.79)	0/2 (0)
L25		8/8 (1)	7/7 (1)	0/5 (0)		2/4 (.50)	0/3 (0)	0/3 (0)
L26	1/1 (1)	12/13 (.92)	18/19 (.95)		1/1 (1)	2/2 (1)	5/6 (.83)	0/1 (0)
L27		16/16 (1)	8/12 (.67)	1/1 (1)		2/5 (.40)	1/2 (.50)	0/2 (0)
L28		5/5 (1)	5/8 (.63)	0/3 (0)	0/2 (0)	2/2 (1)	4/7 (.57)	0/4 (0)
L29		11/11 (1)	12/12 (1)	0/1 (0)	3/4 (.75)	10/12	7/9 (.78)	0/2 (0)
L30	1/1 (1)	10/10 (1)	3/6 (.50)	0/5 (0)	1/2 (.50)	8/8 (1)	7/13 (.54)	0/3 (0)
M11		6/6 (1)	2/3 (.67)	3*/9 (.33)	0/1 (0)	10/10 (1)	2/4 (.50)	0/4 (0)
M12	1/1 (1)	5/6 (.83)	7/11 (.64)	0/1 (0)	3/3 (1)	8/10 (.80)	5/8 (.63)	0/3 (0)
M13	4/5 (.80)	13/16 (.81)	14/15 (.93)	1/5 (.20)	6/11 (.55)	13/16 (.81)	10/13 (.77)	2/9 (.22)
M14			6/9 (.67)	0/3 (0)	0/3 (0)	12/12 (1)	4/6 (.67)	0/2 (0)
M15		9/14 (.64)	5/7 (.71)	0/4 (0)	3/3 (1)	7/8 (.89)	5/7 (.71)	0/2 (0)
M16	3/3 (1)	11/14 (.79)	10/12 (.83)	0/2 (0)	0/3 (0)	9/9 (1)	4/6 (.67)	0/3 (0)
M17	1/1 (1)	7/8 (.89)	7/7 (1)			1/2 (.50)	4/5 (.80)	3/5 (.60)
M18	0/1 (0)	12/16 (.75)	11/14 (.79)			6/6 (1)	7/8 (.89)	0/3 (0)
M19	1/1 (1)	13/14 (.93)	7/9 (.78)	0/5 (0)	0/2 (0)	11/12 (.92)	9/11 (.82)	0/3 (0)
M20		17/19 (.89)	5/9 (.56)	3/3 (1)	5/7 (.71)	13/19 (.68)	3/4 (.75)	2/4 (.50)
H01	3/3 (1)	7/7 (1)	12/13 (.92)	3/3 (1)	2/3 (.67)	5/5 (1)	5/5 (1)	5/7 (.71)
H02	1/1 (1)	12/14 (.86)	15/16 (.94)	3/5 (.60)	5/5 (1)	13/14 (.93)	8/8 (1)	4/4 (1)
H03	1/1 (1)	5/8 (.63)	17/17 (1)		4/8 (.50)	25/25 (1)	23/26 (.88)	2/2 (1)
H04	2/2 (1)	11/13 (.85)	16/18 (.89)	4/4 (1)	3/3 (1)	5/7 (.71)	14/14 (1)	7/8 (.89)
H05	2/2 (1)	9/10 (.90)	19/20 (.95)		3/3 (1)	8/8 (1)	8/9 (.89)	6/7 (.86)
H06		11/12 (.92)	11/11 (1)	3/3 (1)		4/5 (.80)	5/5 (1)	5/6 (.83)
H07	2/2 (1)	15/15 (1)	19/19 (1)	3/3 (1)	3/3 (1)	16/17 (.94)	10/10 (1)	6/6 (1)
H08	2/2 (1)	15/19 (.79)	6/7 (.86)	2/3 (.67)	4/4 (1)	4/4 (1)	7/7 (1)	2/3 (.67)
H09		14/15 (.93)	11/14 (.79)		1/1 (1)	10/10 (1)	1/3 (.33)	3/3 (1)
H10	2/3 (.67)	19/20 (.95)	12/13 (.92)	3/3 (1)	10/11 (.91)	19/20 (.95)	17/17 (1)	5/5 (1)
Control	3/3 (1)	16/16 (1)	8/8 (1)	8/8 (1)	6/6 (1)	4/4 (1)	11/11 (1)	11/11 (1)

The number before the slash ('/') indicates frequency count of application of the morphology while the number after the slash shows the context for that morphological structure. The number in the bracket indicates the rate of suppliance.
* M11 produced 'looks' three times.

Appendix L The 30 Informants' PT Stages of Morphology: 'Meet the Partner' and 'Spot the Differences' Tasks (+ Here-and-Now) and 'Topic and Comments' Task (- Here-and-Now)

'Meet the partner' and 'spot the differences' Task					
	Lemma access	Category procedure	NP procedure	VP procedure	Sentence procedure
L21	+	+	+	+	-
L22	+	+	+	-	-
L23	+	+	+	+	-
L24	+	+	+	+	-
L25	+	+	+	+	-
L26	+	+	+	+	-
L27	+	+	+	+	-
L28	+	+	+	-	-
L29	+	+	+	+	-
L30	+	+	+	-	-
M11	+	+	+	+	-
M12	+	+	+	+	-
M13	+	+	+	+	-
M14	+	+	+	+	-
M15	+	+	+	+	-
M16	+	+	+	+	-
M17	+	+	+	+	-
M18	+	+	+	+	-
M19	+	+	+	+	-
M20	+	+	+	+	+
H01	+	+	+	+	+
H02	+	+	+	+	+
H03	+	+	+	+	+
H04	+	+	+	+	+
H05	+	+	+	+	+
H06	+	+	+	+	+
H07	+	+	+	+	+
H08	+	+	+	+	+
H09	+	+	+	+	+
H10	+	+	+	+	+
NC	+	+	+	+	+

'Topic and Comments' Task					
	Lemma access	Category procedure	NP procedure	VP procedure	Sentence procedure
L21	+	+	+	+	-
L22	+	+	+	-	-
L23	+	+	+	+	-
L24	+	+	+	+	-
L25	+	+	+	+	-
L26	+	+	+	+	-
L27	+	+	+	+	-
L28	+	+	+	-	-
L29	+	+	+	+	-
L30	+	+	+	-	-
M11	+	+	+	+	-
M12	+	+	+	+	-
M13	+	+	+	+	+
M14	+	+	+	+	-
M15	+	+	+	+	-
M16	+	+	+	+	-
M17	+	+	+	+	+
M18	+	+	+	+	-
M19	+	+	+	+	-
M20	+	+	+	+	+
H01	+	+	+	+	+
H02	+	+	+	+	+
H03	+	+	+	+	+
H04	+	+	+	+	+
H05	+	+	+	+	+
H06	+	+	+	+	+
H07	+	+	+	+	+
H08	+	+	+	+	+
H09	+	+	+	+	+
H10	+	+	+	+	+
NC	+	+	+	+	+