Effects of positive evidence, indirect negative evidence and form-function transparency on second language acquisition: Evidence from L2 Chinese and L2 Thai

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Abstract

Title: Effects of positive evidence, indirect negative evidence and form-function transparency on second language acquisition: Evidence from L2 Chinese and L2 Thai

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This study investigates second language (L2) acquisition of word orders and markers of collectivity in Chinese and Thai. One of the differences between Chinese and Thai is that Chinese nominal phrases appear with a "numeral + classifier + noun" word order while Thai phrases appear as "noun + numeral + classifier". Another difference is that *men*, the Chinese collective marker, cannot be used with nouns referring to animals or indefinite nouns, while *phûak*, the Thai collective marker, can do so.

Based on the cross-linguistic differences, an empirical study was conducted to answer whether Thai learners of Chinese and Chinese learners of Thai would be able to acquire target language (TL) structures that are different from those in their native language (L1) and whether they could reject incorrect TL structures. One hundred and forty-four participants were recruited to complete an acceptability judgment task and a self-paced reading task.

It is found that both Chinese and Thai learners could perform native-like in their acceptance of TL word orders since early stages of acquisition. However, it took them until an advanced level to be able to completely reject incorrect TL word orders that resembled structures in their L1. Thai learners also faced difficulty rejecting the use of *men* with animal and indefinite nouns in their L2 Chinese. In contrast, Chinese learners tended to be successful in their acquisition of *phûak*.

The results are interpreted in terms of roles of positive evidence and form-function transparency. In general, L2 learners tend to acquire a TL structure earlier when they can receive positive evidence in TL input and when a form-function connection of the structure is transparent. Nonetheless, these factors do not have an absolute effect on acquisition outcome since some learners may be able to use a probabilistic learning strategy to successfully acquire L2 knowledge even when positive evidence is unavailable.

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*	ungrammatical
AJT	acceptability judgment task
AL	advanced learner
BL	beginning learner
C	complementiser
CL	classifier
CLP	classifier phrase
Cn	Chinese
CnAL	advanced learner of Chinese
CnBL	beginning learner of Chinese
CnIL	intermediate learner of Chinese
CnNS	native speaker of Chinese
CP	complementiser phrase
D	determiner
DECL	declarative
DP	determiner phrase
IL	intermediate learner
L1	first language / native language
L2	second language
ms	millisecond
N	noun
NOM	nominative
NP	noun phrase
NS	native speaker
Num	numeral
NumP	numeral phrase
PROG	progressive
RT	reading time

SOV	subject-object-verb
SPR	self-paced reading
Spec	specifier
SVO	subject-verb-object
Th	Thai
ThAL	advanced learner of Thai
ThBL	beginning learner of Thai
ThIL	intermediate learner of Thai
ThNS	native speaker of Thai
TL	target language

Chapter 1: Introduction

The core of this thesis is an investigation of second language (L2) acquisition of word orders and markers of collectivity in Chinese and Thai nominal phrases. The study is conducted in a bi-directional manner, including L2 acquisition of Chinese by Thai learners and L2 acquisition of Thai by Chinese learners. I adopt a generative perspective in analysing linguistic phenomena in terms of features and adopt ideas from the feature re-assembly approach (Lardiere 2005, 2008, 2009a, 2009b) for L2 research.

Features that are main focuses of the current study are [+/–NPmove], [+/–animal] and [+/–indefinite]. To elaborate, the [–NPmove] feature is present in Chinese. It indicates that there is no NP movement in Chinese nominal phrases and accounts for a "numeral + classifier + noun" word order (as this is a default word order when there is no movement). In contrast, the [+NPmove] feature is present in Thai. It indicates a requirement for a movement of NP from a base-generated position, resulting in a word order of "noun + numeral + classifier". The [–animal] and [–indefinite] features both attach to Chinese collective marker *men*. They are responsible for the marker's incompatibility with nouns referring to animals and indefinite nouns respectively. In contrast, Thai collective marker *phûak* has [+animal] and [+indefinite] features, meaning that it is compatible with both animal and indefinite nouns.

In this study, it is assumed that at the beginning of L2 acquisition, learners will transfer knowledge about their native language (L1) to their L2 system (Schwartz & Sprouse 1996). As Chinese and Thai differ in the ways presented above, when Chinese native speakers learn Thai, they have to learn to reject the Chinese-like "numeral + classifier + noun" structure and accept the Thai "noun + numeral + classifier" structure. Moreover, they have to learn that Thai collective marker is compatible with more types of nouns than Chinese collective marker is, and hence allow its usage with animal and indefinite nouns. As for Thai native speakers who learn Chinese, they have to learn to reject the Thai-like "noun + numeral + classifier" structure and accept the Chinese "numeral + classifier + noun" structure. They also have to learn a few restrictions on Chinese collective marker, namely that it cannot be used with either animal or indefinite nouns.

Although the [–NPmove], [–animal] and [–indefinite] features in Chinese and the [+NPmove], [+animal] and [+indefinite] features in Thai are all related to linguistic phenomena within nominal phrases, the learning tasks for learners and the input they receive while acquiring these features are not necessarily the same. In terms of similarity, there are at least three aspects that apply to both Chinese and Thai learners. First, for acquisition of word orders (i.e. whether nouns appear in front of or after numerals), both Chinese and Thai learners can receive input showing a correct structure in their target language (TL), and the input is likely to be abundant because an expression about the number of elements (by the use of numerals with nouns) is one of the basic concepts being expressed in any languages (cf. Chan 2017). The second similarity is that structural input that learners receive can only inform them about what is correct in TL, but it does not directly inform them that a word order based on their L1 is actually ungrammatical in the TL. For example, Thai input containing a "noun + numeral + classifier" structure only informs Chinese learners that such a structure is grammatical, but it does not inform them that a Chinese-like "numeral + classifier + noun" structure is ungrammatical in Thai. The third similarity is that both Chinese and Thai learners face a problem of superficial optionality while acquiring a collective marker in their TL. To elaborate, in both Chinese and Thai, collective markers are used to mark a speaker's collective view to a group of people or animals he/she is referring to. Therefore, whether the markers appear with a noun or not depends on the speaker's viewpoint. However, listeners may have a different point of view from the speaker's, such as perceiving referents as a collective group while the speaker does not do so. Therefore, there can be a context in which a learner (as a listener) expects a collective marker to be used but does not hear it. This kind of situation can lead the learner to believe that the TL marker can be optionally present or absent.

What is different for Chinese and Thai learners is that their acquisition of collective markers is based on different types of input, depending on whether positive evidence is available. For Chinese learners of Thai, positive evidence is available because, during the course of acquisition, the learners will hear phrases in which Thai collective marker co-occurs with animal or indefinite nouns. Their encounter with these structures can help them be aware that the TL usages are different from their L1 usages and realise that what is ungrammatical in their L1 is actually grammatical in the TL. In contrast, positive evidence is not available for Thai learners who have to learn that Chinese collective marker cannot be used with animal or indefinite nouns.

To elaborate, as the Chinese [–animal] and [–indefinite] features lead to an absence of the use of *men* with animal and indefinite nouns, Thai learners will not find structures that reflect the two features in their Chinese input. Since there is no structural evidence for ungrammaticality of "animal / indefinite noun + *men*" combinations, the [+animal] and [+indefinite] features in the learners' L2 grammars will not be directly disconfirmed.

L2 acquisition of Chinese and Thai collective markers is complicated by superficial optionality of the markers mentioned earlier. For Chinese learners of Thai, although TL input can inform them that "*phûak* + animal noun" and "*phûak* + indefinite noun" structures are possible, there may be cases in which the learners expect to hear *phûak* but do not hear it because the speaker does not intend to refer to the referents in a collective manner. As a result, from the learners' perspective, the grammaticality of the structures is not always confirmed by the input they receive. As for Thai learners of Chinese, the difference in perspectives can also lead them to believe that Chinese collective marker can appear optionally. Therefore, when an absence of co-occurrence of the marker with animal or indefinite nouns is noticed, the learners may take it as another instance of the optionality of the marker, instead of taking it as a piece of evidence for ungrammaticality of the usages. As a result, it is likely to be difficult for the learners to completely reject such usages in their L2 Chinese.

Based on the above information, it can be predicted that L2 acquisition of word orders and collective markers in Chinese and Thai may progress in different manners, depending on whether there is structural input in TL to serve as positive evidence and whether the usages are perceived to be optional. A study about acquisition of these linguistic phenomena can help us understand the extent to which these factors affect L2 acquisition. The goal of my empirical study is, then, to find out how Chinese and Thai learners perform regarding these linguistic phenomena, whether they can achieve native-like performance, and how their performances are related to availability of positive evidence and optionality of the structures.

It is hoped that the current study will contribute to the L2 research community in the following ways. First, it can provide data about L2 acquisition of Chinese and Thai, both of which have not been widely studied and documented, at least not as much as L2 English (Myles 2002). In particular, it can add to almost non-existent literature on L2 acquisition of word orders and collective markers in the two languages. Secondly, since empirical data in this study were collected with two instruments, namely an acceptability judgment task and a self-paced reading

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task, we are able to observe and analyse learners' behaviour both in terms of their acceptability level and their sensitivity to ungrammaticality during real-time processing. In other words, the use of different data collection and analysis methods allows us to have a more comprehensive view on learners' performance. Thirdly, as our empirical study was conducted in a bi-directional manner, we are able to compare results across languages. The comparison can help us rule out some interpretations or explanations which only apply to one of the languages, and hence allow us to seek for those which have a more universal implication. Finally, following our analysis of effects of positive evidence and form-function transparency (which is related to the optionality mentioned above), our findings can be taken into account while a larger question of L2 acquisition is discussed, namely what makes some linguistic phenomena easier or harder to acquire than others (cf. Rankin & Unsworth 2016; White 2009).

Chapter 2: Word orders and collective markers in Chinese and Thai nominal phrases

2.1 Introduction and theoretical assumptions

In the current study, I use the term *Chinese* to refer to Mandarin Chinese and *Thai* to refer to Standard Thai. In general, Chinese and Thai both have a *subject-verb-object* (SVO) word order. Regarding nominal phrases, the two languages do not have an article system, and nouns without an overt determiner (i.e. bare nouns) can directly serve as verbal arguments (Hsieh 2008; Huang, Li, & Li 2009; Tumtavitikul 1997). Bare nouns can also be interpreted as singular or plural and definite or indefinite, subject to their environments (Hsieh 2008; Jenks 2011; among others).

In addition to nouns, Chinese and Thai nominal phrases can contain other elements such as pronouns, proper names, numerals, classifiers, demonstratives and grammatical markers. In the two languages, these elements may appear in different combinations, and in this thesis I will focus on the following phenomena:

- When a phrase contains a numeral, a classifier and a noun, the Chinese word order is "numeral + classifier + noun" while the Thai word order is "noun + numeral + classifier".

- When a noun refers to human and its referents consist of more than one entity, if a speaker wants to address the referents as a collective group, a marker of collectivity (i.e. *men* in Chinese and *phûak* in Thai) can be added to the noun, forming a "human noun + collective marker" structure such as *xuesheng-men* (student-*men*) in Chinese and a "collective marker + human noun" combination such as *phûak-nákrian* (*phûak*-student) in Thai.[1]

- In contrast, if a noun refers to animals, a Chinese "animal noun + collective marker" combination is ungrammatical while a Thai "collective marker + animal noun" combination is grammatical.

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[1] Throughout this thesis, *pinyin* (a standard Chinese phonetic transcription) without tone marks is used to transcribe Chinese. An AUA transcription system is used to transcribe Thai, with help of a tool on Thai Language website (http://www.thai-language.com/?nav=dictionary&anyxlit=1).

- Chinese also requires nouns in the "human noun + collective marker" combination to be definite while nouns in the Thai "collective marker + human/animal noun" combination can be either definite or indefinite.

To analyse linguistic materials related to the abovementioned phenomena, I adopt a featural framework based on Minimalist Program (Chomsky 1995) whose main ideas are that features are what accounts for cross-linguistic differences and that sentences are grammatical if all featural requirements in a sentence are met. I also make some assumptions regarding linguistic analysis of nominal phrases, as listed below:

- I assume that all argumental nominal phrases project a DP (Determiner Phrase), with D (determiner) as a head (Abney 1987; Longobardi 1994; Progovac 1998; for discussion about Chinese DPs in particular, see Li 1998; Pan 1999; Tang 1990a; Wang 2012; Wu & Bodomo 2009; Yang 2005:7; for discussion about Thai DPs, see Jenks 2011; Jiang 2012:400-401; Singhapreecha 2001). However, to save space, I will only present relevant parts of DPs while discussing specific issues.

- Without movement, DPs are head-initial (for general arguments on this topic, see Kayne 1994; Whitman 2008; for arguments on Thai in particular, see Simpson 2005; Visonyanggoon 2000).

- A numeral serves as a head of NumP (Numeral Phrase) (Huang *et al.* 2009; Li 1998, 1999; Tang 1999; Wang 2012).

- Chinese and Thai numerals require a use of classifiers or measure words (Aikhenvald 2000:121; Allan 1977; Bisang 1993; Gil 2013; Goral 1979; Jones 1970).[2] It is assumed that a classifier or a measure word serves as a CL head and numerals take a CLP (Classifier Phrase) as their complement (cf. Cheng & Sybesma 1999; Li 1998; Huang *et al.* 2009 for an analysis of Chinese; see Piriyawiboon 2009; Simpson 2005; Singhapreecha 2001 for an analysis of Thai).

- An NP (Noun Phrase) is a complement of a classifier.

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[2] Classifiers are linguistic devices that are used to categorise nouns in terms of the kind of entity that they are. In contrast, measure words individuate nouns in terms of quantity, having a similar function to that of *pound* or *pint* in English (Aikhenvald 2000:1; Her 2012; Her & Hsieh 2010; Lyons 1977: 463).

In the following sections, I will provide detailed analyses of word orders in Chinese and Thai nominal phrases and usages of collective markers, as well as explain similarities and differences between the two languages in terms of features.

2.2 Word orders

2.2.1 Chinese

As mentioned in the previous section, bare nouns in Chinese and Thai can serve as verbal arguments without an overt determiner. In other words, a Chinese or Thai DP may contain only one lexical element which is a noun. However, Chinese and Thai nouns may also merge with other elements to form a DP. Elements in focus of this section are nouns, numerals and classifiers. An analysis of DP structures formed with these elements will be provided, with a purpose to explain different word orders in Chinese and Thai.

Let us begin with a Chinese structure. It has a "numeral + classifier + noun" word order, as shown in (1). The numeral *san* "three", classifier *ge* and noun *haizi* "child" appear in Num, CL and N positions respectively, as shown in (2). When this phrase is formed, there is no movement after lexical elements are merged into their positions. Therefore, the word order of the phrase corresponds to a linear order of these elements in the structure in (2). Moreover, a demonstrative such as *zhe* "this" can merge to the structure, forming a phrase in (3) which has a structure in (4). Note that while the Chinese "numeral + classifier + noun" structure usually has an indefinite reading, nominal phrases with demonstratives are universally interpreted as definite (Cheng & Sybesma 1999; Hsieh 2008, Chapter 3; Huang *et al.* 2009, Chapter 8; Sio 2006, Chapter 4; Trinh 2011; among others).

(1) san   ge   haizi   (2)
     three   CL   child
     "three children"
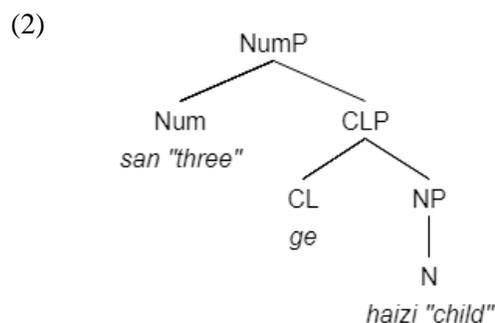
(3) zhe   san   ge   haizi   (4)
     this   three CL   child
     "these three children"

```
                    DP
                  /    \
                 D      NumP
              zhe "this"  /  \
                        Num    CLP
                    san "three" / \
                              CL   NP
                              ge    |
                                    N
                              haizi "child"
```
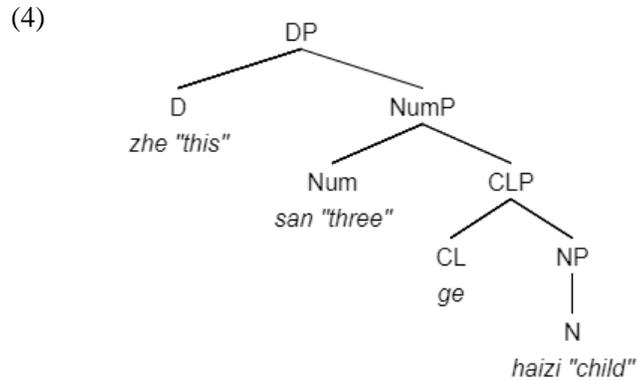
It is also worth noting that, in contrast to what has been discussed above, a "noun + numeral + classifier" word order is also possible in Chinese, but it is very rare for one to encounter. According to Wu, Feng, & Huang (2006), the structure was used in ancient Chinese (at least since the pre-Qin era, i.e. before 221 BC) to indicate number counting, forming a contrast with the "numeral + classifier + noun" structure that was used to elaborate characteristics of a noun. However, since the Tang or Song dynasty (around 618 to 1279 AD), the "numeral + classifier + noun" structure has been prevalent and eventually become a standard word order in modern Chinese. Nowadays, the "noun + numeral + classifier" word order is very infrequently used and can only be found in limited contexts (Cheng & Sybesma 2014; Wu *et al.* 2006) or fixed expressions such as *xiaocai yi die* (side-dish one plate) "a piece of cake". Consequently, I will assume that the likelihood for learners of Chinese to encounter the structure is low.

2.2.2 Thai

Contrary to Chinese, Thai nominal phrases have a "noun + numeral + classifier + demonstrative" word order. Recall that in this study, it is assumed that Chinese and Thai DPs can similarly contain DP, NumP, CLP and NP layers and that DPs are universally head-initial (i.e. in a default structure, D appears first while N appears last, such as the one in (4)). The noun-initial word order in Thai is, therefore, often analysed as a result of movements within a nominal phrase as will be shown below.

Let us first look at a "noun + numeral + classifier" structure with an example in (5). In this phrase, the Thai classifier *khon* follows the numeral *săam* "three", similar to the "numeral + classifier" sequence in Chinese. The difference between the two languages is that the Thai noun *dèk* "child" appears in front of the numeral. To explain the phenomenon, it is speculated that

Thai numerals carry a feature which calls for a movement of NP from its base-generated position (i.e. as a complement of CL) to Spec,NumP, leading to a structure illustrated in (6). (For similar analyses regarding Thai NP movement, see Jenks 2011:97; Simpson 2005; Singhapreecha 2001; Visonyanggoon 2000.) For ease of contrast between Thai and Chinese, I will call the feature on Thai numerals that accounts for the NP movement a [+NPmove] feature, while the [−NPmove] feature is assigned to Chinese numerals to indicate that they do not require an NP movement.[3]

(5) dèk   sǎam   khon
    child   three   CL
    "three children"

(6)
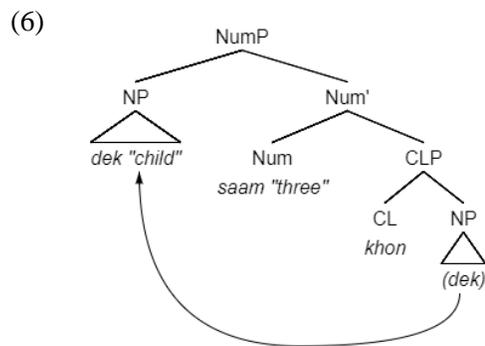
(7) dèk   sǎam   khon   níi
    child   three   CL   this
    "these three children"

(8)
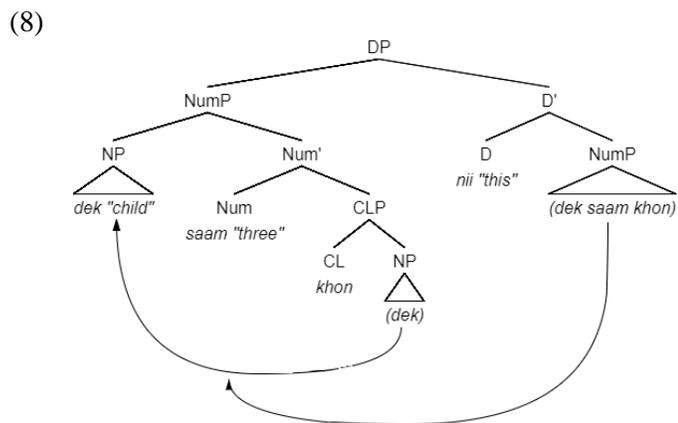
When Thai nominal phrases contain a demonstrative, such as the one in (7) which has a demonstrative *níi* "this", the demonstrative is base-generated as D and takes NumP as its complement. Thai demonstratives also carry a movement feature (Prasithrathsint 2000;

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[3] Alternatively, the feature on Thai numerals can also be labelled as [EPP] as it is a feature that usually serves as a syntactic motivation for movement (Adger 2003, Chapter 6; Chomsky 2001; among others). However, I decided not to use the label because the [EPP] feature usually does not come with a feature value (i.e. + or −) while, as can be seen in following sections, I will use the + and − values to distinguish Chinese and Thai features throughout this thesis. Therefore, to keep my feature labelling consistent, I decided to label it as [+NPmove] instead.

Savetamalya 1989; Singhapreecha 2001) which calls for movement of the NumP from its base-generated position to Spec,DP, resulting in a structure shown in (8). In short, when a Thai nominal phrase contains a demonstrative and a numeral, there are two movements to check the movement features, namely an NP-to-Spec,NumP movement and a NumP-to-Spec,DP movement.

It should be added that, in both Chinese and Thai, when a numeral is "one", it may not be spelled out in a surface structure, leading to a "demonstrative + (*yi* 'one') + classifier + noun" structure in Chinese and a "noun + (*nùŋ* 'one') + classifier + demonstrative" structure in Thai (Cheng & Sybesma 1999; Hsieh 2008). Nevertheless, their underlying structures are the same as those of other numerals.

2.3 Markers of collectivity / collective markers

2.3.1 Functions and syntactic status of Chinese and Thai collective markers

The focus of this section is on markers of collectivity (also called *collective markers*), namely the morpheme *men* and *phûak* in Chinese and Thai respectively. These markers can be added to nouns in their respective language to indicate that noun referents are viewed collectively by the speaker.[4] To be specific, the markers provide information that the noun refers to more than one individual referent, and from the speaker's perspective these referents are grouped together as a whole (for Chinese, see Chao 1968; Chen 1987; Hsieh 2008; Iljic 1994, 1998; Norman 1988; Zhang 2001; for Thai, see Bisang 1996; Jenks 2011). For example, in Chinese, *xuesheng* "student" can refer to a student or many students, but *xuesheng-men* must refer to more than one student in a collective manner. The situation is similar in Thai in that *nákrian* "student" can be interpreted as singular or plural, but *phûak-nákrian* must refer to more than one student who forms a collective group. These examples also show that collective markers in the two languages appear in different positions. That is, the Chinese marker *men* appears to the right of a noun while the Thai marker *phûak* appears to the left of a noun.

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[4] They can also be added to pronouns. For example, a Chinese pronoun *ta* means "he/she" while *ta-men* means "they". Similarly, a Thai pronoun *khăw* means "he/she" while *phûak- khăw* means "they". However, since the number of pronouns in the two languages is limited and the combinations of a pronoun with a collective marker are often viewed as lexical items, they are not a focus of the current study.

For the Chinese marker *men* in particular, some studies suggest that it is a plural marker which is similar to the English morpheme *–s* (Her 2012; Huang *et al.* 2009; Li 1998, 1999). However, this claim has been challenged (by Tang 2004, for example) with an important piece of evidence that the marker in fact does not add a plural meaning to a noun. To begin with, recall the word *xuesheng* "student" in the previous paragraph which, by itself, can be interpreted as either *student* or *students*. This example shows that Chinese nouns have a number-neutral interpretation, i.e. without context they can have either singular or plural reading (Corbett 2000). Although it is true that nouns with *men* can only be plural, the fact that a plural reading is possible even without the presence of *men* makes it illogical to argue that plurality is the function of the marker (Cheng & Sybesma 1999; Chierchia 1998). Instead, the plural reading is derived from the collective reading. That is, to view something as a whole, there must be more than one individual referent in a group. This is why the referents can never be singular. The situation is similar in Thai in that nouns can be plural even without the marker *phûak*. For this reason, in this study I do not analyse *men* and *phûak* as plural markers.

As for their categorical status, since *men* and *phûak* are not plural markers, it is not appropriate to analyse them as a Num head like the English plural marker *–s* (Wiltschko 2008). Instead, I adopt Wiltschko's proposal that number-related markers (such as plural markers in the Halkomelem language in her study) may be an adjunct or a modifier to their associated nouns, and I will analyse the Chinese and Thai collective markers as such.

It is worth emphasising that presence or absence of *men* and *phûak* is subject to a speaker's viewpoint, i.e. whether a speaker wants to specify that he/she is addressing referents as a group or not. To elaborate, recall that Chinese and Thai bare nouns can be interpreted as plural without any explicit markers. They, therefore, can refer to a group of referents even without the presence of a collective marker. However, to explicitly indicate that the referents are defined as a group by him/her, the speaker can also choose to add a collective marker to a noun (cf. Iljic 1994 which discusses the Chinese collective marker in particular). Because the presence of Chinese and Thai collective markers is not only determined by attributes of the referents (such as whether there is more than one entity that can form a collective group) but also by the speaker's viewpoint as well as his/her choice to address them as a group, listeners may not be able to always correctly predict whether a collective marker will be used in a specific sentence. As a result, to listeners, the presence or absence of *men* and *phûak* may seem optional.

2.3.2 Animacy restriction on Chinese and Thai markers

In the previous section, we have seen similarities between Chinese and Thai collective markers in terms of function and categorical status. It has not been mentioned yet that not all nouns can be used with the markers and that the types of nouns which can do so differ in the two languages. In Chinese and Thai, there are at least two factors which determine whether a noun is compatible with collective markers, namely animacy levels and (in)definite interpretation of a noun. They will be discussed in this section and Section 2.3.3 respectively.

Regarding the animacy issue, a relationship between the presence of the Chinese collective marker *men* and animacy characteristics of nouns has been discussed in several books and articles (Iljic 1994; Lü 2002a:142; Yang 2005; among others). Essentially, *men* mainly attaches to nouns referring to human. For example, *xuesheng* "student", *haizi* "child" and *laoshi* "teacher" can be combined with *men* to become *xuesheng-men*, *haizi-men* and *laoshi-men*. In contrast, nouns referring to objects cannot be used with *men*. For example, *pingguo* "apple", *qiche* "car" and *diannao* "computer" cannot become *pingguo-men*, *qiche-men* or *diannao-men* even when a speaker wants to refer to them as a group.

Chinese nouns referring to animals are generally incompatible with *men*. For example, phrases like *dongwu-men*, *shizi-men* and *houzi-men* (in which the meanings of *dongwu*, *shizi* and *houzi* are *animal*, *lion* and *monkey* respectively) are usually regarded as ungrammatical. However, there is a situation in which these "animal noun + *men*" combinations can be acceptable, namely when they are personified such as when they appear in fairy tales in which animals can talk and act like human (Hsu 1994, cited in Lardiere 2009a). Still, it should be noted that this kind of usage is rare and often only appears in a written language (Lü 2002b:284; Wang 2000). In other words, without specific contexts which force a personified interpretation, Chinese "animal nouns + *men*" structures are ungrammatical.

To sum up, with respect to the use of *men*, Chinese nouns can be semantically divided into three categories, namely nouns referring to human (also called *human nouns* in this thesis), nouns referring to animals (also called *animal nouns*) and nouns referring to objects (also called *inanimate nouns*). Human nouns can be used with *men*, while inanimate nouns and animal nouns which are not personified cannot be used with *men*.

Based on the three categories, let us now look at the Thai collective marker *phûak*. Similar to *men* in Chinese, *phûak* be used with human nouns (Bisang 1996; Jenks 2011,

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Piriyawiboon 2010). For example, *nákrian* "student", *dèk* "child" and *khɔ̌ɔthaan* "beggar" all refer to human and hence can be used with *phûak*, becoming *phûak-nákrian*, *phûak-dèk* and *phûak-khɔ̌ɔthaan* respectively. Also, like Chinese, Thai inanimate nouns are unlikely to appear with *phûak*. For example, *khúkkîi* "cookie", *rótyon* "car" *thiiwii* "television" cannot become *phûak-khúkkîi*, *phûak-rótyon* or *phûak-thiiwii*.

The difference between Chinese and Thai markers is on animal nouns. While the Chinese *men* cannot appear with animal nouns, the Thai marker *phûak* can do so. For example, the Thai words *sùʔnák* "dog", *kràʔtàay* "rabbit" and *sǐŋtoo* "lion" can be combined with *phûak* to become *phûak-sùʔnák*, *phûak-kràʔtàay* and *phûak-sǐŋtoo* respectively, and these phrases are not restricted to a personified context as it is in Chinese.

To put it in featural terms, the Chinese and Thai collective markers both carry a [+human] feature, meaning that they can attach to nouns which have a semantic feature of [human]. As to animals, since the Chinese marker is generally not compatible with nouns of this type, it carries a [–animal] feature. In contrast, the Thai marker carries a [+animal] feature because it is compatible with animal nouns. Finally, as both markers do not attach to inanimate nouns, they both have a [–inanimate] feature.

According to Jenks (2011), a difference in semantic selection of collective markers can be explained by the Animacy Hierarchy which categorises nouns based on their degrees of animacy. From the highest to the lowest degree of animacy, the hierarchy is: human > animal > inanimate (Comrie 1989:185). As proposed by Corbett (2000:56), items involved in a nominal number system (such as collective markers in this case) may apply with nouns from the top segment of the hierarchy downwards. In our current examples, the Chinese collective marker only applies to the topmost level of the hierarchy which consists of human nouns, while the Thai marker applies to the top two levels, namely human and animal nouns. To sum up, in this section we have argued that Chinese and Thai collective markers select nouns according to their animacy levels. The difference between the two languages is that semantic selection of the Chinese marker stops at the first level of the Animacy Hierarchy while the Thai marker also selects nouns in the second level of the hierarchy.

2.3.3 Definiteness restriction on Chinese marker *men*

Factors that determine grammaticality of nominal phrases that contain a collective marker are not limited to the animacy level of nouns. They also include how nouns are interpreted within a particular sentence, i.e. whether they have a definite or indefinite reading. For example, although the Chinese phrase *xuesheng-men* (student-*men*) "students" can be grammatical based on our discussion in the previous section, it is grammatical only when we assume that the phrase is interpreted as definite (i.e. identifiable in a given context). It is, however, ungrammatical if it has an indefinite reading (Huang *et al.* 2009; Iljic 1994; Li 1999; Tang 2004).

In order to determine whether a collective marker is subject to a definiteness restriction, we can put it in a context that allows only one type of reading (i.e. either definite or indefinite) and see whether the presence of the marker affects the sentence's grammaticality. Let us begin with the definite reading. It has been argued that nominal phrases at a preverbal subject position in Chinese and Thai tend to be interpreted as definite (Cheng & Sybesma 1999; Huang *et al.* 2009; Jenks 2011).[5] In examples (9) – (12), all nouns at the subject position (i.e. *xuesheng*, *xuesheng-men*, *nákrian* and *phûak-nákrian*) indeed have a definite reading and their most appropriate English translation is "the student(s)", not "a student" or "students". Since sentences that contains a definite noun with a collective marker (namely (10) in Chinese and (12) in Thai) are grammatical, just like their counterparts with definite nouns only (namely (9) and (11) respectively), it can be induced that collective markers in the two languages are compatible with definite nouns.

(9) xuesheng   zhengzai   gongyuan   li   tiqiu   (Chinese sentence without *men*)
     student   PROG   park   in   kick-ball
     "The student(s) is/are playing football in the park."
     * "A student is playing football in the park."
     * "Students are playing football in the park."
     * "There is/are student(s) playing football in the park."

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[5] Jenks (2011:69) argues that Thai bare nouns at a preverbal subject position can also be interpreted as indefinite. However, such interpretation does not seem to be a default one as the author also points out that the indefinite interpretation of a bare noun subject is not salient unless a topic is added before the noun.

(10) xuesheng-men   zhengzai   gongyuan   li   tiqiu   (Chinese sentence with *men*)

      student-*men*   PROG   park   in   kick-ball

      "The students are playing football in the park."

(11) nákrian   kamlaŋ   tèʔbɔɔn   yùu-nay   sǔan   (Thai sentence without *phûak*)

      student   PROG   kick-ball PROG-in   park

      "The student(s) is/are playing football in the park."

(12) phûak-nákrian   kamlaŋ   tèʔbɔɔn   yùu-nay   sǔan   (Thai sentence with *phûak*)

      phûak-student   PROG   kick-ball PROG-in   park

      "The students are playing football in the park."

As for the indefinite reading, we can test it in an existential sentence. Existential sentences are those that assert existence or nonexistence of something, such as sentences in a form of "*there + be* + nominal phrase (+ locative phrase)" in English, "(locative phrase +) *you* 'have' + nominal phrase (+ predication)" in Chinese and "*mii* 'have' + nominal phrase (+ predication) (+ locative phrase)" in Thai (Allan 1971; Huang 1987; Hsieh 2008; McNally 2011). Examples of Chinese and Thai existential sentences are provided in (13) and (15). Note that in what follows, I will refer to a noun or a nominal phrase appearing after the existential markers *you* in Chinese and *mi* in Thai as a *pivot noun/phrase*. For example, in examples (13) and (15), their pivot nouns are *xuesheng* and *nákrian* "student" respectively.

As pointed out by Huang (1987), Chinese existential sentences exhibit a *definiteness effect* (Fischer, Kupisch, & Rinke 2016; Safir 1982). That is, only indefinite nouns/phrases are permitted to serve in a pivot position, while definite nouns/phrases are not allowed to do so.[6] As a result, the pivot noun *xuesheng* in (13) can only be interpreted as indefinite and can be translated as either "a student" or "students" but not "the student(s)". To contrast, let us look at a Chinese example in (14) in which the pivot phrase *na ge xuesheng* (that-CL-student) "that student" contains a demonstrative *na* "that" which gives a definite reading to the phrase. Since there is a conflict between the definite reading determined by *na* "that" and the indefinite reading

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[6] Throughout this thesis, I limit my scope of existential sentences to positive existential ones (i.e. those indicating existence of something) not the negative ones which indicate nonexistence of something, as the two types of sentences may have some differences in terms of their interaction with definiteness of a pivot noun.

required by the definiteness effect of existential sentences, the sentence becomes ungrammatical. The situation is the same in Thai as its existential sentences only allow indefinite nouns/phrases in the pivot position. For example, the pivot noun *nákrian* "student" in (15) must be interpreted as indefinite. Additionally, since the sentence in (16) has an additional demonstrative *nán* "that", the conflict between the definite reading of *nán* "that" and the indefinite reading required by the existential sentence makes it ungrammatical.[7]

(13) you   xuesheng zhengzai gongyuan li   tiqiu   (Chinese)
      have   student   PROG   park   in   kick-ball
      "There is a student playing football in the park."
      "There are students playing football in the park."
      * "The student(s) is/are playing football in the park."
      * "There is/are the student(s) playing football in the park."

(14) * you   na   ge   xuesheng zhengzai gongyuan li   tiqiu   (Chinese)
        have that CL   student   PROG   park   in   kick-ball
      * "There is that student playing football in the park."

(15) mii   nákrian   kamlaŋ   tèʔbɔɔn   yùu-nay   sǔan   (Thai)
      have   student   PROG   kick-ball PROG-in   park
      "There is a student playing football in the park."
      "There are students playing football in the park."

(16) * mii   nákrian   khon   nán   kamlaŋ   tèʔbɔɔn   yùu-nay   sǔan   (Thai)
        have student   CL   that PROG   kick-ball PROG-in   park
      * "There is that student playing football in the park."

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[7] To be precise, the presence of a demonstrative is not the only difference between sentences in (13) vs. (14) and (15) vs. (16). A classifier is also added to accompany demonstratives in (14) and (16) because Chinese and Thai demonstratives must be accompanied by a quantifying word or a quantifying phrase such as "(numeral 'one') + CL" in these examples. (Note that the numeral "one" is omitted from the surface structures as discussed in Section 2.2.) Nonetheless, the addition of classifiers does not affect validity of our examples as the point of these sentences is that additional demonstratives inevitably make the pivot phrases definite.

Based on the fact that a pivot noun/phrase in existential sentences can only have an indefinite reading, we can use it as a tool to test whether a collective marker is compatible with indefinite nouns or not, and as we will see, this method shows that Chinese and Thai collective markers behave differently. Let us first look at a Chinese sentence in (17) which is adjusted from (13) with an addition of the marker *men* to the noun *xuesheng* "student" which must be interpreted as indefinite based on its appearance in an existential sentence. It can be seen that, in comparison with (13), the addition of *men* makes (17) ungrammatical, indicating that the Chinese collective marker is not compatible with indefinite nouns (Aoun & Li 2003; Hsieh 2008; Iljic 1994; Li 1999; Liu 2003; Tang 2004).[8] The situation, however, is different in Thai. The sentence in (18) is adjusted from (15) with an addition of the marker *phûak* to the noun *nákrian* "student". The grammaticality of (18) suggests that there is no conflict between a requirement for a pivot noun to be indefinite and the use of *phûak*. In other words, it shows that the Thai collective marker is compatible with indefinite nouns.

(17) * you   xuesheng-men   zhengzai   gongyuan   li   tiqiu   (Chinese)
         have   student-*men*   PROG   park   in   kick-ball
         "There are students playing football in the park."

(18) mii   phûak-nákrian   kamlaŋ   tèʔbɔɔn   yùu-nay   sǔan   (Thai)
         have   *phûak*-student   PROG   kick-ball   PROG-in   park
         "There are students playing football in the park."

To sum up, the above examples illustrate a restriction that only applies to Chinese but not Thai. In particular, Chinese collective marker can only attach to definite nouns but not indefinite ones, while Thai collective marker can be used with both definite and indefinite nouns. To put it in featural terms, both Chinese and Thai markers carry a [+definite] feature, but when it comes to

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[8] Of course, the addition of *men* in (17) also changes the number characteristic of the noun. That is, *xuesheng* "student" in (13) can be interpreted as either singular of plural, but *xuesheng-men* (student-*men*) in (17) can only be plural because the use of a collective marker implies that more than one referent is present. However, since existential sentences do not have a requirement regarding the number of referents represented by pivot nouns, the difference in singular/plural readings between (13) and (17) is unlikely to be a cause for ungrammaticality of (17).

indefiniteness, the feature for the Chinese marker is [−indefinite] while the one for the Thai marker is [+indefinite]. Such a phenomenon will be called a *definiteness restriction* in this thesis.

2.3.4 Chinese marker *men* and quantifying phrases

From Section 2.3.2 and 2.3.3, it can be seen that Chinese collective marker *men* is subject to more restrictions than Thai collective marker *phûak*. This includes the fact that the Chinese marker can only be used with definite human nouns, while the Thai marker can be used with definite/indefinite human/animal nouns. In addition, the use of the Chinese marker is also restricted by quantifying phrases which may appear in the same nominal phrase, as will be described below.

In the literature, there have been some discussions about compatibility of *men* with quantifying phrases. Researchers seem to agree that a "noun-*men*" structure cannot co-occur with numerals (Chu 2000; Huang *et al.* 2009; Li 1999).[9] For example, the grammatical phrase in (19) contains a numeral *san* "three" but not *men*. However, when *men* is added, the resulting phrase in (20) becomes ungrammatical. Such a restriction can be explained in terms of semantics. That is, while *men* indicates that referents are viewed as a whole, numerals draw attention to the number of individual referents (Chu 2000). As a result, co-occurrence of *men* with a numeral creates divergence in the focus of number (i.e. whole vs. individual), leading to unacceptability of a structure.

(19)   san   ge   xuesheng
       three   CL   student
       "three students"

(20) * san   ge   xuesheng-men
       three   CL   student-*men*
       "three students"

---

[9] This phenomenon may only apply to Mandarin Chinese used in mainland China, as it has been reported that the use of *men* with numerals is possible in Taiwanese Mandarin Chinese (Her 2012; Hsieh 2008).

Despite the consensus about the conflict between *men* and numerals, there seems to be some discrepancy between the literature and the real language use with regards to co-occurrence of *men* and a quantifying word *xie* "a few". On the one hand, it is argued in the literature that *xie* can co-occur with *men* because, unlike numerals, *xie* represents an inexact number and does not draw attention to a specific number (Chu 2000; Li 1999). As a result, it does not contradict the collective characteristic of *men*. On the other hand, from my interview with native speakers of Chinese, some of them prefer not to use *xie* with *men*. For them, a phrase in (22) which contains *xie* and *men* is not as well-accepted as its counterpart without *men* in (21). Although such preference does not apply to every native speaker, an explanation for some native speakers' lower preference on phrases containing *xie* and *men* can be found in Iljic (1994) which argues that *xie* and *men* represent different levels of subjectivity. That is, while *men* is used to construct a collective group of elements from a speaker's perspective, *xie* is a pure quantitative operation which does not imply the speaker's subjectivity. Such a slight and subtle difference between the two words may be a reason why these native speakers prefer non-co-occurrence of *xie* and *men* in the same phrase.

(21)   zhe   xie   xuesheng
     this   few   student
     "these students"

(22)   ? zhe   xie   xuesheng-men
     this   few   student-*men*
     "these students"

Compared with Chinese, a restriction regarding quantifying phrases seems to be looser on Thai collective marker *phûak*. In particular, there seems to be no conflict between co-occurrence of *phûak* and a numeral in the same nominal phrase, as shown by grammaticality of (24) in which *phûak-nákrian săam khon* (*phûak*-student-three-CL) "three of the students" contains *phûak* and a numeral *săam* "three". In addition, *phûak* does not seem to be in conflict with *làw* "group" (which can be considered as a close equivalent of *xie* "a few" in Chinese based on their meanings and appearances next to demonstratives) as shown by grammaticality of (25).

(23) chăn mii ŋəən hây nákrian săam khon

      I   have money give student three CL

      "I have money for three students."

(24) chăn mii ŋəən hây phûak-nákrian săam khon   (From Jenks 2011:107)

      I   have money give *phûak*-student three CL

      "I have money for three of the students." [10]

(25) phûak- nákrian làw níi

      phûak-student group-this

      "these students"

2.4 Summary

In this chapter, several characteristics of Chinese and Thai nominal phrases have been introduced and contrasts are made between the two languages. These linguistic phenomena are discussed from a featural perspective and assigned with corresponding features. Phenomena and features which are main focuses of my empirical study are summarised in Table 1.

Table 1 Phenomena and features which are main focuses of the current study

type	language	phenomenon	feature
word order	Chinese	"numeral + classifier + noun" word order	[–NPmove]
	Thai	"noun + numeral + classifier" word order	[+NPmove]
animacy restriction	Chinese	collective marker cannot be used with animal nouns	[–animal]
	Thai	collective marker can be used with animal nouns	[+animal]
definiteness restriction	Chinese	collective marker cannot be used with indefinite nouns	[–indefinite]
	Thai	collective marker can be used with indefinite nouns	[+indefinite]

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[10] As Jenks (2011) points out, although (24) is grammatical, *phûak* makes its interpretation slightly different from a similar sentence without the marker shown in (23). In particular, the presence of *phûak* emphasises a partitive interpretation of the nominal phrase; therefore, *phûak-nákrian săam khon* (*phûak*-student-three-CL) in (24) indicates that the three students are parts of a larger group of students and should be translated into "three of the students" instead of "three students". In contrast, *nákrian săam khon* (student-three-CL) in (23) can refer to any three students who are not necessarily parts of a larger group.

From Table 1, there are three types of features which are important in this study. The first one includes the [+/–NPmove] features which have an effect on word orders. Specifically, Chinese numerals carry a [–NPmove] feature, representing the fact that they do not require NP movement. As a result, the Chinese word order follows a linear order of a universal DP structure which is "numeral + classifier + noun". In contrast, Thai numerals carry a [+NPmove] feature, suggesting that there is a movement of NP from a base-generated position to a Spec,NumP position. As a result, the NP appears before the numeral and the Thai word order becomes "noun + numeral + classifier".

Next, we focus on a relationship between semantics of nouns and presence or absence of collective markers (namely *men* in Chinese and *phûak* in Thai). Although the two markers are similar in that both of them can be used with nouns referring to human, they differ when nouns refer to animals. In particular, *men* is generally incompatible with animal nouns, hence having a [–animal] feature, while *phûak* is compatible with them, hence having a [+animal] feature.

Lastly, we look at a relationship between (in)definite readings of nouns and presence or absence of collective markers. Although *men* and *phûak* are both compatible with definite nouns, only *phûak* is compatible with indefinite nouns such as those appearing in existential sentences. In other words, *phûak* has a [+indefinite] feature, while *men* has a [–indefinite] feature.

As for an interaction between collective markers and quantifying phrases described in Section 2.3.4, it is not a focus of my empirical study. However, it will play a role in my design of test sentences and my data analysis, as will be discussed in Chapter 4 and 5.

Chapter 3: Positive evidence and form-function transparency in second language acquisition

3.1 Approaches to second language acquisition

3.1.1 The feature re-assembly approach

In Chapter 2, I analyse linguistic phenomena related to Chinese and Thai nominal phrases in terms of features. In this chapter, I will show how these features are related to issues in L2 research and how studying the acquisition of these features can provide us with more insights on L2 acquisition in general. Since my study focuses on features, it is mostly consistent with the feature re-assembly approach proposed by Lardiere (2005, 2008, 2009a, 2009b). Therefore, I will borrow some ideas from the approach as will be described below.

To begin with, let us understand main concepts of the feature re-assembly approach as primarily discussed in Lardiere (2009a). The approach is an endeavour to elaborate a research paradigm on L2 acquisition by taking syntactic features at its core. This is in contrast with a traditional approach of studying L2 acquisition in terms of parameter resetting which, according to Lardiere (2008, 2009a, 2009b), is problematic. In particular, if linguistic phenomena are to be described or analysed in terms of parameters following the Principles and Parameters framework (Chomsky 1981, 1986), ideally the number of parameters in each language should be small. It is not ideal to analyse languages with fragmentation of parameters (or microparameters) as such a method will allow parameters to proliferate and run out of control, hence providing no discernible benefit for researchers (Lardiere 2009a; Lightfoot 1997). However, in reality, it is difficult to describe linguistic phenomena with a limited set of parameters, and a parametric analysis often fails to provide an adequate coverage of phenomena in any languages. Without a suitable set of parameters, it is consequently nearly impossible to study how L2 learners will acquire or reset them.

Instead of taking a parametric approach to L2 acquisition, Lardiere adopts an idea from the Minimalist Program (Chomsky 1995) that lexical items are bundles of features. Cross-linguistic differences are not a result of different parameter settings, but a result of differences in featural specifications. For example, language A may have feature X and Y associated with lexical item A, while language B may have feature X and Z associated with lexical item B. These

two lexical items are similar in having the feature X, but different on feature Y and Z. As a result, the two items might be perceived as close equivalents based on the shared feature X, but they are not identical as a result of the other two features.

Analogous to cross-linguistic differences, learners' L2 grammars and a TL grammar may also diverge if they contain different featural specifications. For a lexical item with multiple features, learners may be able to successfully acquire some of the features, but fail to acquire others. It is these unacquired features that cause learners to behave differently from native speakers of the target language.

Regarding what happens during language acquisition, Lardiere makes it clear that L1 and L2 acquisition processes are different. For L1 acquisition, it is believed that children are born with a set of linguistic features as part of human genetic endowment. Therefore, their task is to select a subset of those features that are deployed in a particular language and assemble them into certain lexical items. In contrast, L2 learners have a different point of departure. The feature re-assembly approach assumes that L2 acquisition begins with learners making a connection between lexical items (also called *morpholexical items* in Lardiere 2009a, 2009b) in their L1 and TL. Although Lardiere does not elaborate a process in which learners make a connection between items in the two languages, it is assumed that the link is made on a basis of meaning or grammatical function. For example, Thai learners of Chinese are likely to map the Thai numeral *nùŋ* "one" with the Chinese numeral *yi* "one" because the two words have the same quantity-expressing function. The approach also adopts a Full Transfer concept from the Full Transfer / Full Access hypothesis (Schwartz & Sprouse 1996) and assumes that, after a connection is made in L2 grammars, features on an L1 item (excluding phonetic features) will be transferred to its L2 counterpart. In the case of the word "one" mentioned above, a full transfer will lead to the [+NPmove] feature which attaches to the Thai numeral to be transferred to *yi* "one" in the learners' L2 Chinese. The lexical matching and featural transfer processes form a *mapping stage* of L2 acquisition.

In reality, it is likely that features on L1 and TL items which are mapped with each other are not exactly the same. Therefore, the tasks of L2 learners after mapping are to figure out a correct combination of features for each L2 item and to assemble them accordingly. These processes constitute a *re-assembly stage* of L2 acquisition. To elaborate, Lardiere proposes that feature re-assembly begins with learners' observation of contrasts among the use of different

lexical items in TL. For example, learners from a non-tense-marked language may notice that verbs in English are used in various forms, such as *walk* and *walked*. After the observation, they will try to associate the contrast with a difference in meaning or grammatical function (e.g. the tense difference in our current example) in order to figure out what feature is responsible for the contrast. After the feature is identified, they will incorporate it into a corresponding lexical item, such as adding a [Past] feature to the word *walked*. In other words, features of the word *walked* in the learners' L2 English are re-assembled with an addition of a new tense feature.

After the feature re-assembly approach was proposed and extensively described in Lardiere (2009a), a number of studies have been conducted with this approach (such as Cho 2012; Hwang 2012; Hwang & Lardiere 2013; Mai & Yuan 2016; Shimanskaya 2015; Yuan & Zhao 2011) and to verify viability of the approach (such as Choi 2009; Dominguez, Arche, & Myles 2011; Muroya 2013a; Renaud 2011a). To me, the rise in popularity of the approach within L2 acquisition research community can be attributed to at least two factors. First, the approach is compatible with a current trend in syntactic theories, i.e. a featural approach to analysing linguistic phenomena (as in the Minimalist Program). Secondly, its focus is more fine-tuned than some of the previous approaches in L2 studies, such as the parameter resetting approach mentioned above and the Interface Hypothesis (Sorace 2011, 2012; Sorace & Filiaci 2006; Sorace & Serratrice 2009; Tsimpli & Sorace 2006), which tend to view linguistic phenomena rather holistically and make across-the-board predictions about learners' behaviours (Prawatmuang & Zhao 2014; Yuan 2010; Yuan & Dugarova 2012). Such a fine-tuned approach is beneficial for researchers as they can gain more insights into L2 grammars by focusing on specific features (Spinner 2013). Considering advantages of the approach, I will adopt its concepts in my current research, with details in the next section.

3.1.2 Current study's approach and assumptions

One of the concepts that I adopt from the feature re-assembly approach is to take a fine-tuned view on linguistic phenomena, i.e. analysing behaviour of a lexical item in terms of separate features instead of parameters. Let us take a topic of word orders as an example. In early days of L2 acquisition studies, researchers tried to study word orders using a parameter resetting approach, and as a basis, parameters that affect word orders had to be identified. However, this has proven to be a difficult task for L2 Chinese research as Chinese word orders do not always fit

with criteria of a head-initial or head-final parameter (Flynn & Espinal 1985; Huang 1982; Light 1979; Jiang 1991; Travis 1984). On the one hand, the language is substantively head-final as modifiers of nouns, verbs and adjectives precede their heads.[11] For example, in the phrase *hao xuesheng* "good student", the modifier *hao* "good" appears on the left while the head noun *xuesheng* "student" appears at the phrase-ending position. On the other hand, the language has an SVO structure which, under Greenberg's (1963) universal word order patterns, is a characteristic of head-initial languages.[12] As a solution, Huang (1982) suggests an analysis of Chinese word orders with two possible parameters, i.e. head-initial and head-final, but Chinese NPs are always head-final.

If Huang's parametric analysis was adopted in the current study, we would say that the "numeral + classifier + noun" structure in Chinese represented its head-final parameter as the noun appears at the final position of the phrase, while the Thai "noun + numeral + classifier" structure represented a head-initial parameter as the noun appears first. Yet, this parametric dichotomy cannot account for other relevant phenomena within nominal phrases of the two languages. Note that, during our contrast of the Chinese and Thai structures above, we only focus on positions of nouns and assign the parameters accordingly. The phrases, however, also contain the "numeral + classifier" part which appears in the same order in the two languages. If it is agreed that Num and CL are separate heads and numerals in Num always take scope over classifiers in CL, then we will not be able to explain how two languages which have different head-directionality parameters can produce the same word order for "numeral + classifier" (Simpson 2005b).[13] It is, then, quite clear that we cannot appropriately account for the word

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[11] Note that in the past century, nominal phrases were often analysed as NPs, not DPs which were proposed around the end of the century (cf. Abney 1987). Therefore, in this particular context, when we talk about a head of a nominal phrase, we are referring to nouns, not determiners.

[12] Some researchers such as Li & Thompson (1981) proposed that Chinese may be an SOV language based on an increasing use of the *ba* structure (i.e. "subject + *ba* + object + verb") and other evidence. However, the analysis has been argued against and it is usually agreed that a basic word order in Chinese is SVO (Kuang 1980; Li 1990).

[13] To explain why Chinese and Thai nominal phrases both have the "numeral + classifier" word order despite their difference on positions of nouns, one may propose to analyse the "numeral + classifier" structure as a bundle occupying only one head and the bundle has a fixed word order which is not related to a head-directionality parameter of a nominal phrase. However, the bundle analysis is not widely adopted because it brings about a problem of doubly-filled head (Tang 1990b:414). Moreover, if "numeral + classifier" was analysed as a head, we

order difference in Chinese and Thai by assigning a single head-directionality parameter for each language. And without a firm basis regarding parameters in each language, one must be cautious before proceeding with an L2 study about resetting of those parameters.

As to the animacy and definiteness restrictions on Chinese and Thai collective markers, it is also difficult to explain cross-linguistic differences in terms of parameters. Recall that the animacy and definiteness restrictions are semantic restrictions, i.e. they are conditioned by semantics and interpretation of nouns. Nonetheless, according to McGilvray (2016), semantic features do not appear to be parameterised under the Principles and Parameters framework (Chomsky 1981, 1986). Note that in Chomsky's original proposal, parameters should be sets of properties which have complex effects in differentiating otherwise similar languages. Ideally, a set of parameters in each language should be small and finite, and each parameter should be associated with a cluster of deductive consequences (Baker 1996; Lightfoot 1997). However, since the number of lexically expressed concepts is large and unlikely to be grouped into sets of deductive concepts, it is virtually impossible to parameterise semantic properties.

Instead of trying to fit linguistic phenomena in the parametric framework, we can focus on features that affect specific behaviour of a lexical item and study how each of them is acquired. The latter approach is what is proposed by Lardiere (2009a and others) and adopted in this thesis. In particular, I will study L2 acquisition of [+/–NPmove], [+/–animal] and [+/–inanimate] features separately but thoroughly. The method also allows us to study effects of other factors on L2 acquisition. For example, regarding acquisition of the [+/–animal] features on collective markers, we can observe an acquisition of the Thai marker by Chinese native speakers to learn how L2 acquisition is like when positive evidence is available. Conversely, we can learn about L2 acquisition under a lack of positive evidence by observing Thai learners' acquisition of the Chinese marker.

Another portion of the feature re-assembly approach adopted in this thesis is to assume that, at an initial stage, learners map L1 and TL lexical items based on their shared meaning or grammatical function, then transfer features from an L1 item to its corresponding TL item.

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would not be able to explain how, sometimes in Chinese, an adjective can appear between the two elements leading to a "numeral + adjective + classifier" combination (Dong 2013; Her & Hsieh 2010; Hsieh 2008; Lu 1987; Tang 1990b, 2005; Zhang 2011; Zhou 2010). As a result, it is more desirable to analyse Num and CL as two different heads, each with its own projection.

Moreover, following the Full Transfer hypothesis, it is assumed that all features except for the phonetic ones are transferred into the learners' L2 system. For example, in our study of word orders, it is assumed that Chinese and Thai learners map L1 and TL numerals based on their quantity-denoting function, such as mapping the Chinese numeral *yi* "one" and the Thai numeral *nùŋ* "one" together. Then, they transfer features from their L1 numerals to their L2 counterparts, including the [+/–NPmove] feature and other features that are not focuses of this study (such as a categorical-selection [*u*CL] feature which accounts for the numerals' selection of a CLP as their complement).

Similarly, when learners encounter a collective marker in their TL, they will map it with the collective marker in their L1 and transfer its features over. These features include the [+human], [–inanimate] and [+definite] features which are the same in Chinese and Thai, as well as the [+/–animal] and [+/–indefinite] features to which the two languages assign different feature values. After the initial transfer, learners may enter the re-assembly stage and start to adjust the incorrect [+/–animal] and [+/–indefinite] features to match the correct values in their TL. Note that, although the [+/–animal] and [+/–indefinite] features are both carried by a single morpholexical item, i.e. a collective marker, they are separate features. Therefore, it is possible that their acquisition is affected by different factors and develops at a different pace.

3.2 Aspects of L2 acquisition research related to the current study

3.2.1 Previous studies related to linguistic phenomena in this study

After the feature re-assembly approach was proposed, several studies have adopted it in different research areas. These include studies of L2 syntactic features such as [Gender] (Renaud 2011b; Shimanskaya & Slabakova 2014; Spinner 2013), [Number] (Spinner 2013), [Q] (Choi 2009; Yuan 2015) and [EPP] (Muroya 2013b) and L2 semantic-selection features such as [+/–telic] (Mai 2013; Mai & Yuan 2016) and [+/–human] (Hwang 2012; Hwang & Lardiere 2013).

Some of these studies explore issues that are closely related to linguistic phenomena in the current study, including Moruya's (2013b) work on L2 acquisition of word order in English *wh*-questions. Indeed there are certain differences between Moruya's research and my current project, including the fact that she studies word orders in *wh*-questions while I study word orders in nominal phrases; she studies a word order difference between Japanese and English while I study a difference between Chinese and Thai; and she labels a feature which motivates

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movement (of English *wh*-phrases) as [EPP] while my study uses a more specific label, i.e. [+NPmove]. Nonetheless, the essence of her and my research is similar in that we both study L2 acquisition of pure syntactic features that are responsible for movement. For this reason, her work can serve as a point of comparison for the current study.

A contrast between Japanese and English *wh*-questions is that while *wh*-phrases in Japanese stay *in situ*, those in English have to move to the front of a sentence because of an [EPP] feature attached to a [*u*Wh] feature on the English C (Pesetsky & Torrego 2001). To study L2 acquisition of the English [EPP] feature by Japanese native speakers, Muroya implemented a picture-stimulus task to elicit spontaneous data from her participants. It is found that the participants fronted English *wh*-words 100% of the time, regardless of specific *wh*-words (e.g. *who* or *what*) and type of questions (e.g. whether the *wh*-words are originally in an object or subject position), even among participants with limited exposure to English whose shortest length of exposure was only 8 months. The results suggest that the [EPP] feature was assembled to the learners' L2 English grammars quite early on. They also suggest that successfully acquiring a feature which is not present in one's native language is possible.

Regarding collective markers, Hwang (2012) and Hwang & Lardiere (2013) investigate the animacy restriction on a Korean marker *–tul*. The marker is added to the right of a Korean noun to indicate a plural reading of the noun. Therefore, its function is close to that of collective markers *men* and *phûak* examined in this thesis. What is interesting is that *–tul* is not allowed on nouns which appear in a numeral-classifier construction (with a word order of "noun + numeral + classifier") unless the nouns refer to human. Hwang & Lardiere (2013:60) provide two examples, repeated here as (26) and (27). They demonstrate a contrast between grammaticality of the former sentence in which *–tul* attaches to a human noun *haksayng* "student" and ungrammaticality of the latter sentence in which *–tul* attaches to a non-human noun *chayk* "book". As the [human] feature of nouns plays a role in Korean plural marking, it is appropriate to say that, when appearing in a numeral-classifier construction, *–tul* has a semantic-selection feature [+human].

(26) haksayng-tul twu myeng-i kyosil-ey tulewa-ss-ta
　　　 student-*tul*　　 two CL-NOM classroom-to enter-PAST-DECL
　　　 "Two students entered the classroom."

(27) * chayk-tul   twu   kwen-i   chayksang   wiey   iss-ta
        book-*tul*   two   CL-NOM   desk   on   exist-DECL
        "There are two books on the desk."

In contrast to Korean, the English plural marker –*s* does not pose a semantic requirement on nouns. It can attach to both human nouns (such as *students*) and non-human nouns (such as *books*). To study whether English native speakers can acquire the semantic-selection feature on the Korean marker, the researchers employed an acceptability judgment task containing grammatical sentences with –*tul* attaching to human nouns and ungrammatical sentences with –*tul* attaching to non-human nouns. It is found that learners at intermediate levels could not make a distinction between the two sentence types, accepting both of them to a similar degree, while advanced learners were able to recognise the semantic restriction to a certain extent. In addition, an individual analysis shows that it was possible for some learners to eventually gain native-like attainment on this feature. In sum, these results suggest that although acquiring a semantic restriction in TL is difficult, there is still a chance for some learners to be successful.[14]

3.2.2 A need for further studies

Despite the fruitful results described in the previous section, I believe there is still a need for more research in order for us to have a better understanding about language development during L2 acquisition and about L2 acquisition of word orders and collective markers in particular. The reason is that, although many researchers have been able to describe and test linguistic elements that may pose difficulties for L2 learners, at the current stage we are yet to agree on what causes such difficulties. Even the feature re-assembly approach which is a relatively new research paradigm does not provide a specific hypothesis about learners' behaviour that can be further tested. Take Lardiere (2009a), which is one of the seminal papers on this approach, as an example. When it comes to a question of what leads to success in L2 acquisition, the author only points out that L2 acquisition success is not determined by types of features (such as interpretable vs. uninterpretable or available vs. unavailable in L1) and suggests that learners

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[14] As a working definition, a feature is said to be easy to acquire if learners can perform native-like at early stages of L2 acquisition. On the other hand, it is difficult to acquire if learners fail to perform native-like at early or even later stages.

should have a chance to successfully acquire all types of features.[15] She, however, does not provide a comprehensive perspective of why some features still seem to be more difficult to acquire than others.

In the paper, Lardiere also mentions that it is important for learners to detect contrasts between forms of different lexical items (such as a singular form *student* vs. a plural form *students*) in order to figure out a correct feature that accounts for differences in TL and successfully re-assemble it to a corresponding lexical item. She states that "any feature contrast that is detectable is, in principle, ultimately acquirable" (Lardiere 2009a:214). Based on this statement, it can be understood that feature detectability is a good predictor of learners' success. However, the author does not provide a definition for *detectability* nor discuss factors that may affect learners' detection of such contrasts. Furthermore, immediately following the above statement, the author continues by saying "although it might not be actually acquired in any given particular case for independent reasons", suggesting that there are more factors influencing success of L2 acquisition than feature detectability. Unfortunately, she does not discuss which "independent reasons" can come into play.

Because of the lack of precision in her statement, the feature re-assembly proposal has been criticised as being a *post hoc* explanation of L2 phenomena rather than a predictive one (White 2009). This makes the approach falls short as an appropriate theoretical model, as scientific models should aim to provide testable predictions. From this point of view, some researchers suggest that the approach aim to seek out universal constraints on feature re-assembly so that it can eventually allow us to predict which language combinations will be easier or harder to acquire than others (Slabakova 2009; White 2009). However, at the current stage, the approach does not seem to be able to do so.

To achieve a goal of improving predictability, it is important that studies are conducted to discover constraints on feature re-assembly, and feature-related factors should be studied in more detail so that their roles in L2 acquisition can be better understood. In the current study, I choose to focus on roles of availability and/or lack of positive evidence as well as form-function transparency. Previous findings related to these factors will be reviewed in the following sections.

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[15] This is contrary to a view from the representational deficit account (Hawkins 2005; Hawkins & Hattori 2006; Tsimpli & Dimitrakopoulou 2007) which states that learners will inevitably fail to acquire uninterpretable features in their target languages.

3.2.3 L2 acquisition when positive evidence is available in a target language

Positive evidence can be understood as linguistic data, in both spoken and written form, to which learners are exposed (Gass & Selinker 2008:305; VanPatten & Benati 2010:127).[16] A role of positive evidence in language acquisition is widely recognised. Even within the generative approach in which language learning is believed to be driven by human's internal mechanisms and constrained by Universal Grammar, input is still obligatory. For example, under the Principles and Parameters framework (Chomsky 1981, 1986), although parameters can give language acquirers advance knowledge of what possibilities there are in a language, acquirers still need to receive input data in order for them to determine a choice between various possible parameter settings (White 2003). In addition, under a more recent Minimalist Program, input or language experience (also called *primary linguistic data*) is viewed as one of the three factors that determine human's language competence (Chomsky 2005).

With regards to L2 acquisition in particular, a role of positive evidence is highlighted in many hypotheses and models. For example, in Carroll's (1999, 2001, 2007) Autonomous Induction Theory which places importance on both Universal Grammar and processing, when learners receive a piece of input (i.e. stimulus) which is consistent with their current L2 system, the system will be strengthened. On the contrary, when the input is not consistent with the system and causes failure in parsing, learning mechanisms will try to adjust properties in the system to accommodate the novel input (Maftoon & Esfandiari 2015; Smith 2013). Learning, therefore, is triggered by a failure to process input (Gass & Selinker 2008).

Applying the above concept to our current study, it can be said that after the mapping stage in which L1 and TL lexical items are matched and L1 features are transferred to the L2 system, positive evidence can help learners confirm or disconfirm the presence of those features. For example, if learners receive input that matches with a language structure expected as an outcome of features in their L2 grammars, the features will be confirmed. On the other hand, if the input does not match their expectation, the existing features will be disconfirmed and learners

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[16] In contrast, negative evidence (also called *direct negative evidence* or *negative feedback*) refers to explicit information about which strings of words are not grammatical, such as parents' or teachers' correction of incorrect speech or their adverse reactions to it (Bruton 2000; Chomsky 1981:8-9; Pullum & Scholz 2002; White 2003, Chapter 5). Such evidence is often little and noisy in L1 acquisition (Marcus 1993) but it may occur more frequently in a second language classroom.

may change their hypothesis about existence of the features and re-assemble them accordingly. In a nutshell, input provides materials from which language acquirers can discern specific configurations of features on each lexical item (Lardiere 2009a). It is, therefore, very important for L2 acquisition (Rankin & Unsworth 2016; Tsimpli 2014).

Effects of positive evidence described above have been confirmed by empirical studies such as Lee (2015) and Lee & Lardiere (2016). The topic of these two papers is L2 acquisition of number marking in Korean and Indonesian. As introduced by the authors, both Korean and Indonesian have means to indicate plurality of nouns. Specifically, Korean does so by adding the suffix *–tul* to a noun (such as *chayk* "book" vs. *chayk-tul* "books") while Indonesian uses a full reduplication of a noun (such as *buku* "book" vs. *buku-buku* "books").[17] Nonetheless, plural marking in the two languages differ in a few ways, including their compatibility with non-numeric quantifiers such as *manhun* "many" in Korean and *banyak* "many" in Indonesia. In particular, it is grammatical for a Korean non-numeric quantifier to appear with plural marking such as in the phrase *manhun chayk-tul* "many books". In contrast, it is ungrammatical for an Indonesian non-numeric quantifier to appear with plural marking; hence *banyak buku-buku* "many books" is ungrammatical. To put it in featural terms, we can say that the Korean plural marker has a [+non-numeric quantifier] feature while the Indonesian counterpart has a [−non-numeric quantifier] feature.[18]

Adopting the feature re-assembly approach, the studies assume that Indonesian learners of Korean will transfer the [−non-numeric quantifier] feature on their L1 plural marking to their L2 Korean counterpart, hence not allowing the usage of *–tul* with non-numeric quantifiers at the initial stage of L2 acquisition. One of their research questions asks whether the learners will be able to allow such a usage later on. Based on the production data obtained by a sentence completion task, it is found that even the lowest proficiency learners in the studies (defined as low-intermediate) produced Korean plural marking with a non-numeric quantifier, and the

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[17] The authors also note that plural marking in these languages is not mandatory as it is also grammatical to use Korean and Indonesian nouns with plural referents without a plural marker (Kwon & Zribi-Hertz 2004).

[18] In the original papers, Lee (2015) and Lee & Lardiere (2016) describe the phenomenon discussed here with a [rel] feature, in which "rel" is an abbreviation of *relative* which refers to relativity in quantification expressed by non-numeric quantifiers (in comparison with numeric quantifiers which express *absolute* quantification). Since the label itself is not of the utmost importance here, I change it to [+/−non-numeric quantifier] for clarity.

percentage of production of plural marking increased with the participants' level of proficiency. Their results from a grammaticality judgment task and a multiple-choice test also indicate that most Indonesian learners in all three proficiency groups in the studies (i.e. low-intermediate, high-intermediate and advanced) accepted the Korean "non-numeric quantifier + noun + *tul*" structure.

　　Based on the findings, it may be the case that after an initial transfer of the [−non-numeric quantifier] feature, Indonesian learners receive Korean input which includes the "non-numeric quantifier + noun + *tul*" structure. As this structure is incompatible with the [−non-numeric quantifier] feature on their L2 Korean marker, the positive evidence disconfirms the feature and triggers a change from [−non-numeric quantifier] to [+non-numeric quantifier]. It is also worth noting that this change can happen relatively early in L2 acquisition process as learners in Lee (2015) and Lee & Lardiere (2016) started to perform native-like since a low-intermediate level.

3.2.4 L2 acquisition when positive evidence is not available in a target language

As discussed in the previous section, positive evidence is crucial for L2 acquisition. A relevant question is, then, what L2 systems will be like if learners receive no positive evidence regarding certain features in a target language. In particular, there may be cases in which an L1-transferred feature leads to acceptance of certain language structures which are ungrammatical and not present in TL. As learners will not be exposed to any positive evidence about the structures, will they be able to know that the transferred feature is incorrect and unlearn it?[19] Several experimental studies, literature reviews and discussions have been conducted with regards to this question. In general, they argue that it is difficult for learners to unlearn or disallow a usage which is possible in their L1 but not present in TL (Gabriele 2009; Ionin & Montrul 2010;

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[19] Of course, learners may receive negative evidence regarding the structures. For example, teachers may correct them when they produce incorrect sentences. However, this learning method is likely to lead to explicit knowledge (i.e. the conscious awareness of what a language consists of and/or of its linguistic rules) (Ellis 2004; Krashen 1982; Rebuschat 2013). Since it is not yet clear how explicit and implicit knowledge are related and whether explicit knowledge can be converted to implicit knowledge (Ellis 2009), I will not focus on the effect of direct negative evidence and explicit instruction in this thesis. My focus, instead, is on the effect of linguistic evidence in natural input.

Inagaki 2001; Lee 2015; Slabakova, Leal, & Liskin-Gasparro 2014; Sorace 2011; Trahey 1996; Yuan 2014).

Let us take Lee (2015) and Lee & Lardiere (2016) previously described in Section 3.2.3 as an example again. In addition to studying L2 Korean plural marking, the researchers also study L2 acquisition of Indonesian plural marking by Korean learners. Recall that the use of a plural marker with non-numeric quantifiers is acceptable in Korean but not in Indonesian. Based on an assumption that Korean learners will initially transfer the [+non-numeric quantifier] feature to their L2 Indonesian, allowing co-occurrence of plural marking with non-numeric quantifiers, and the fact that there is no structural input regarding the co-occurrence in Indonesian, the authors predict that it will be difficult for Korean learners to unlearn the [+non-numeric quantifier] feature. Moreover, a successful feature re-assembly, if any, is predicted to be delayed until later stages of acquisition. Results from a grammaticality judgment task in their empirical study confirm these predictions. In particular, low proficiency learners failed to reject the ungrammatical "non-numeric quantifier + noun + noun" structure in Indonesian, indicating that the Korean-like [+non-numeric quantifier] feature might sill be present in their L2 grammars. The performance, however, became more native-like in high-intermediate and advanced groups.

As a late acquisition of the Indonesian [–non-numeric quantifier] feature forms a contrast with an early acquisition of the Korean [+non-numeric quantifier] feature described in Section 3.2.3, these bi-directional studies provide good data for effects of positive evidence. That is, it is relatively easy for learners to acquire a TL usage even though it is different from their L1 as long as they can be exposed to examples of the usage in TL input. Contrastingly, when a usage is ungrammatical, it simply does not appear in TL input and no relevant structure will be available for learners. As a result, there is no positive evidence that can trigger feature re-assembly in learners' L2 grammars. The learners, consequently, will find it difficult to unlearn a corresponding L1-transferred feature.

Now that it is evident that a lack of positive evidence can lead to difficulty in L2 acquisition, the following questions may arise: When a TL feature is different from an L1 feature and no positive evidence is available in TL input, to what extent is the TL feature difficult to acquire? Can learners eventually unlearn the L1-transferred feature, acquire the correct TL feature and perform native-like? There are at least two points of view regarding the answers: 1)

learners will fail to acquire the correct feature even at the ultimate attainment level; and 2) they can acquire the correct feature. These two ideas will be explored in the following sub-sections.

3.2.4.1 Dormant feature hypothesis

The dormant feature hypothesis proposed in Yuan (2014) is one of the hypotheses which hold a view that L2 acquisition will not be successful if positive evidence is not available in TL.[20] Yuan's (2014) study is about L2 acquisition of English *wh-on-earth* phrases (e.g. *what on earth* and *who on earth*) by Chinese native speakers. It tests several types of features related to the English *wh-on-earth* structure and its Chinese counterpart, the *daodi…wh* structure. Among these features, ones that can provide a clear picture on effects of positive evidence are [wh$_Q$], [wh$_{prop}$] and [+/−D-link] features.

The three features are available on the Chinese *daodi…wh* structure. Firstly, the [wh$_Q$] feature allows *daodi…wh* to appear in a *wh*-complement clause that serves as a question. For example, in (28), the part beginning with *daodi* serves as a complement clause of the verb *zhidao* "know". It has a property of a question as it indicates that Zhangsan wants to know who the person is. Another feature, [wh$_{prop}$], allows *daodi…wh* to appear in a *wh*-complement clause that serves as a proposition. This is shown by (29) in which the complement clause (starting from *daodi*) is not a question. It only states the fact known by Zhangsan. Lastly, *daodi…wh* also has a [+D-link] feature (in which *D* refers to *discourse*) which suggests that *wh*-words in *daodi…wh* structures can be anaphoric to a referent previously mentioned in the discourse. For example, in (30), the *wh*-word *shei* "who" is linked to *you ren* "someone" in the previous sentence.

(28) Zhangsan   xiang   zhidao   daodi   shei   hui   mai   na   ben   shu
      Zhangsan   want   know   *daodi* who   will buy   that CL   book
      "Zhangsan wonders who will buy that book."[21]

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[20] I am not aware of formal naming of the hypothesis. However, in this thesis, I use the term *dormant feature hypothesis* to refer to a hypothesis drawn from an idea about dormant features proposed in Yuan (2014). Similarly, in the following text, I call an L2 acquisition hypothesis drawn from an idea about probabilistic learning a *probabilistic learning hypothesis*.

[21] Chinese sentences in (28) – (30) are taken from Yuan (2014:520-521). I have modified some of their English translations to better represent the meaning in Chinese.

(29) Zhangsan   zhidao   daodi   shei   hui   mai   na   ben   shu
     Zhangsan   know   *daodi*   who   will   buy   that   CL   book
     "Zhangsan knows who will buy that book."

(30) you ren$_i$ mai-le   na   ben   shu.   Zhangsan   zhidao   daodi   shi   shei$_i$.
     someone   buy-PERF   that   CL   book   Zhangsan   know   *daodi*   is   who
     "Someone bought that book. Zhangsan knows who that person is."

Among the three features, the [wh$_Q$] feature is the only one available in English *wh-on-earth* phrases. As *wh-on-earth* carries the [wh$_Q$] feature but not the [wh$_{prop}$] feature, it can only be used in complement clauses that function like a question, not a proposition. This is shown by a contrast between (31) and (32) (taken from Yuan 2014:517) in which the *wh*-complement clause of the former sentence serves as a question while the *wh*-complement clause of the latter sentence serves as a proposition. Between the two sentences, only (31) is acceptable. Regarding the [D-link] feature, *wh-on-earth* has an opposite feature value to *daodi…wh*. The English feature is [–D-link], meaning that *wh*-words in *wh-on-earth* structures cannot be bound by a referent at a text level or in a discourse. Instead, they refer to any referents in the entire universe. For example, *who on earth* must be interpreted as anyone in the universe. If the phrase is forced to be bound by a referent, such as being anaphoric to *someone* in (33), it becomes ungrammatical.

(31)   I wonder who on earth would trust him.
(32)   * I know who on earth would trust him.
(33)   Someone$_i$ bought that house. * John knows who$_i$ on earth.

For Chinese learners of English, after L1 transfer of features from *daodi…wh* to *wh-on-earth* during a mapping stage, they are expected to receive English input like (31) which will confirm to them that the [wh$_Q$] feature is indeed present in their TL. In contrast, as the [wh$_{prop}$] and [+D-link] features are not available in English structures, the learners will never encounter a sentence that provides them with evidence to confirm or disconfirm presence of the features. These L2 features which receive neither confirming nor disconfirming input are focuses of Yuan's study.

In the study, the author used three instruments to test learners' behaviour, two of which were related to features being discussed here, namely an acceptability judgment task and an interpretation task. The former task was designed for the [wh$_Q$] and [wh$_{prop}$] features. Participants were asked to read English sentences that were modified to manifest different types of features and afterwards judge them on a scale of –2 (completely unacceptable) to +2 (completely acceptable) which indicated different degrees of acceptability. For the latter task, participants were given sentences that contained a *wh*-word or a *wh-on-earth* phrase and a potential antecedent. They were then asked to answer two questions: whether the sentences are acceptable and to what extent the *wh*-word or the *wh-on-earth* phrase can be linked to the antecedent. This task is used to test the [+/–D-link] feature.

The acceptability judgment task shows that advanced and very advanced learners in the study did not have a problem accepting test sentences in which *wh-on-earth* was in a complement clause functioning like a question (type *k* of test sentences in the original study). They performed native-like and could successfully acquire the [wh$_Q$] feature. In contrast, none of the learner groups demonstrated native-like behaviour on the [wh$_{prop}$] feature (type *i* in the original study). To be exact, unlike English native speakers who strongly rejected sentences in which *wh-on-earth* was used in a propositional complement clause, the Chinese learners (including those who were very advanced in English) were indeterminate in their judgment and could not reject these sentences. Within the acceptability scale from –2 to +2, their mean scores are around 0.

As for the interpretation task, results show that English native speakers considered test sentences in which *wh-on-earth* carried a [+D-link] feature to be unacceptable. Meanwhile, a large proportion of participants in each learner group consistently judged these sentences as acceptable. In other words, the learners did not seem to be able to rule out the infelicitous linking between *wh-on-earth* and an entity in the discourse, suggesting that the [+D-link] feature was still present in their L2 grammars.

Comparing results above, it can be seen that learners performed better on the [wh$_Q$] feature than the [wh$_{prop}$] and [D-link] features. The author explains that, because the learners can receive positive evidence which confirms the presence of the [wh$_Q$] feature, such as by hearing sentences like (31), the feature continues to be active in their L2 grammar after being transferred from L1. On the contrary, because there is no positive evidence regarding the [wh$_{prop}$] and

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[D-link] features in English input, these features are likely to lose vitality in learners' L2 lexicon and become less active. The author calls this type of features a *dormant* feature.

Yuan proposes that there can be a few consequences when a feature becomes dormant, including random behaviour in learners' production and interpretation, as well as learners' inability to confidently reject ungrammatical structures related to the dormant feature. To give an example, when the [wh$_{prop}$] feature becomes dormant, even though Chinese learners of English might be sensitive to ungrammaticality of the feature in their L2 English and might be able to rate test sentences with the incorrect [wh$_{prop}$] feature as less acceptable than their counterparts with a correct feature, their ratings of the ungrammatical sentences are not low enough to indicate that they are confident about its ungrammaticality.

Pushing forward the concept of dormant features, the author proposes that, in case of a long-term absence of confirming or disconfirming evidence in TL input, the dormant status is likely to be permanent and learners may never be successful in feature re-assembly. Moreover, he also points out that different types of features (such as semantic, morphosyntactic and discourse features) can all become dormant.

3.2.4.2 Probabilistic learning hypothesis

Contrary to the view that lack of positive evidence in TL leads to unsuccessful acquisition, some researchers believe that a long-term absence of positive evidence may in fact lead to successful L2 acquisition. The latter viewpoint is likely to stem from a question of poverty of stimulus in L1 acquisition. To be specific, poverty of stimulus is a situation in which people come to know more than what they could have gleaned from data provided to them, such as the case when a child knows what is ungrammatical in his L1 despite no negative evidence in the input (VanPatten & Benati 2010:127). To explain how children can achieve this kind of knowledge, some researchers propose that the children may obtain knowledge about ungrammaticality of certain structures by probabilistic learning (also called *statistical learning*) (Boyd & Goldberg 2011; Clark & Lappin 2009; Hsu & Griffiths 2016; Yang 2015).[22]

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[22] Of course, one of the most prevalent explanations for the problem of poverty of stimulus is that people are born with an innate specification which guides them into what is allowed or disallowed in a language, i.e. Universal Grammar (UG), as proposed by Chomsky (1965, 1981, 2000) (VanPatten & Benati 2010:128). In this thesis, I do

According to Clark & Lappin (2009), probabilistic learning in L1 acquisition proceeds in two steps. First, learners infer which kind of sentences has high probability of occurrence and which kind has low probability of occurrence based on a frequency of examples in their observed data. For example, learners of English can notice a high frequency of usage of the sentence form "He is …" along with non-occurrence of the form "He am …". Next, based on a comparatively low probability of a certain structure, learners infer that the structure is ungrammatical. For examples, since the probability of "He am …" in English input is virtually zero, learners can conclude that the structure is ungrammatical.

From the above example, it can be seen that under the probabilistic learning model, a lack of positive evidence regarding certain sentence structures actually provides useful information to learners by letting them know that the structures may be ungrammatical. This kind of information is called *indirect negative evidence* because it can inform learners about what is ungrammatical (similar to a function of negative evidence) but it is not provided explicitly to the learners (hence being indirect) (cf. Bruton 2000:124; Pearl & Mis 2016; White 2003:277).

As the task to figure out ungrammatical structures is not only faced by L1 learners but L2 learners as well (MacWhinney 2008), the concepts of probabilistic learning and indirect negative evidence have been applied to L2 acquisition (Trapman & Kager 2009; Treffers-Daller & Calude 2015; Yi, Lu, & Ma 2017; Zyzik 2009). Nonetheless, what is unique to probabilistic learning in L2 acquisition is that it can be affected by learners' L1. In particular, Plough (1995) argues that L1 provides a domain of expectation for people when they learn a new language. For instance, while observing TL input, L2 learners will expect to find structures that reflect a usage in their L1. If examples of the usage are found, the expectation will be confirmed. On the contrary, in case where an L1-like usage is ungrammatical in TL, incoming language materials will not match learners' expectation. After the absence of an expected structure is repeatedly noticed, learners will form a new hypothesis about TL grammar and adjust their L2 system accordingly.

The abovementioned role of indirect negative evidence has been supported by empirical studies such as Mai & Yuan (2016). Mai & Yuan's study is on L2 acquisition of a Chinese *shi…de* cleft construction which conveys a focus meaning similar to that by an English *it*-cleft construction. According to the researchers, *shi…de* has an obligatory past-tense reading (Paul &

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not attempt to argue for or against the presence and the role of UG in language acquisition. However, I believe it is possible that children acquire L1 with help of both UG and probabilistic learning.

Whitman 2008; Simpson & Wu 2002; Teng 1979). For example, although the sentence in (34) does not contain any temporal adverbials, it can only have a past-tense interpretation as shown by the English translation. This restriction leads to ungrammaticality of *shi…de* constructions which contain future-oriented temporal adverbials such as *mingtian* "tomorrow" in (35). In contrast, English *it*-cleft constructions are compatible with both past and future tenses, as shown by grammaticality of both (36) and (37).

(34) mali   shi   cong   xianggang   qu   meiguo   de   (from Mai & Yuan 2016:249)
      Mary   *shi*   via   Hong Kong   go   US   *de*
      "It was via Hong Kong that Mary went to the US."
      * "It is via Hong Kong that Mary (will) go to the US."

(35) * mali   shi   mingtian   qu   meiguo   de   (from Mai & Yuan 2016:249)
      Mary   *shi*   tomorrow   go   US   *de*
      "It is tomorrow that Mary will go to the US."

(36) It was yesterday that Mary went to the US.
(37) It is tomorrow that Mary will go to the US.

Based on the facts described above, the researchers predict that English-speaking learners of Chinese will initially allow the Chinese *shi…de* cleft construction to be used in both past and future contexts. In order to acquire the correct usage of *shi…de*, the learners have to disallow its use in the future context. However, this is unlikely to be an easy task as there is no *shi…de* structure in Chinese input that serves to disconfirm the learners' expectation. To study whether English learners are able to recognise the temporal restriction of *shi…de*, the researchers conducted an empirical study using an acceptability judgment task as one of their tools.

Based on participants' performance in the study, it is found that low-intermediate and high-intermediate learners were indeterminate in their judgment of sentences containing a future adverbial in the *shi…de* construction. The indeterminacy is reflected by their group mean scores which fall between "probably unacceptable" and "probably acceptable" categories. In contrast, advanced learners, like Chinese native speakers, could reject the ungrammatical sentences. Moreover, 71% and 76% of participants in the advanced and high-intermediate groups judged

the ungrammatical sentences with scores at least one point lower than their control sentences (which are grammatical sentences containing a past adverbial in the *shi…de* construction). The results indicate that these two groups of learners were aware that sentences with *shi…de* and future adverbials were less acceptable than their controls. To sum up, the study reveals native-like performance regarding the temporal restriction on Chinese *shi…de* construction by some high proficiency learners, and the success was achieved even without any help of positive evidence in Chinese input.

To explain this outcome, the researchers speculate that the successful acquisition is a result of probabilistic learning. It may be the case that, while receiving Chinese input, the learners implicitly calculated a probability of future adverbials appearing in *shi…de* cleft, in comparison with a probability of past adverbials in the same context. After a cumulative statistical calculation had reached a turning point, they started to realise that future adverbials were incompatible with *shi…de*. As a result, restructuring of their L2 grammar was triggered and the learners started to reject the use of future adverbials in *shi…de* construction. The researchers also pointed out that the grammatical restructuring took place in a gradual fashion (i.e. from lower to higher proficiency groups, there is a gradual increase in learners' rejection rates of ungrammatical sentences and their individual accuracy rates) and the non-target grammar lingered for a while before disappearing completely. Since the longer time is likely to correlate with a larger amount of input, this result is in line with a view that, in order for learners to abstract regularities from concrete exemplars of language use, the amount of input they receive has to be abundant enough (Boyd & Goldberg 2011; Yang 2015; Zyzik 2009).

3.2.5 L2 acquisition and form-function transparency

Availability and lack of positive evidence are not the only factors that can affect L2 acquisition. According to DeKeyser (2005), L2 acquisition may also be influenced by a psycholinguistic factor, namely the way a TL form and its function/meaning are connected in the learners' mind. When talking about form-function connection (also called *form-meaning connection*), a *form* can refer to a syntactic construction such as the English "*wh*-word + auxiliary/modal + subject + verb" structure, a morphosyntactic element such as the English verb ending *–ed* or a specific lexical item such as the word *that*. Functions of the abovementioned *wh*-construction and the verb ending *–ed* are to form a question and to indicate past tense, respectively. The word *that*,

however, can have different functions depending on the context, such as a determiner function in *that pair of scissors* and a clause marker function as in *books that I read* (VanPatten & Benati 2010:86).

A form-function connection can sometimes be simple and transparent, i.e. a form only has one function and this function is represented by only one form. But in many cases, the connection is less transparent than that (Don 2017; Hengeveld 2011). According to DeKeyser (2005), lack of transparency in form-function connection can be due to at least three factors: redundancy, opacity and optionality. To elaborate, redundancy refers to a situation in which more than one element in a sentence has the same function. For example, when an English sentence contains a past-oriented temporal adverbial such as *yesterday*, the verb ending *–ed* becomes redundant and does not provide additional meaning to the sentence. The fact that multiple forms can be connected to one function makes it difficult to establish a connection between the function and the forms. In contrast to redundancy, opacity refers to a situation in which one form has multiple functions as a result of homonyms, such as the case of the word *that* mentioned in the previous paragraph. This kind of relationship also leads to lower form-function transparency.

Optionality refers to a situation in which a form can have alternating presence or absence despite having the same function (not including subtle differences in pragmatics).[23] For instance, in Italian, pronouns can either be overt or covert. Take (38) and (39) as examples. Both sentences are grammatical despite the fact that the pronoun *lei* is present in the former but missing in the latter.[24] As the pronominal function in Italian is sometimes expressed by an overt form and sometimes by a null form, it can be difficult to establish a connection between the forms and their underlying function.

(38) Maria telefonerà quando lei ne avrà voglia
      Maria will-call   when   she will feel like
      "Maria will call if she wants." [25]

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[23] Note that the term *optionality* here should not be confused with *optionality* in a sense of interlanguage variability such as the one discussed in Parodi & Tsimpli (2005) (Bulté & Housen 2012; DeKeyser 2005).

[24] When a pronoun is absent from a surface structure, it is actually in a form of a phonetically null pronominal element called *pro* (Rizzi 1982, cited in Belletti *et al.* 2007).

[25] The Italian examples are from Belletti *et al.* (2007:660) but the English translations are provided by me.

(39) Maria   telefonerà   quando   ne avrà voglia
     Maria   will-call   when   *pro*   will feel like
     "Maria will call if (she) wants."

In spite of what has been presented above, I would like to add that the presence or absence of pronouns in (38) and (39) are, in fact, not totally optional. There are subtle pragmatic differences in interpretation of the two sentences. In particular, the pronoun *lei* "she" in (38) is typically interpreted as introducing a new topic, i.e. another woman who is not Maria. In contrast, the null pronoun in (39) refers to the preverbal subject of the superordinate clause, i.e. Maria (Belletti & Bennati & Sorace 2007; Carminati 2002; Grimshaw & Samek-Lodovici 1998; Samek-lodovici 1996). However, since we are talking about form-function transparency in L2 acquisition, we should consider the perception of optionality from a learners' perspective (DeKeyser 2005). And since learners often fail to recognise differences in discourse or pragmatics (Sorace 2011; Sorace & Filiaci 2006; Tsimpli & Sorace 2006), it is likely that they are not sensitive to the interpretive nuance and hence perceive the presence and absence of Italian pronominal subjects as being optional.[26]

As for a relationship between form-function transparency and L2 acquisition, results from empirical studies generally indicate that learners are unlikely to behave native-like when rule-governed (i.e. non-optional) TL forms are perceived as being optional. Let us continue to use pronouns as an example. In contrast to the Italian phenomenon mentioned above, English does not allow its pronominal subjects to be covert (D'Alessandro 2015).[27] For example, the sentence *Maria will call if she wants* will become ungrammatical if the pronoun *she* is omitted. Based on the difference between English and Italian, Belletti *et al.* (2007) designed a story telling task and a picture verification task to study L2 acquisition of Italian pronominal subjects by English native speakers who were very advanced in Italian. They found that the learners indeed produced some null subjects in spontaneous narratives. However, they produced overt pronominal subjects at a higher rate than Italian native speakers and interpreted antecedents of overt pronominal

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[26] The claim that learners often fail to recognise differences in discourse or pragmatics is not uncontroversial. For a view that learners can have target-like discourse or pragmatic knowledge, see Ivanov (2009) and Rothman (2009).

[27] According to Harvie (1998), although English is often claimed to be a prime example of non-null-subject languages, omission of subjects has been found in oral conversations. Nonetheless, the author also points out that such evidence may not be enough to categorise English as a pro-drop language or even a semi-pro-drop language.

subjects differently. In other words, the very advanced learners seem to have acquired a surface phenomenon of Italian pronominal subjects (i.e. knowing that Italian pronouns can be omitted) but have not acquired a rule underlying the superficial optionality (i.e. the interpretive differences). As a result, they could not perform native-like even when they had high proficiency in Italian in general.

3.3 Characteristics of features in the current study

Obviously, L2 acquisition can be influenced by many factors (Yuan 2010). However, in the current study I would like to focus on effects of presence or absence of positive evidence in TL input and form-function transparency. Characteristics of features in my study with regard to these factors are summarised in Table 2.

Table 2 Characteristics of features in the current study with regard to availability of positive evidence and form-function transparency

	Feature	Positive evidence	Form-function connection
For learners with L1 Thai and L2 Chinese	[–NPmove] on numerals	available	transparent
	[+NPmove] on numerals	not available	transparent
	[–animal] on collective marker	not available	not transparent
	[–indefinite] on collective marker	not available	not transparent
For learners with L1 Chinese and L2 Thai	[–NPmove] on numerals	not available	transparent
	[+NPmove] on numerals	available	transparent
	[+animal] on collective marker	available	not transparent
	[+indefinite] on collective marker	available	not transparent

In what follows, let us have a closer look at characteristics of each feature, beginning with the [+/–NPmove] features. Recall that the [–NPmove] feature represents no movement within a nominal phrase and accounts for the "numeral + classifier + noun" word order in Chinese. In contrast, the [+NPmove] feature suggests that there is an NP movement within a nominal phrase, leading to the word order of "noun + numeral + classifier" in Thai. Since word orders in Chinese and Thai are fixed, when nominal phrases appear as "noun + numeral + classifier" in Chinese or "numeral + classifier + noun" in Thai, they are ungrammatical.

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When Thai native speakers learn Chinese, they will encounter the "numeral + classifier + noun" structure in the input. This kind of input can inform them that Chinese nouns appear at a phrase-final position. It, however, does not serve as direct evidence to reject a possibility that the Thai-like "noun + numeral + classifier" structure might be correct in Chinese as well. To put it in featural terms, the input Thai learners receive only contains positive evidence for the Chinese [−NPmove] feature but does not contain disconfirming evidence against the Thai [+NPmove] feature.[28] The positive evidence can only tell the learners what is grammatical in TL, but it does not tell them what is ungrammatical.

When Chinese native speakers learn Thai, they will encounter the "noun + numeral + classifier" structure which can inform them that Thai nouns appear at a phrase-initial position. The structure serves as positive evidence informing them about the presence of the [+NPmove] feature. However, since Chinese learners begin their acquisition by transferring the [−NPmove] feature from their L1 to their L2 Thai, they will expect the "numeral + classifier + noun" structure to also be grammatical, and this feature has to be removed in order for them to successfully acquire the TL word order. Similar to the case of Thai learners discussed above, Chinese learners also face a problem of lack of evidence to disconfirm the L1-transferred feature. To be specific, Thai input can only show them grammatical structures in Thai but does not tell them which other structures are ungrammatical. As a result, there is no direct disconfirming evidence for the [−NPmove] feature.

In terms of form-function transparency, a relationship between Chinese and Thai nominal phrase structures and their [+/−NPmove] features are quite transparent. Redundancy, opacity and optionality problems do not exist in their form-function connection. To elaborate, recall that redundancy is a situation when more than one form has the same function. Since the [+/−NPmove] features attach to the form of numerals in their respective language and no other parts of a nominal phrase carry these features, the form-function connection is not redundant. Opacity, on the other hand, is a situation when a form has more than one function. Since the Chinese "numeral + classifier + noun" structure and the Thai "noun + numeral + classifier" only

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[28] In the current study, [+NPmove] and [−NPmove] features will be tested and discussed separately. They are not assumed to be mutually exclusive. In other words, it is assumed to be possible that a learner allows both features on the numerals, hence accepting both "noun + numeral + classifier" and "numeral + classifier + noun" structures. For evidence that learners may accept two contrasting word orders, see Trahey (1996) and Trahey & White (1993).

have one main function, i.e. to express quantity, the form-function connection is not opaque. Finally, optionality is a situation when a form can have alternating presence or absence while maintaining the same meaning. This problem does not exist in either Chinese or Thai because when nominal phrases in these two languages contain information about quantity, the numeral cannot be alternatively present or absent.

Compared with the word order issue discussed above, a form-function connection of collective markers in the two languages is less transparent as a result of optionality. Recall that whether a collective marker is used or not is based on speaker's perspectives (i.e. it is only used when he/she views referents as a collective group). Listeners, in contrast, have no way to certainly know how the speaker views the referents. As a result, there may be cases in which a listener views the referents as a group but the speaker does not. In this situation, the listener may expect the use of a collective marker but does not hear it, leading him/her to believe that the collective marker can be optionally present or absent.

The case of optionality is particularly complicated for the Chinese marker *men* because its presence or absence interacts with semantically obscure restrictions (cf. DeKeyser 2005). To begin with, let us recall that based on L1 transfer, *men* in Thai learners' L2 Chinese grammars will carry a [+human] feature, allowing phrases like *xuesheng-men* (student-*men*) to be used. However, the learners may notice that even in a context where they are certain that the referents (i.e. students) are viewed as a group, *men* is sometimes omitted. If they have not realised that the absence of *men* in this context is due to other restrictions (such as the definiteness restriction that prevents *xuesheng-men* from appearing as a pivot noun in an existential sentence), they may interpret the absence as evidence for optionality of the marker.

As for availability of positive evidence regarding the [+/–animal] and [+/–indefinite] features on collective markers, the situations are different in L2 Chinese and L2 Thai acquisition. For Chinese learners of Thai, at an initial stage they will transfer the [–animal] and [–indefinite] features from their L1 marker *men* to the Thai marker *phûak* in their L2 grammars. These features will prohibit the use of *phûak* with animal nouns and indefinite nouns. However, the learners are likely to encounter such usages later when they continue to receive input in Thai, and structures like "*phûak* + animal noun" and "*phûak* + indefinite noun" will serve as positive evidence that disconfirms the L1-transferred [–animal] and [–indefinite] features.

On the contrary, no such disconfirming evidence is available for Thai learners of Chinese. Note that for Thai learners, they begin their acquisition by transferring the [+animal] and [+indefinite] features to their L2 Chinese marker. These features will allow them to accept the use of the marker with animal nouns and indefinite nouns as represented by the "animal noun + *men*" and "indefinite noun + *men*" structures. What the learners have to do, then, is to unlearn these L1-like usages. However, since the structures do not appear in the TL, there is no structural evidence in the input that demonstrates ungrammaticality of the L1-transferred features. As a result, these learners have to unlearn the [+animal] and [+indefinite] features without help of positive evidence.

As features in my study have different characteristics in terms of availability of positive evidence and form-function transparency, a comparison of L2 learners' behaviour related to each feature can help reveal effects of the two factors. This knowledge, in turn, can help us make predictions about learners' behaviour in other similar situations and can be integrated into a theory of L2 acquisition in general. For example, by integrating effects of positive evidence and form-function transparency into the feature re-assembly approach, researchers can form a hypothesis and predict which features are easier or harder to re-assemble based on their featural characteristics, hence adding testability to the L2 acquisition model.

Chapter 4: Empirical study

4.1 Research questions

Given differences between word orders and collective markers in Chinese and Thai nominal phrases, an empirical study was conducted with the following research questions:

1. Will Thai learners be able to acquire the Chinese "numeral + classifier + noun" word order and reject the Thai-like "noun + numeral + classifier" word order in their L2 Chinese?

2. Will Chinese learners be able to acquire the Thai "noun + numeral + classifier" word order and reject the Chinese-like "numeral + classifier + noun" word order in their L2 Thai?

3. Will Chinese collective marker *men* in Thai learners' L2 grammars be sensitive to animacy and definiteness restrictions? In particular, will Thai learners be able to reject Chinese nominal phrases that refer to animals and contain *men*? Will they be able to reject indefinite nominal phrases that contain *men*?

4. Will Chinese learners be able to accept the use of Thai collective marker *phûak* with animal nouns and indefinite nouns?

4.2 Research instruments

In order to find out answers to the above questions, a self-paced reading (SPR) task and an acceptability judgment task (AJT) were used as two main research instruments in the current study. In what follows, rationales for choosing the two instruments will be provided.

Let us begin with SPR. In this task, participants sit in front of a computer screen and read sentences in a word-by-word or phrase-by-phrase manner. They press a button or a key on the keyboard to allow the next word or phrase to appear on the screen while the computer records time related to each button press. When confounding factors are kept under control, it is believed that reading times (RTs) which are longer than usual reflect processing difficulties, which may imply participants' detection of ungrammaticality or anomaly in a sentence (Jegerski 2014; Keating & Jegerski 2015; Marinis 2010; Roberts 2012b). This phenomenon is called an *ungrammaticality effect* in this thesis. Because SPR measures participants' responses in real time

and because it can provide fine-tuned data regarding participants' behaviour, it has been adopted in L2 acquisition research to study learners' implicit knowledge (Jiang 2004, 2007; Roberts & Liszka 2013) as well as language processing (Dong, Wen, Zeng, & Ji 2015; Hopp 2006; Jackson & Roberts 2010; Wu, Kaiser, & Andersen 2012).

While SPR has been adopted as a linguistic research method since 1980s (see Just, Carpenter, & Woolley 1982 which is one of the early studies that used the SPR technique), AJT is a more traditional instrument. It is also easier to implement as it does not require a computer setup. In AJT, participants are asked to read sentences and indicate a degree to which they accept the sentences. It has been argued that AJT can be used to test L2 learners' implicit knowledge (Ellis 1991) and the task has been used by many studies for this purpose (cf. Bley-Vroman, Felix, & Ioup 1988; Gass 1983; Schachter, Tyson, & Diffley 1976; Yuan 2015).

Despite having been widely used in L2 research, both SPR and AJT have certain limitations. A challenge in a research design with an SPR task is a control of variables. As SPR usually records reading times to a millisecond unit, if variables in test sentences are not well controlled, they may lead to difference in RTs, which may then affect our data interpretation. Therefore, many factors (such as word length, word difficulty, position of a tested structure in a test sentence) have to be considered during the design of SPR sentences. But in spite of careful consideration, there are still some external factors that researchers cannot control. For example, a participant may cough during the experiment and unintentionally slow down their reading speed. Since SPR data are not always perfect, it is preferable to have other sources of data in the same study. AJT can provide such data without some of the problems in SPR. For example, in an untimed AJT, the cough or slower reading speed will not affect participants' judgment, hence not becoming a confounding factor. However, AJT also has its own disadvantage as it cannot yield data which are as fine-tuned as SPR does. Since both SPR and AJT seem to be viable tools in L2 acquisition studies but both of them also have some limitations, I choose to use both tasks in my empirical study so that their results can complement each other. Other studies that use both SPR and AJT as their research instruments are Jackson & Roberts (2010) and Jegerski (2016), for example.

4.3 Overall design of test sentences

In this section, I will elaborate on my considerations during a design of test items. Let us begin with one of the factors that are controlled in all test sentences, namely vocabulary difficulty. I made sure that Chinese words in my test sentences are frequently used by trying to choose those in Level 1 or 2 of *Words and Characters for Chinese Proficiency Syllabus* (Guojia Hanyu Shuiping Kaoshi Weiyuanhui Bangongshi Kaoshi Zhongxin 1991). For Thai, as no standardised graded vocabulary list was found, I chose relatively simple words and asked a few Chinese learners of Thai to confirm that they were not too difficult.

Moreover, as mentioned in Section 4.2, test sentences in our empirical study must be carefully designed in order to control for possible confounds on learners' behaviour. This is particularly important for the SPR task. In what follows, factors that were taken into consideration during my design of test sentences, in order to make them suitable for the SPR task, will be presented.

To begin with, length of each segment in a test sentence was strictly controlled. (A segment is a chunk of words or phrases that appear on the screen at any given time when participants perform an SPR task.) For Chinese, each segment was allowed to contain up to 3 characters. For Thai, each segment was allowed to contain up to 3 syllables.[29]

Within each sentence type (a.k.a. condition), a sentence structure was kept identical across all tokens (i.e. individual sentences that belong to the same sentence type). For example, as will be elaborated in the next section, Thai test sentences in Condition 1a were designed in a form of "time + person + *càʔ* 'will' + verb + person + *pay* 'go' + place" which has a general meaning of "in the future, person A will take person B to place C". Although different words indicating future times (such as *phrûŋníi* "tomorrow" and *piinâa* "next year") were used in the "time" segment and different names were used in the "person" segments, the general structure of

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[29] Because Thai is an alphabetical language, we cannot count a length of a segment by a number of characters like we do in Chinese. Instead, I count its length by syllables. However, note that there can be some complications in Thai syllable counting. For example, by English transcription, the word *rooŋpháyaabaan* "hospital" seems to have 4 syllables, namely *rooŋ*, *phá*, *yaa* and *baan*. However, in Thai pronunciation, the *phá* syllable is shorter than others and can be regarded as a half syllable. To simplify the counting rule, I do not count half syllables as a syllable in the current study. As a result, *rooŋpháyaabaan* is regarded as having 3 syllables.

all sentences in this condition would not change. Moreover, segment length of each position was also kept constant across all tokens.

A position of critical segments (i.e. segments where an initial effect of test sentence manipulation is predicted to occur) was another controlled factor. In all test sentences, critical segments were placed around the middle of a sentence. There are always at least 3 segments preceding a critical segment and at least 2 segments following it. This is to prevent a slow reaction which is often observed at the beginning and ending parts of a sentence from affecting participants' reading time at critical segments.

However, in order to ensure at least 3 segments before a critical segment and at least 2 segments after it, sometimes test sentences had to be quite long and complex. To reduce difficulty in sentence processing, I tried to use sentences which have a similar surface structure in Chinese and Thai. For example, the "time + person + 'will' + verb + person + 'go' + place" structure mentioned above is not only valid in Thai, but also in Chinese.

4.4 Test sentences

Below, test sentences in the current study and their rationale will be introduced. According to features being tested, they are divided into 3 sets per language. Each set contains control and experimental conditions. Experimental conditions contain features and structures in our research questions, while control conditions represent simpler and grammatical versions of experimental sentences. Control sentences serve to ensure that participants do not have a problem with parts of experimental sentences that are not a test target. This way, if participants reject experimental sentences, we can be rather confident that the reason for such rejection is the tested features. Each condition contains 12 tokens. In this section, only one example will be given for each condition. For full lists of test sentences, see Appendix A and B.

4.4.1 Set 1: Word orders

The first set of test sentences is designed to test the [+NPmove] and [–NPmove] features on numerals. It is designed with three different conditions. Condition 1a is a control condition in which numerals and their accompanying classifiers are not present. Condition 1b has the same structure as Condition 1a but with an addition of numerals and classifiers. In this condition, the position of nouns relative to numerals is designed to be correct in a target language, namely

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"numeral + classifier + noun" in Chinese and "noun + numeral + classifier" in Thai. In contrast, Condition 1c is designed to represent a structure that is grammatical in learners' L1 but ungrammatical in their TL, namely "noun + numeral + classifier" for Thai learners of Chinese and "numeral + classifier + noun" for Chinese learners of Thai. Examples of test sentences in this set are shown in (40) – (45).

(40) Chinese 1a   mingtian   Xiaoli   hui   dai   haizi   qu   yiyuan   kanbing
                tomorrow   Xiaoli   will   bring   child   go   hospital   see-doctor
                "Tomorrow Xiaoli will take (her) child(ren) to see a doctor at a hospital."

(41) Chinese 1b   mingtian   Xiaoli   hui   dai   san   ge   haizi   qu   yiyuan   kanbing
                tomorrow   Xiaoli   will   bring   three   CL   child   go   hospital   see-doctor
                "Tomorrow Xiaoli will take three children to see a doctor at a hospital."

(42) Chinese 1c   * mingtian   Xiaoli   hui   dai   haizi   san   ge   qu   yiyuan   kanbing
                 tomorrow   Xiaoli   will   bring   child   three   CL   go   hospital   see-doctor
                 "Tomorrow Xiaoli will take three children to see a doctor at a hospital."

(43) Thai 1a   phrûŋníi   sùʔdaa   càʔ   phaa   lûuklûuk   pay   rooŋpháyaabaan
           tomorrow   Suda   will   bring   child   go   hospital
           "Tomorrow Suda will take (her) children to a hospital."

(44) Thai 1b   phrûŋníi   sùʔdaa   càʔ   phaa   lûuklûuk   sǎam   khon   pay   rooŋpháyaabaan
           tomorrow   Suda   will   bring   child   three   CL   go   hospital
           "Tomorrow Suda will take three children to a hospital."

(45) Thai 1c   * phrûŋníi   sùʔdaa   càʔ   phaa   sǎam   khon   lûuklûuk   pay   rooŋpháyaabaan
            tomorrow   Suda   will   bring   three   CL   child   go   hospital
            "Tomorrow Suda will take three children to a hospital."

In this thesis, *critical segments/regions* in example sentences are marked with grey background.[30] They are important for SPR analysis because RTs from these positions will be compared against each other in order to observe participants' reaction to the manipulation of test sentences. In order to avoid a confounding effect caused by a difference in lexical items, critical regions in Condition 1b and 1c must contain the same words. As a result, the numeral, classifier and noun segments are combined as a critical region in these conditions. For example, critical regions in (41) and (42) are *san ge haizi* (three-CL-child) "three children" and *haizi san ge* (child-three-CL) respectively. RTs from the numeral, classifier and noun segments will be added up during an SPR analysis, resulting in an RT of the whole critical region, so that the two conditions can be compared fairly. Also note that, as critical positions are only relevant to SPR, not AJT, sentences that are not included in SPR analysis (such as control sentences in Condition 1a) are not marked for critical regions.

4.4.2 Set 2: Animacy restriction on collective markers

Sentences in this set are designed to test the [+/–animal] features on L2 collective markers. There are four conditions in this set, among which the first three are controls and the last one is an experimental condition. In each language, all conditions have a similar sentence structure, namely "person + 'think' + main nominal phrase + predicate" in Chinese and "time + person + 'say' + main nominal phrase + predicate" in Thai. The main nominal phrases appear in the middle of sentences and always have a structure of "demonstrative + *xie* + human/animal noun (+ *men*)" in Chinese and "(*phûak* +) human/animal noun + *làw* + demonstrative" in Thai. For example, main nominal phrases in (46) and (50) are *zhe-xie xuesheng* (this-few-student) "these students" and *nákrian làw-níi* (student-group-this) "these students" respectively.

The main nominal phrases are manipulated to reflect differences among four test conditions. In particular, nouns in Condition 2a and 2b are human nouns, such as *xuesheng* "student" in Chinese examples (46) – (47) and *nákrian* "student" in Thai examples (50) – (51).

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[30] Within a context of an SPR task, the terms *segment* and *region* are often used interchangeably in this thesis. However, strictly speaking, segments are presentation units a participant see on the screen during task completion, while regions are conceptual units used during data analysis. It can be the case that one region includes more than one segment, such as a critical region of Condition 1b and 1c which includes the "numeral + classifier" and "noun" segments as discussed in this section.

The difference between Condition 2a and 2b is that the former does not contain a collective marker while the latter does. Despite the difference, because human nouns in Chinese and Thai can be used both with and without a collective marker, both conditions are grammatical.

In contrast, nouns in main nominal phrases of Condition 2c and 2d refer to animals, such as *dongwu* "animal" in Chinese examples (48) – (49) and *sùʔnák* "dog" in Thai examples (52) – (53). Similar to the 2a-2b pair, the difference between the 2c-2d pair is that the former condition does not contain a collective marker while the latter does. Since Chinese does not allow animal nouns to be used with a collective marker, Chinese Condition 2d is ungrammatical.[31] Thai, on the other hand, allows the use of animal nouns with a collective marker. Therefore, Thai Condition 2d is grammatical.

A comparison can also be made between Condition 2b and 2d in each language. These conditions both contain a collective marker. Their main nominal phrases are definite (as indicated by the demonstratives *zhe* "this" or *na* "that" in Chinese and *níi* "this" or *nán* "that" in Thai) and refer to more than one referent (as indicated by *xie* "a few" in Chinese and *làw* "group" in Thai). Based on the definiteness and plurality characteristics of the phrases, they should be compatible with collective markers. Nonetheless, there is one variable that distinguishes between Condition 2b and 2d, namely semantics of nouns. Note that nouns in main nominal phrases of 2b refer to human while those in 2d refer to animals. With all other variables being equal, if a participant accepts Condition 2b and rejects Condition 2d, we can be quite certain that semantics of nouns is the factor which leads to the difference in his/her reaction. In particular, it can be interpreted that he/she only allows human nouns to appear with a collective marker but does not allow animal nouns to do so.

(46) Chinese 2a   xiaozhang   renwei   zhe-xie   xuesheng   tebie   congming

           principal   think   this-few   student   very   clever

           "The principal thinks these students are very clever."

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[31] As mentioned in Chapter 2, there are some exceptions in which the Chinese collective marker is allowed to appear with animal nouns, i.e. when animal nouns are personified. Taking this into account, in the current design I try to create contexts in which nouns are interpreted as referring to real animals, not in a personified way.

(47) Chinese 2b   xiaozhang   renwei   zhe-xie   xuesheng-men   tebie   congming

              principal   think   this-few   student-*men*   very   clever

              "The principal thinks these students are very clever."

(48) Chinese 2c   baba   juede   zhe-xie   dongwu   bijiao   congming

              father   think   this-few   animal   quite   clever

              "My father thinks these animals are quite clever."

(49) Chinese 2d   * baba   juede   zhe-xie   dongwu-men   bijiao   congming

               father   think   this-few   animal-*men*   quite   clever

               "My father thinks these animals are quite clever."

(50) Thai 2a   mûakîi   khruuyày   phûutwâa   nákrian   làw-níi   nâarák   mâak

            just-now   principal   say   student   group-this   cute   very

            "The principal just said that these students were very cute."

(51) Thai 2b   mûakîi   khruuyày   phûutwâa   phûak-nákrian   làw-níi   nâarák   mâak

            just-now   principal   say   *phûak*-student   group-this   cute   very

            "The principal just said that these students were very cute."

(52) Thai 2c   mûakîi   maalii   bɔ̀ɔkwâa   sùʔnák   làw-níi   nâarák   mâak

            just-now   Mali   say   dog   group-this   cute   very

            "Mali just said that these dogs were very cute."

(53) Thai 2d   mûakîi   maalii   bɔ̀ɔkwâa   phûak-sùʔnák   làw-níi   nâarák   mâak

            just-now   Mali   say   *phûak*-dog   group-this   cute   very

            "Mali just said that these dogs were very cute."

A few notes should be made to elaborate on my rationale for a design of above sentences. First, an introduction of *xie* "a few" in Chinese test sentences can be both advantageous and risky. On the one hand, it helps to ensure that the main nominal phrases refer to more than one referent, hence allowing them to be viewed as a group when the marker *men* is added. It also serves to make the phrases complete, as Chinese demonstratives *zhe* "this" and *na* "that" must be

accompanied by either a quantifying word such as *xie* or a quantifying phrase such as "numeral + classifier". But on the other hand, since there is a slight semantic distinction between *xie* and *men* as discussed in Chapter 2, some people may find phrases with both *xie* and *men* less acceptable than those with either *xie* or *men*. Since the sensitivity to such a semantic distinction only applies to certain individuals, I will take measures to eliminate those who are sensitive to it from our analysis and keep those who allow co-occurrence of *xie* and *men* for further analysis. Details about the procedure will be described in Section 5.2.2.

Secondly, for Thai test sentences, there may be no need to add a demonstrative *níi* "this" or *nán* "that" to main nominal phrases to force a definite interpretation, because Thai collective marker is compatible with both definite and indefinite nouns. However, in the current design, I include it for the following reasons. First, it makes test sentences in Chinese and Thai comparable in terms of sentence structure and level of complexity, hence making a cross-language comparison more convenient. Secondly, it makes test sentences a little longer, hence giving us more opportunity to observe a spillover effect during the SPR task. (More information about the effect can be found in Section 5.1.5.) Thirdly, if *làw* "group" is to be added to main nominal phrases to ensure that participants interpret them with multiple individual referents, a demonstrative is required to accompany *làw*.

4.4.3 Set 3: Definiteness restriction on collective markers

Sentences in this set are designed to test [+/–indefinite] features on learners' L2 collective markers. Recall that Thai collective marker *phûak* can be used with indefinite nouns while Chinese collective marker *men* cannot. In order to test learners' acceptability and sensitivity to the use of collective markers with indefinite nouns, we need to design test sentences in a way that nouns can only be interpreted as indefinite. For this purpose, I placed the critical nouns in existential clauses (i.e. Chinese clauses beginning with *you* "have" and Thai clauses beginning with *mii* "have") as it is universal for a pivot noun in existential sentences/clauses to be indefinite.

In order to confirm that our participants indeed only allow indefinite nouns as a pivot of existential sentences/clauses, I included a pair of prerequisite tests (namely Prerequisite A and B) in my test materials. In Prerequisite A, pivot nouns are bare nouns which can be interpreted as indefinite, such as *xuesheng* and *nákrian* "student" in (54) and (56). Because there is no conflict between the indefiniteness requirement of existential sentences and the indefinite reading of

nouns, sentences in this type are grammatical. In contrast, pivot nouns in Prerequisite B come with a demonstrative as shown by *zhe-xie xuesheng* (this-few-student) "these students" and *nákrian làw-nán* (student-group-that) "those students" in (55) and (57). Because phrases with demonstratives have a definite reading, there is a conflict between the indefiniteness requirement of existential sentences and the definite reading of nouns. As a result, sentences in this type are ungrammatical. There are 3 tokens for each type of prerequisite sentences.

(54) Chinese Prerequisite A   you   xuesheng   zai   jiaoshi   li   shuijiao

                                  have   student   at   classroom   in   sleep

                                  "There is/are (a) student(s) sleeping in the classroom."

(55) Chinese Prerequisite B   * you   zhe-xie   xuesheng   zai jiaoshi   li   shuijiao

                                      have this-few student   at   classroom   in   sleep

                                      "These students are sleeping in the classroom."

                                      * "There are these students sleeping in the classroom."

(56) Thai Prerequisite A mii   nákrian   kamlaŋ   kinkhâaw   yùu-nay   rooŋʔaahǎan

                              have   student   PROG   eat-rice   PROG-in cafeteria

                              "There is/are (a) students(s) eating in a cafeteria."

(57) Thai Prerequisite B * mii   nákrian   làw-nán   kamlaŋ   kinkhâaw   yùu-nay   rooŋʔaahǎan

                                have   student   group-that PROG   eat-rice   PROG-in cafeteria

                                "Those students are eating in the cafeteria."

                              * "There are those students eating in the cafeteria."

If a participant accepts Prerequisite A and rejects Prerequisite B, we can be certain that he/she only allows indefinite nouns at a pivot position in existential sentences. This information can serve as a basis for our design of test sentences in Condition 3a and 3b. In these conditions, an existential clause serves as a CP complement of the verb *kanjian* "see" in Chinese and *phûutwâa/bɔ̀ɔkwâa* "say" in Thai. The difference between the two conditions is that pivot nouns in the control condition 3a are bare nouns while those in the experimental condition 3b are nouns with a collective marker. For example, pivot nouns of Chinese sentences in (58) and (59) are *xuesheng* "student" and *xuesheng-men* (student-*men*) respectively. Pivot nouns in both

conditions should be interpreted as indefinite based on their occurrence in existential clauses. Since there is no conflict between the indefiniteness requirement of existential clauses and the indefinite reading of bare nouns, the control condition 3a is grammatical in both Chinese and Thai. The experimental condition 3b, however, is only grammatical in Thai because Thai allows its collective marker to attach to indefinite nouns while Chinese does not do so.

(58) Chinese 3a   xiaozhang   gangcai   kanjian   you   xuesheng   zai   gongyuan   li   tiqiu

       principal   just   see   have   student   at   park   in   kick-ball

       "The principal just saw that there was/were (a) student(s) playing football in the park."

(59) Chinese 3b   * xiaozhang   gangcai   kanjian   you   xuesheng-men   zai   gongyuan   li

       principal   just   see   have   student-*men*   at   park   in

       tiqiu

       kick-ball

       "The principal just saw that there were students playing football in the park."

(60) Thai 3a   mûakîi   maalii   phûutwâa   mii   nákrian   kamlaŋ   kinkhâaw   yùu-nay

       just-now   Mali   say   have   student   PROG   eat-rice   PROG-in

       rooŋʔaahǎan

       cafeteria

       "Mali just said that there was/were (a) student(s) eating in the cafeteria."

(61) Thai 3b   mûakîi   maalii   phûutwâa   mii   phûak-nákrian   kamlaŋ   kinkhâaw   yùu-nay

       just-now   Mali   say   have   *phûak*-student   PROG   eat-rice   PROG-in

       rooŋʔaahǎan

       cafeteria

       "Mali just said that there were students eating in the cafeteria."

4.5 SPR post-stimulus task

It is recommended that SPR experiments should contain a post-stimulus distractor task, such as acceptability judgment or meaning-based comprehension questions, in addition to main SPR test sentences. The goal of a post-stimulus task is to give participants a clear purpose for reading SPR sentences, so that they pay attention to them throughout the experiment (Jegerski 2014; Keating

& Jegerski 2015). A comprehension task was chosen in this study. To elaborate, after a participant finished reading an SPR sentence, a corresponding comprehension sentence would appear, and the participant would be asked to judge whether the meaning of the SPR sentence matched with the meaning of the new sentence. As this task required a comparison between meanings of the two sentences, participants could not just randomly press a key while each SPR segment appeared on the screen. Instead, they had to pay attention to reading and understanding them.

Let us use a Chinese test sentence in Condition 1a, repeated here as (62), as an example. After a participant finished reading all segments in this sentence, (63) would appear on the screen as a whole sentence. On this screen, the participant was asked to either press an "F" key on the keyboard to indicate that he/she thought meanings of (62) and (63) matched with each other, or press a "J" key to indicate that the meanings were incompatible. For this example, if the participant had paid attention to reading both sentences, it was expected that he/she would press "F". To give another example, let us look at sentences in (64) and (65), among which (64) is another token from Chinese Condition 1a and (65) is its comprehension sentence. Since the sentence in (64) says that Xiaoming will go to play football while the one in (65) says that he will stay at home, the two sentences have mismatched information. As a result, the "J" response was expected. In addition, participants could also press a "7" key (on the upper row of the keyboard) if they could not make a judgment on a particular pair of sentences.

(62) mingtian   Xiaoli   hui   dai   haizi   qu   yiyuan   kanbing
      tomorrow   Xiaoli   will   bring   child   go   hospital   see-doctor
      "Tomorrow Xiaoli will take (her) child(ren) to see a doctor at a hospital."

(63) Xiaoli   mingtian   yao   qu   yiyuan
      tomorrow   Xiaoli   will   bring   three
      "Xiaoli will go to a hospital tomorrow."

(64) mingtian   Xiaoming   hui   pei   pengyou   qu   gongyuan   tiqiu
      tomorrow   Xiaoming   will   go with   friend   go   park   kick-ball
      "Tomorrow Xiaoming will go to play football in a park with (his) friend(s)."

(65) mingtian Xiaoming hui zai jia
     tomorrow Xiaoming will at   home
     "Tomorrow Xiaoming will stay at home."

Several factors were considered during my design of comprehension sentences. To begin with, vocabularies and sentence structures were controlled to be relatively simple. Moreover, I avoided including structures which are focuses of this study in comprehension sentences. For example, because the "numeral + classifier + noun" structure is a target structure in one of my research questions, it does not appear in any comprehension sentences. I also tried not to repeat exact phrases from a test sentence in order to avoid participants adopting a rote-memory strategy for the task.

Also, to follow Wu *et al.*'s (2012) recommendation, my comprehension sentences were designed to ask about matching/mismatch information from different parts of test sentences. For example, sentences in (66) and (68) are from Thai Condition 1a. Their comprehension sentences are shown in (67) and (69) respectively. In both cases, the comprehension sentences do not match with the test sentences, but they differ in terms of where information about the mismatch comes from. For (66) and (67), the mismatch information comes from the beginning part of the SPR sentence, specifically from the word *piinâa* "next year" which does not match with *wanphrûŋníi* "tomorrow" in (67). For (68) and (69), the mismatch information comes from the ending part of the SPR sentence, specifically from the word *rooŋpháyaabaan* "hospital" which does not match with the activity provided in the comprehension sentence (i.e. *sɨɨkhɔ̌ɔŋ* "shopping"). By varying positions of crucial information, participants were required to pay close attention to all parts of test sentences while completing the SPR task.

(66) piinâa   câwnaay càʔ sòŋ   phánákŋaan pay tàaŋcaŋwàt
     next-year boss   will send employee   go   out-of-town
     "Next year the boss will send (an) employee(s) out of town."

(67) phánákŋaan càʔ   dəənthaaŋ wanphrûŋníi
     employee   will travel   tomorrow
     "The employee(s) will travel tomorrow."

(68) phrûŋníi   khunkhruu   càʔ   phaa   nákrian   pay   rooŋpháyaabaan
      tomorrow   teacher   will   bring   student   go   hospital
      "Tomorrow the teacher will take (a) student(s) to a hospital."

(69) khunkhruu   càʔ   pay   súɯkhɔ̌ɔŋ
      teacher   will   go   shop
      "The teacher will go shopping."

In addition, the number of the expected "F" and "J" responses in each condition was balanced. That is, among 12 tokens in each test sentence type, 6 of them have a meaning which matches with their corresponding comprehension sentences and the other 6 have a mismatched meaning.

4.6 SPR & AJT task arrangement

It is recommended in the literature that, during an SPR task, participants should not be exposed to the same sentence in different variations/conditions, such as seeing a test token in Condition 1a as well as its corresponding sentence in Condition 1b. Otherwise, based on a priming effect, a previously seen variation of the sentence may affect participants' reading time of the second variation they see. Test sentences, therefore, should be assigned to different lists in a counter-balanced fashion to avoid the effect (Keating & Jegerski 2015; Tien, Tzeng, & Hung 2002).

Test sentences in the current study are divided into four groups. The first group includes Condition 1a, 1b and 1c. These sentences share the same sentence structure and differ only in terms of presence or absence of "numeral + classifier" as well as its position relative to nouns. The second group includes Condition 2a and 2b whereas the third group includes Condition 2c and 2d. The difference between the two groups is that critical nouns of the former group are human nouns while critical nouns of the latter group are animal nouns. Although sentences in these two groups share a similar sentence structure, they do not share exactly the same lexical items. Therefore, strictly speaking, only Condition 2a and 2b form a minimal pair, while Condition 2c and 2d form another minimal pair. The fourth group includes Condition 3a and 3b which are different only in terms of presence or absence of a collective marker. Under such categorisation, only the first group of test sentences has three conditions while the other three groups have two conditions.

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To create counter-balanced lists of test sentences, the number of conditions in each group must be the same. For this study, all groups were adjusted to have three conditions. To achieve this number, a filler condition was added to groups with only two conditions, namely Group 2, 3 and 4. These fillers were ungrammatical sentences that were irrelevant to linguistic phenomena being tested in the current study. Therefore, in addition to filling in the space in the counter-balanced lists, these filler sentences also served as a distractor to draw participants' attention away from our tested elements. They also served to balance the number of grammatical and ungrammatical sentences that participants were exposed to because, without the filler conditions, there were a disproportionately large number of grammatical conditions in our design. But after including filler conditions, the grammatical vs. ungrammatical ratios were improved, i.e. 1:1 in Chinese (6 grammatical conditions vs. 6 ungrammatical conditions) and 2:1 in Thai (8 grammatical conditions vs. 4 ungrammatical conditions).[32]

Table 3 Distribution of test sentences in different presentation lists

List 1	List 2	List 3
Condition 1a, Token 1-4	Condition 1a, Token 5-8	Condition 1a, Token 9-12
Condition 1b, Token 5-8	Condition 1b, Token 9-12	Condition 1b, Token 1-4
Condition 1c, Token 9-12	Condition 1c, Token 1-4	Condition 1c, Token 5-8
Condition 2a, Token 1-4	Condition 2a, Token 5-8	Condition 2a, Token 9-12
Condition 2b, Token 5-8	Condition 2b, Token 9-12	Condition 2b, Token 1-4
Filler 1, Token 9-12	Filler 1, Token 1-4	Filler 1, Token 5-8
Condition 2c, Token 1-4	Condition 2c, Token 5-8	Condition 2c, Token 9-12
Condition 2d, Token 5-8	Condition 2d, Token 9-12	Condition 2d, Token 1-4
Filler 2, Token 9-12	Filler 2, Token 1-4	Filler 2, Token 5-8
Condition 3a, Token 1-4	Condition 3a, Token 5-8	Condition 3a, Token 9-12
Condition 3b, Token 5-8	Condition 3b, Token 9-12	Condition 3b, Token 1-4
Filler 3, Token 9-12	Filler 3, Token 1-4	Filler 3, Token 5-8

After adding fillers, sentences in each group were assigned to one of three presentation lists in a counter-balanced fashion as shown in Table 3. With this arrangement, a participant would

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[32] Note that Condition 2d and 3b are ungrammatical in Chinese but grammatical in Thai, hence the difference in the number of (un)grammatical conditions between the two languages.

encounter 4 out of 12 tokens from each condition. Afterwards, sentences in the same list were pseudo-randomised, i.e. their order was shuffled and manually checked, in order to avoid sentences with similar structures or vocabularies appearing next to each other. A result of this process was the order of sentences that participants would see.

In what follows, more details about SPR task implementation will be provided. First of all, as participants in the current study might not have been familiar with the task, I added five practice sentences (together with their comprehension sentences) before test sentences in each list as warm-up materials to let participants get used to the format and requirement of the task. Contents and structures of practice sentences were irrelevant to our research questions.

Secondly, an SPR task usually requires researchers to divide test sentences into smaller units (i.e. segments) so that participants can read them in a self-paced manner. In the current study, test sentences were often divided by a word unit, such as *xiaozhang* "principal" and *renwei* "think" in (70). (Vertical lines in the example represent boundaries of each segment.) However, I allowed some exceptions to this segmentation rule. First, collective markers *men* and *phûak* were presented in the same segment as nouns they attach to, such as *xuesheng-men* (student-*men*) in (70). Secondly, a "demonstrative + *xie*" combination in Chinese and a "*làw* + demonstrative" combination in Thai were also grouped as one segment, such as *zhe-xie* in (70). A "numeral + classifier" combination in Set 1 was also presented as one segment. The reason for these groupings is that results from my pilot study revealed irregular reading behaviour, including prolonged RTs, by both native speakers and learners when elements in these combinations were presented separately. In other words, it seems to be more natural for participants to read these combinations in one unit.

(70) | xiaozhang | renwei | zhe-xie | xuesheng-men | tebie | congming |
|-----------|--------|---------|--------------|-------|----------|
| principal | think | this-few | student-*men* | very | clever |

"The principal thinks these students are very clever."

Each segment was presented in a *moving window* (also called *linear non-cumulative*) style (Marinis 2010) in which the first segment of a test sentence always appeared at the left-hand side of the screen. When participants pressed a designated key (i.e. a space bar as implemented in the current study), the first segment disappeared and the second segment appeared to the right of the

original segment. This process was repeated each time the key was pressed until the sentence ended. A key press at the last SPR segment led to a screen with a whole comprehension sentence. To indicate whether meaning of the comprehension sentence matched with that of the preceding SPR sentence or not, participants were asked to press an "F" key on the keyboard to indicate a match or a "J" key to indicate a mismatch. They could also press a "7" key if they could not make a judgment.

In Chinese, declarative sentences always end with a punctuation mark "。". During SPR, this Chinese full stop was shown together with the last segment of each sentence, such as the word *congming* "clever" in (70). Thai, on the other hand, does not have a punctuation mark indicating the end of a sentence. Therefore, a "." symbol was deliberately added to the last segment of a sentence. Although this treatment made the text different from the natural writing style in Thai, it was necessary as it could suggest to participants that the sentence was ending, hence allowing them to process the whole sentence before the comprehension sentence appeared. Description about the additional full stop in Thai was given during an introduction session to all participants who also had an opportunity to familiarise themselves with it during the practice session which contained five practice sentences. The full stop was not added when sentences were presented as post-stimulus comprehension sentences in the SPR task or when they were presented in an AJT format.

Test sentences in AJT were identical to those in SPR and, within each list, they were arranged in the same order. Differences between AJT and SPR formats are that AJT test sentences were not accompanied by a comprehension task and that prerequisite test sentences were only added to the AJT lists. In addition, in contrast to the SPR task which was computer-based, AJT was paper-based. Participants were asked to indicate their degree of acceptability to each sentence based on a four-point scale (Duffield 2003:99, cited in Hermas 2015) with scores from 1 to 4 representing "completely unacceptable", "rather unacceptable", "rather acceptable" and "completely acceptable" respectively. An "I don't know" option, marked as "x" on the questionnaire, was also available for them to choose in case they could not make a judgment.

4.7 Supplementary tasks

In addition to test sentences, their comprehension sentences and prerequisite test sentences, some other tasks and materials were also included in the study. First of all, vocabulary lists containing

all words from test sentences in each language were prepared. The lists not only included vocabularies in their native scripts, i.e. Chinese characters or Thai alphabets, but also translation of those words in learners' native language. Moreover, Chinese *pinyin* (phonetic transcription) was added to the list of Chinese words.

Another additional material in the empirical study was a questionnaire about participants' background information. It asked for participant's consent to participate in the study, their age, gender, native language, length of study of a target language and their length of stay in a target language environment.

Moreover, cloze tests were administered to determine participants' L2 proficiency. The Chinese cloze test consisted of materials used in Yuan & Dugarova (2012). It was made up of two short stories, each containing 20 blanks in which participants had to fill with appropriate Chinese characters to make the stories complete. To increase difficulty of the text, *pinyin* was not provided in this task. The Thai cloze test was created to mimic the format of the Chinese test. In particular, I first looked up two short stories online, each consisting of about 200 words. Some sentences and vocabularies were adjusted to maintain a proper level of difficulty. Then, 20 words were removed from each story, adding up to 40 blanks in total. For a scoring method, participants received one point when they filled in a blank with a suitable word according to the context (Fotos 1991). Within each test, the highest score a participant could get was 40 points.

4.8 Participants

One hundred and forty-four participants took part in the current study, among whom 75 people completed a Chinese test and 69 people completed a Thai test; 112 people are female and 32 people are male. Most of them were university students majoring in business Chinese and business Thai, while some high-proficiency learners were teachers and interpreters.

Learners' proficiency groups (i.e. beginning, intermediate and advanced) were determined by cloze test scores. Results of an ANOVA on cloze test scores indicate that scores by the four participant groups (i.e. the three learners' groups and a native speakers' group) within each language are statistically significant ($F(3,71) = 567.788$, $p = .000$ among the Chinese target language groups and $F(3,65) = 747.881$, $p = .000$ among the Thai target language groups). Note that, throughout the current study, a *p*-value lower than a 0.05 significance level serves as a criterion to reject a null hypothesis in a statistical test. Post-hoc Scheffé's tests show that, within

Table 4 Participants' information

Target language	Group	No. of partici-pants	Average age (min – max)	Average length of TL study (min – max) (unit: month)	Average length of living in TL environment (min – max) (unit: month)	Average cloze test scores (min – max)
Chinese	Beginning learners (CnBL)	21	20.0 (19 – 24)	15.7 (10 – 44)	0 (0 – 0)	8.3 (3 – 14)
	Intermediate learners (CnIL)	18	20.0 (18 – 21)	42.6 (12 – 72)	2.7 (0 – 24)	20.1 (15 – 28)
	Advanced learners (CnAL)	21	23.1 (19 – 29)	96.5 (48 – 165)	20.3 (0 – 72)	38.0 (34 – 40)
	Native speakers (CnNS)	15	21.1 (19 – 22)	n/a	n/a	39.0 (36 – 40)
Thai	Beginning learners (ThBL)	18	20.6 (19 – 22)	8.6 (4 – 12)	7.4 (5 – 10)	6.6 (4 – 13)
	Intermediate learners (ThIL)	18	20.3 (18 – 23)	25.9 (17 – 36)	7.7 (5 – 10)	21.6 (16 – 26)
	Advanced learners (ThAL)	18	26.6 (23 – 34)	38.9 (8 – 72)	44.3 (8 – 120)	35.2 (33 – 38)
	Native speakers (ThNS)	15	20.6 (18 – 29)	n/a	n/a	36.5 (34 – 40)

each tested language, scores from all groups of participants differ from each other in a statistically significant manner ($p = .000$) except for advanced learners and native speakers' pairs ($p = .733$ for a Chinese pair and $p = .388$ for a Thai pair). From these results, it can be regarded that advanced learners in this study possessed near-native proficiency in their TL. Furthermore, their high cloze test scores also correspond to their long study time of the TL and the time they spent in TL environment. Table 4 summarises our participants' information. In the "group" column, abbreviations for each group of participants are shown and these terms will be used throughout the following chapters.

It is worth noting that participants in the same proficiency group may not have exactly the same level of knowledge or proficiency. For example, it is unlikely that everybody in the CnBL group had the same degree of proficiency in Chinese. When comparing across languages, it might also not be the case that participants in the CnBL group had a similar proficiency level as those in the ThBL group. One reason for a potential difference between learners' proficiency across languages is that all data in the current study were collected in Thailand. As a result, it is certain that all Chinese learners of Thai had been living in a Thai speaking environment. On the other hand, none of the Thai beginners of Chinese in this study had lived in a Chinese speaking environment. However, this discrepancy should not affect our data analysis because the study was not designed to directly compare data across the two languages.

Within each proficiency group, participants were divided into three sub-groups according to the recommendation in Keating & Jegerski (2015). Each of the three sub-groups was assigned with one of the three test sentence presentation lists described in Section 4.6.

4.9 Data collection

Our data collection process began with vocabulary lists introduced in Section 4.7. The lists were given to participants at least one day before their appointed experiment dates. Participants were asked to familiarise themselves with all words in the list and to learn their pronunciation and meaning. On the appointed date, I provided the participants with words in their given list and asked them to read and translate those words. This is to confirm that our participants knew the words that would appear in the experiment. After that, participants were given an instruction on how to complete an SPR task and practised it with five practice sentences. During this time, they were allowed to ask questions in case they did not understand how to complete the task.

After participants were confident with the task, the main experiment began. It included the SPR task, background information questionnaire, cloze test and AJT in this exact order. I have chosen this task order to allow the SPR task, which is time-critical, to appear first. Otherwise, had the SPR task been arranged in a different order, participants' reaction time might have been influenced by tiredness or sentences that appeared before it. Previous studies which arrange SPR before AJT include Roberts & Liszka (2013) and Sagarra & Herschensohn (2010). Moreover, as sentences in SPR and AJT are the same, I put a background information questionnaire and a cloze test between the two tasks to reduce participants' recalling of SPR sentences during their completion of AJT.

The AJT was paper-based. It was untimed, but participants were encouraged to complete it as fast as possible and not to correct their judgment. Throughout the experiment, participants were not allowed to consult dictionaries or other people. At the end of the experiment, they were paid for their participation.

Chapter 5: Results

5.1 Data analysis methods

5.1.1 Arguments for comparison across test conditions instead of proficiency groups

During data analysis, the focus of my study will be on comparisons of participants' performance under different test conditions, not comparisons across different proficiency groups. This applies to test sentences in both SPR and AJT formats. For the SPR task, this method is desirable because people who possess different levels of fluency often read at a different speed (as can be seen in data from Jackson & Roberts 2010; Pliatsikas & Marinis 2013; Renaud 2011a; Roberts 2012a; Segalowitz 2005; Yuan 2017). For example, it is likely that beginning learners read more slowly than advanced learners or native speakers of a target language. Therefore, it is not reasonable to compare RTs from these groups of participants against each other. In contrast, by comparing results within the same proficiency group, we can avoid the effect of proficiency on RTs.

AJT, on the other hand, has another problem related to proficiency. As will be seen in Section 5.2, different groups of participants have rather different judgment styles. That is, when native speakers accept or reject a sentence, they tend to rate it at an extreme end of the 1-to-4 scale. As a result, their mean scores for grammatical sentences are often close to 4 and their scores for ungrammatical sentences are often close to 1. In contrast, learners seem to be more conservative and tend not to rate sentences at the extreme ends. To avoid an effect of judgment styles in our analysis, I follow a practice in studies which use an AJT method (such as Yuan 2015) by comparing scores between different test conditions as judged by the same group of participants, rather than comparing scores between groups.

Not only are there practical reasons not to compare data from different proficiency groups as outlined above, when considering our research questions, it is also more appropriate to compare data between different test conditions. In particular, in this study we embark to investigate how participants respond to sentences with different featural characteristics. We expect that native speakers will respond to sentences that are ungrammatical differently from those that are grammatical with statistical significance. A question for learners, then, is whether they also respond to the two conditions in a statistically significant way.

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To give more specific examples, let us imagine test sentences in which Condition A is grammatical and Condition B is ungrammatical. When tested with an SPR method, native speakers may read a critical segment in Condition A averagely at 200 milliseconds (ms) and a critical segment in Condition B at 400 ms, and a chosen statistical test shows that RTs in these two conditions are statistically significant. Advanced learners may read the critical segment in Condition A at 300 ms and Condition B at 500 ms, and the statistical test also shows a significant difference. Now, imagine that beginning learners read the critical segment in both conditions at 400 ms and the statistical test does not show that the RTs are significant. From these data, the important information to us is that native speakers and advanced learners are sensitive to ungrammaticality in Condition B while beginning learners are not. In contrast, it is not as important whether learners' actual RTs are the same or different from native speakers'. For example, although the advanced learners read Condition A one and a half times slower than the native speakers, this does not affect our conclusion. Likewise, although the beginning learners read Condition B at exactly the same speed as the native speakers, this does not suggest that they are as sensitive to ungrammaticality in Condition B as the native speakers are. Following the above rationale, I did not choose to directly compare learners' RTs with native speakers'.

5.1.2 Analysis of test sentences in AJT format

In the first step of AJT analysis, "I don't know" responses (marked with "x" in the questionnaire) were discarded from our data set and would not be included in our mean score calculation nor statistical comparison. Since no native speakers of Chinese and Thai chose this option, this treatment did not affect the number of data points in the CnNS and ThNS groups. In contrast, some non-native speakers chose this option, and the treatment resulted in a reduction of 7.12%, 2.53%, 0.13%, 3.57%, 0.31% and 1.08% of data points from CnBL, CnIL, CnAL, ThBL, ThIL and ThAL groups respectively. For a test of definiteness restriction in Set 3 which has prerequisite tests, data from participants who did not pass prerequisite tests were also eliminated at this stage.

Next, mean scores were calculated per test condition and group of participants. As possible scores in this task range from 1 to 4 (i.e. from completely unacceptable to completely acceptable), mean scores between 1 and 2 are taken to indicate that participants tended to reject

test sentences of this type; mean scores between 3 and 4 indicate that participants tended to accept them; while mean scores between 2 and 3 indicate that participants were indeterminate.

Within each group of participants, an independent T-test was performed to compare their judgment scores in Condition 2a vs. 2b, Condition 2c vs. 2d, and Condition 3a vs. 3b.[33] For Set 1 of test sentences, since it contains three test conditions, instead of the T-test, a one-way between-condition ANOVA was conducted to observe significance between the three conditions. If a statistical significance was found, *post hoc* comparisons using a Scheffé's method would then be performed between control and experimental conditions.

From T-test and ANOVA results, a *p*-value in each pair of comparison was noted and interpreted. For example, when an experimental condition is designed to be ungrammatical and it is compared against a grammatical control, if participants are sensitive to ungrammaticality in the experimental condition, their *p*-value is expected to be lower than 0.05, i.e. being statistically significant. On the other hand, if participants are not sensitive to the ungrammaticality, their *p*-value is expected to be higher than the significance level.

Moreover, in a case where native speakers are sensitive to ungrammaticality (i.e. $p < 0.05$), if a *p*-value from learners' judgment is also lower than 0.05, the learners will be regarded as having performed *native-like*. On the contrary, if learners' statistical significance result is different from native speakers' result, e.g. when the native speakers' result is statistically significant but the learners' result is not, the learners are considered to be *non-native-like* in detecting ungrammaticality in our test sentences.

AJT scores were also analysed on an individual basis. In particular, participant's judgment of each test sentence is divided into two categories. If a participant rated a test sentence with a score of "1" or "2", he/she is considered to be *rejecting* this sentence. On the other hand, if he/she rated a sentence with a score of "3" or "4", he/she is considered to be *accepting* the sentence. As each participant encountered 4 individual sentences (i.e. tokens) for each test

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[33] For Set 2 and 3, an independent-samples T-test, not a paired-samples T-test, was chosen as an inferential statistical test. A paired T-test would be a preferred method if a participant encountered two variations of the same token, such as encountering Token 1 of Condition A as well as Token 1 of Condition B. However, as mentioned in Section 4.6, the current study arranged test sentences in a counter-balanced way, such as assigning Token 1-4 of Condition A and Token 5-8 of Condition B to a particular participant. This way, he/she would never encounter the same token in different test conditions. As a result, the test sentences cannot be paired. For a guideline in choosing statistical tests, see Larson-Hall (2010).

condition, he/she is considered to be *consistently rejecting* a particular condition if he/she rejected (i.e. giving scores of "1" or "2" to) at least 3 out of 4 tokens. Likewise, he/she is considered to be *consistently accepting* a condition if he/she accepted (i.e. giving scores of "3" or "4" to) at least 3 out of 4 tokens.[34]

5.1.3 Analysis of test sentences in SPR format: data elimination based on post-stimulus task responses

Now let us look at the SPR task. Recall that each SPR test sentence was followed by a comprehension sentence that asked for participants' judgment on information match/mismatch. The main purpose of the comprehension task was to keep participants focused throughout the experiment, hence making their RTs more reliable.

Regarding results of the comprehension task, a participant's response is considered correct if it is an intended answer for a particular pair of sentences. An incorrect judgment and an "I cannot judge" response (by pressing the "7" key) are considered to be incorrect responses. Native speakers in our study provided correct answers most of the time, with CnNSs making correct judgments 93.5% of the time and ThNSs 90.83% of the time. Among learners, a general trend is that the higher proficiency they possessed, the higher proportion of correct judgments they had. To be specific, average percentages of correct responses among Thai learners of Chinese are 76.23% by CnBLs, 89.06% by CnILs and 92.66% by CnALs. Percentages of correct responses among Chinese learners of Thai are 78.96% by ThBLs, 82.38% by ThILs and 88.45% by ThALs.

In studies that implement an SPR task, results of post-stimulus tasks are often used to determine whether certain data points should be eliminated from the main study. One way to do this is to set an arbitrary cut point for percentages of correct responses by each participant. If a participant's judgment score falls below the cut point, the *participant* is eliminated from the

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[34] I am aware that the criterion based on 3 out of 4 sentences may not be stringent enough to argue that a participant responded to a test condition in a *consistent* way. However, as my preliminary analysis shows, a criterion based on a consistency of 4 out of 4 sentences is too stringent and creates difficulty in our data analysis because it does not leave room for any human errors such as marking one of the four tokens with "x" or erroneously marking one of the tokens incorrectly. If the *4 out of 4* criterion had been used, even native speakers in the current study would have been considered to be performing rather poorly. Therefore, the *3 out of 4* criterion is adopted.

study. This method has been implemented in Dong *et al.* (2015), Gibson & Wu (2013), Jiang (2004, 2007), Jiang, Novokshanova, Masuda, & Wang (2011), Pearlmutter, Garnsey, & Bock (1999) and Sagarra & Herschensohn (2010). However, cut points in these studies vary from 60% to 90% and none of the studies provide an argument for their chosen values.

Another way of data treatment based on comprehension responses is to eliminate SPR data from *sentences* of which comprehension question is answered incorrectly, as performed in Jackson (2008), Pliatsikas & Marinis (2013) and Roberts & Liszka (2013). This is based on an assumption that incorrect comprehension judgments reflect either a lack of attention during the experiment or comprehension behaviour that is otherwise non-standard (Keating & Jegerski 2015). As a result, data from these sentences should be deemed ineffective. In the current study, I pursued this method and eliminated SPR data from sentences with incorrect comprehension task responses.

5.1.4 Analysis of test sentences in SPR format: treatment of very high and very low values and calculation of residual reading times

According to Keating & Jegerski (2015), the next step in preparing RT data for statistical analyses is trimming to minimise effects of extreme data points and outliers. The reason for the treatment is that, during an experiment, participants' RTs can be affected by various factors (such as distraction by itchiness or outside noise) which may lead to their unusual responses including pressing buttons faster or slower than their normal speed.

As pointed out by Keating & Jegerski, there is no single acceptable technique for data trimming. Nonetheless, it usually involves deletion of RTs of less than 100-200 ms as well as replacement of very high values (defined by a range of 2000-6000 ms or by 2-3 standard deviations away from a mean score) with more moderate values. In the current study, I deleted RTs below 100 ms (as also performed in Chen 2014; He & Kaiser 2012, 2016; Hofmeister & Vasishth 2014; Jegerski 2016; Niikuni & Muramoto 2014; Wallot & Van Orden 2011), resulting in reduction of 2 data points from the CnNS and CnAL groups (i.e. 1 data point from each group).

Regarding the upper limit, I defined RTs above 2500 ms as high value RTs (cf. Slevc, Rosenberg & Patel 2009; Wallot & Van Orden 2011) and replaced these data points with 2500 ms. Next, RTs that are more than 2 standard deviations above a mean RT in each stimulus region in each condition by each proficiency group were identified and replaced with a value which is 2

standard deviations above the mean RT (cf. Jiang 2007; Nicol, Forster, & Veres 1997). With these replacement operations, data points being treated comprise 4.89%, 13.29%, 8.34%, 7.77%, 6.90%, 13.41%, 11.81% and 8.60% of data derived from the previous step for CnNS, CnBL, CnIL, CnAL, ThNS, ThBL, ThIL and ThAL groups respectively.

Keating & Jegerski also state that, when participants within the same group read at a different speed, it can introduce inter-participant variability to a computation of group means. Moreover, if comparable segments in contrasting conditions are not equal in length, the length will become a confounding factor in statistical comparison. The authors suggest that one way to control for the individual difference and the length difference is to calculate *residual reading times*. In this study, I followed the suggestion and calculated residual reading times for each participant and segment region by running a regression analysis on raw RTs of each participant with word length as a predictor variable. This method has also been performed in other SPR studies including Ferreira & Clifton (1986), Pearlmutter *et al.* (1999), Squires (2014) and Trueswell, Tanenhaus, & Garnsey (1994).

5.1.5 Analysis of test sentences in SPR format: statistical hypothesis testing

Based on data derived from the above treatments, a statistical analysis using an independent T-test was performed on each segment/region in contrasting conditions.[35] Units of analysis are often divided into 4 types, namely pre-critical, critical, post-critical (a.k.a. spillover) and sentence-final (a.k.a. wrap-up) regions (Keating & Jegerski 2015). These regions are important to our analysis in different ways.

To begin with, a critical region is a position where an initial effect of test sentence manipulation is predicted to occur. If a participant is sensitive to ungrammaticality of an experimental condition, it is expected that he/she spends longer time on the ungrammatical condition, compared to its grammatical counterpart. Moreover, the longer response is likely to begin from a critical region. As an example, let us look at sentences in (71) and (72) which are taken from Chinese Condition 1b and 1c respectively. These sentences were designed to test

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[35] Methods that have been widely used to compare RTs include ANOVA and its variations such as a repeated ANOVA or a mixed ANOVA (Dong *et al.* 2015; Hopp 2006; Jackson & Roberts 2010; Pliatsikas & Marinis 2013; Roberts & Liszka 2013; Sagarra & Herschensohn 2010 and Wu *et al.* 2012). However, since the current study only compares two conditions against each other, T-test is a more appropriate tool.

word orders in nominal phrases. Their critical regions are *san ge haizi* (three-CL-child) and *haizi san ge* (child-three-CL) respectively. If a participant has acquired a correct word order in Chinese, he/she is expected to notice ungrammaticality of (72) at the critical region and start to read slower. On the contrary, since the word order in (71) is grammatical, he/she is expected to read all segments in a regular manner.

(71) mingtian   Xiaoli   hui   dai   san   ge   haizi   qu   yiyuan   kanbing
      tomorrow   Xiaoli   will   bring   three   CL   child   go   hospital   see-doctor
      "Tomorrow Xiaoli will take three children to see a doctor at a hospital."

(72) * mingtian   Xiaoli   hui   dai   haizi   san   ge   qu   yiyuan   kanbing
      tomorrow   Xiaoli   will   bring   child   three   CL   go   hospital   see-doctor
      "Tomorrow Xiaoli will take three children to see a doctor at a hospital."

A pre-critical region consists of segments that appear before a critical region. For example, a pre-critical region of (71) and (72) is *mingtian Xiaoli hui dai* (tomorrow-Xiaoli-will-bring). As lexical items in this region are matched across the two contrasting conditions and they appear before the critical region, no ungrammaticality effect should occur. In other words, participants' RTs are not expected to be statistically significant at the pre-critical region of contrasting conditions.

A post-critical/spillover region includes segments that follow a critical region, except the last segment of a sentence (which is considered a wrap-up segment). For example, a post-critical region of (71) and (72) is *qu yiyuan* (go-hospital). Several studies have found that, when participants are sensitive to ungrammaticality of a sentence, their slow response may continue from a critical region onto following segments. This phenomenon is called a *spillover effect*, as shown in data from Clifton (2013), Frank, Fernandez Monsalve, Thompson, & Vigliocco (2013), Pearlmutter *et al.* (1999), Roberts & Liszka (2013), Sharkey & Sharkey (1987) and Warren & Gibson (2002). As a result, several SPR studies include a spillover region in their reading time analysis (cf. Jackson 2008, 2010; Jackson & Roberts 2010; Roberts & Liszka 2013; Tokowicza & Warren 2010; among others).

Lastly, a sentence-final/wrap-up segment is the last segment of a sentence, such as the *kanbing* (see-doctor) segment in (71) and (72). In the current study, a full stop was added to

wrap-up segments during the SPR task in order to let participants know that the sentence was ending. A *sentence wrap-up effect* has been observed since early SPR studies (Just & Carpenter 1980; Just *et al.* 1982; Mitchell & Green 1978). Results in these studies show that when readers face a problem understanding a sentence, their RTs at the final position of the sentence tend to be longer than RTs from sentences without ambiguity or ungrammaticality. This suggests that the sentence wrap-up position is where readers try to resolve issues previously found in a sentence (Just & Carpenter 1980). Following this line of thought, in the current study it is expected that participants who are sensitive to ungrammaticality in a test sentence may spend longer time at a sentence wrap-up position, compared to people who are not sensitive to ungrammaticality. Consequently, the wrap-up segment should be one of the positions of which reading times are analysed. (Also see Jackson 2008, 2010 and Tokowicza & Warren 2010 which also include a wrap-up segment in their analyses.)

Since the ungrammaticality effect can be reflected at critical, post-critical and wrap-up segments/regions, these positions will serve as a basis for my interpretation of whether participants are sensitive to ungrammaticality in my test sentences. To be precise, if participants are found to spend significantly longer time at *any* of these positions in an ungrammatical condition, compared to their RTs at a comparable position in a grammatical condition, it will be taken as evidence that the participants are sensitive to ungrammaticality of the experimental condition.

5.2 Results of each set of test sentences

5.2.1 Set 1: Word orders

5.2.1.1 L2 Chinese word orders

Sentences in Set 1 were designed to answer whether L2 learners can accept a correct word order of nominal phrases in their TL and reject an incorrect word order which is similar to that in their L1. To answer the first part of the question for L2 Chinese, we compare Thai learners' behaviour in Condition 1a (a control) and 1b (an experimental condition with a correct Chinese word order of "numeral + classifier + noun"). Both conditions are grammatical. Examples of test sentences in these conditions are repeated here as (73) and (74).

(73) Chinese 1a   mingtian   Xiaoli   hui   dai   haizi   qu   yiyuan   kanbing

　　　　　　　　tomorrow   Xiaoli   will   bring   child   go   hospital   see-doctor

　　　　　　　　"Tomorrow Xiaoli will take (her) child(ren) to see a doctor at a hospital."

(74) Chinese 1b   mingtian   Xiaoli   hui   dai   san   ge   haizi   qu   yiyuan   kanbing

　　　　　　　　tomorrow   Xiaoli   will   bring   three   CL   child   go   hospital   see-doctor

　　　　　　　　"Tomorrow Xiaoli will take three children to see a doctor at a hospital."

Table 5 shows three types of data from our analysis of AJT judgment by each group of participants, including average AJT scores of Condition 1a and 1b, *p*-values from *post hoc* Scheffé's tests comparing Condition 1a and 1b, and results from individual analyses indicating the number of participants who consistently accepted or rejected test sentences in each condition.

Table 5 AJT mean scores, p-values and the number of participants who responded consistently on Chinese test sentences in Condition 1a and 1b

	Mean scores		ANOVA	Individual consistency			
	1a	1b	*post hoc* *p*-value[36]	accept 1a consistently	reject 1a consistently	accept 1b consistently	reject 1b consistently
CnBL	3.22☆	3.13☆	.610	19 / 21 (90%)	0 / 21 (0%)	16 / 19 (84%)	2 / 19 (11%)
CnIL	3.38☆	3.40☆	.978	18 / 18 (100%)	0 / 18 (0%)	17 / 18 (94%)	0 / 18 (0%)
CnAL	3.58☆	3.55☆	.939	21 / 21 (100%)	0 / 21 (0%)	21 / 21 (100%)	0 / 21 (0%)
CnNS	3.98	3.97	.989	15 / 15 (100%)	0 / 15 (0%)	15 / 15 (100%)	0 / 15 (0%)

Notes. Under the mean score columns, a ☆ symbol next to learners' mean scores indicates that scores of learners in that group are statistically significant at *p* < 0.05 when compared with the native speakers' group. As for the individual consistency columns, the expression "19 / 21 (90%)" represents "19 out of 21 (i.e. 90% of) participants fall into this category".

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[36] As explained in Section 5.1.2, *p*-values in Table 5 come from *post hoc* Scheffé's tests after ANOVAs between Condition 1a, 1b and 1c. Precisely, results of the ANOVAs are $F(2,233) = 12.400$, $p = .000$ for CnBLs; $F(2,207) = 47.838$, $p = .000$ for CnILs; $F(2,249) = 179.478$, $p = .000$ for CnALs; $F(2,177) = 338.246$, $p = .000$ for CnNSs. As the results are all significant, *post hoc* comparisons between Condition 1a and 1b (shown in Table 5) and between Condition 1a and 1c (shown in Table 6) can be performed.

Let us first look at native speakers' data. As expected, CnNSs rated both control and grammatical experimental conditions with high mean scores, namely 3.98 for Condition 1a and 3.97 for Condition 1b, and they are not statistically significant ($p = .989$). In addition, all participants in this group consistently accepted both Condition 1a and 1b, suggesting that the native speakers do not have a problem with any structures in our test sentences, including the "numeral + classifier + noun" word order in the experimental condition 1b.

Thai learners also performed relatively well on these conditions. From mean scores, all groups of learners rated both conditions with mean scores above 3.00, indicating that they tended to accept both types of sentences. Statistical analyses also show that their scores on these two conditions do not differ significantly ($p = .610, .978$ and $.939$ for CnBLs, CnILs and CnALs respectively). In addition, individual consistency data reveal that, like CnNSs, all CnALs consistently accepted both conditions. Among CnILs, although 1 person neither consistently accepted nor rejected the experimental condition 1b, 17 of 18 people consistently accepted it.

As for CnBLs, not everybody in this group consistently accepted the control condition. There were 2 people who could not rate control sentences in a consistent manner. As the participants could not perform well on control sentences, it seems to be the case that they had some problems with sentences in this set but the problems were not related to a "numeral + classifier + noun" word order which is only present in the experimental condition. To reduce possible confounding factors, participants who had problems with control sentences were eliminated from the group when we performed individual consistency analysis of Condition 1b. (In all following analyses of individual consistency in this Chapter, calculation of experimental conditions will also be based on participants who consistently accepted their controls.) As a result, individual consistency data of CnBLs in Condition 1b are based on 19 participants who consistently accepted Condition 1a. Among these learners, 2 of them consistently rejected the experimental condition and one person did not judge the test sentences consistently in any directions. Nonetheless, a majority (i.e. 16 out of 19) of beginners consistently accepted our experimental sentences.

Taken together, the abovementioned results suggest that, although the Chinese "numeral + classifier + noun" structure is different from the "noun + numeral + classifier" structure in Thai learners' native language, it did not seem to pose great difficulties for the learners. Particularly, even beginners (CnBLs) in our study could rate Condition 1b with high scores, and the scores are

close to their judgment of the control condition. Also, 84% of them consistently accepted the target structure. It is likely to be the case that the abundance of the "numeral + classifier + noun" structure in Chinese input had facilitated learners' acquisition of the word order. In other words, presence of positive evidence in TL seems to have a positive effect in L2 acquisition.

In contrast, we can look at a case of L2 acquisition when there is neither confirming nor disconfirming evidence in the input as demonstrated by Chinese Condition 1c (see example (75)). Critical phrases in this condition have a "noun + numeral + classifier" word order which mimics a Thai structure but is ungrammatical in Chinese. From Chinese native speakers' (CnNSs) data in Table 6, we can see that they indeed rejected sentences in Condition 1c, giving them a low mean score of 1.47 which is significantly lower than their scores for the control condition 1a; $p = .000$. Moreover, a very large majority (93%) of native speakers consistently rejected ungrammatical sentences in this condition. In short, the empirical data confirm that the "noun + numeral + classifier" structure is ungrammatical in Chinese.

(75) Chinese 1c   * mingtian   Xiaoli   hui   dai   haizi san   ge   qu yiyuan   kanbing

                      tomorrow Xiaoli will bring child three CL go hospital see-doctor

                      "Tomorrow Xiaoli will take three children to see a doctor at a hospital."

Table 6 AJT mean scores, p-values and the number of participants who responded consistently on Chinese test sentences in Condition 1a and 1c

	Mean scores		ANOVA	Individual consistency			
	1a	1c*	*post hoc* *p*-value	accept 1a consistently	reject 1a consistently	accept 1c* consistently	reject 1c* consistently
CnBL	3.22☆	2.56☆	.000	19 / 21 (90%)	0 / 21 (0%)	9 / 19 (47%)	7 / 19 (37%)
CnIL	3.38☆	2.37☆	.000	18 / 18 (100%)	0 / 18 (0%)	4 / 18 (22%)	11 / 18 (61%)
CnAL	3.58☆	1.92☆	.000	21 / 21 (100%)	0 / 21 (0%)	0 / 21 (0%)	21 / 21 (100%)
CnNS	3.98	1.47	.000	15 / 15 (100%)	0 / 15 (0%)	0 / 15 (0%)	14 / 15 (93%)

Based on ANOVA results in Table 6, all groups of learners manifested certain sensitivity to ungrammaticality of the "noun + numeral + classifier" word order as their judgment scores on

Condition 1c are significantly lower than scores in Condition 1a; $p = .000$ for all groups.[37] However, based on other types of data, only advanced learners seem to have performed native-like. That is, CnALs rated Condition 1c with a low mean score of 1.92 and all participants in this group consistently rejected sentences of this type. Learners with lower proficiency, on the other hand, could not completely reject ungrammatical sentences. In particular, CnBLs and CnILs' mean scores on Condition 1c are 2.56 and 2.37. Since these scores are around the middle of the 1-to-4 scale, they indicate the learners' indeterminacy in their judgment. Moreover, among those who did not have a problem with the control condition, 47% of CnBLs and 22% of CnILs consistently accepted the incorrect word order in Condition 1c.

A possible reason some CnBLs and CnILs accepted the incorrect "noun + numeral + classifier" structure is L1 transfer. As discussed in Section 3.1, it is assumed that features on an L1 lexical item are transferred to its corresponding L2 lexical item at an initial stage of L2 acquisition. Regarding the word order issue being discussed here, it is the [+NPmove] feature that is transferred from Thai numerals to the learners' L2 Chinese numerals. Since this feature requires nouns to rise to a pre-numeral position, it can be a reason for the learners' acceptance of the "noun + numeral + classifier" structure in their L2 Chinese.

Learners' behaviour in Condition 1c is also interesting because it can provide us with information about L2 development when disconfirming evidence in natural input is unavailable. As Thai learners start their L2 acquisition with a [+NPmove] feature, one of their tasks is to unlearn the feature. However, in natural language input, the learners can only encounter a "numeral + classifier + noun" structure which informs them that a noun-final position is grammatical. The presence of the "numeral + classifier + noun" form, however, does not explicitly negate a possibility of a "noun + numeral + classifier" form in the same language. In other words, Thai learners are not directly informed about ungrammaticality of a noun-initial structure and it is possible for them to believe that both "numeral + classifier + noun" and "noun + numeral + classifier" structures are acceptable in Chinese. But from our results, despite the lack of disconfirming input against the L1-transferred structure, Thai learners in this study still managed to acquire the feature, as shown by the increasing percentages of learners who could consistently reject Condition 1c, i.e. from 37% of CnBLs, to 61% of CnILs, to 100% of CnALs.

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[37] In addition, their scores on the experimental condition 1c are also significant from the experimental condition 1b ($p = .000$ for all four groups of participants).

The results indicate that it is possible for learners to acquire a correct L2 feature even without disconfirming input.

So far, we have discussed participants' behaviour based on their AJT judgment. In what follows, their performance in SPR task will be presented. A difference between our SPR and AJT analyses is that the control condition 1a is not included in the SPR analysis. Recall that main nominal phrases in 1a contain a single noun while those in experimental conditions 1b and 1c contain a noun as well as a numeral and a classifier. As a word count difference can become a confounding factor on participants' reading behaviour, only Condition 1b and 1c are included in our SPR analysis because they have the same number of segments and the same lexical items.

Results of RT comparisons between Condition 1b and 1c are shown in Figure 1 – 4, each of which corresponds to a proficiency group. Before interpreting data, I would like to explain a format of the figures. First of all, each bar in the figures corresponds to a segment presented to our participants. Under a segment number, an example of lexical items in that segment is provided together with a gloss. The height of each bar indicates an average RT (after data elimination based on incorrect post-stimulus task responses, deletion of extreme data points, and replacement of outliers, as explained in Section 5.1) in that segment position, and the RT values are also shown in a table below the bars. Additionally, the final row of the table shows *p*-values from T-tests of RTs (after data treatments mentioned above and a regression analysis) from two contrasting conditions. For Set 1 in particular, RTs of Segment 5 and 6 were combined prior to the T-test comparison to ensure that the compared regions contained the same lexical items.

Figure 1 CnBLs' group mean RTs on each segment in Chinese Condition 1b and 1c

	1	2	3	4	5	6	7	8	9
	1b mingtian tomorrow	Xiaoli Xiaoli	hui will	dai bring	san ge three CL	haizi child	qu go	yiyuan hospital	kanbing see-doctor
	1c* mingtian tomorrow	Xiaoli Xiaoli	hui will	dai bring	haizi child	san ge three CL	qu go	yiyuan hospital	kanbing see-doctor
1b	1023	1091	714	678	881	947	603	978	1007
1c*	1018	1087	642	723	922	895	565	947	1044
p =	0.459	0.833	0.269	0.455	0.633		0.223	0.563	0.485
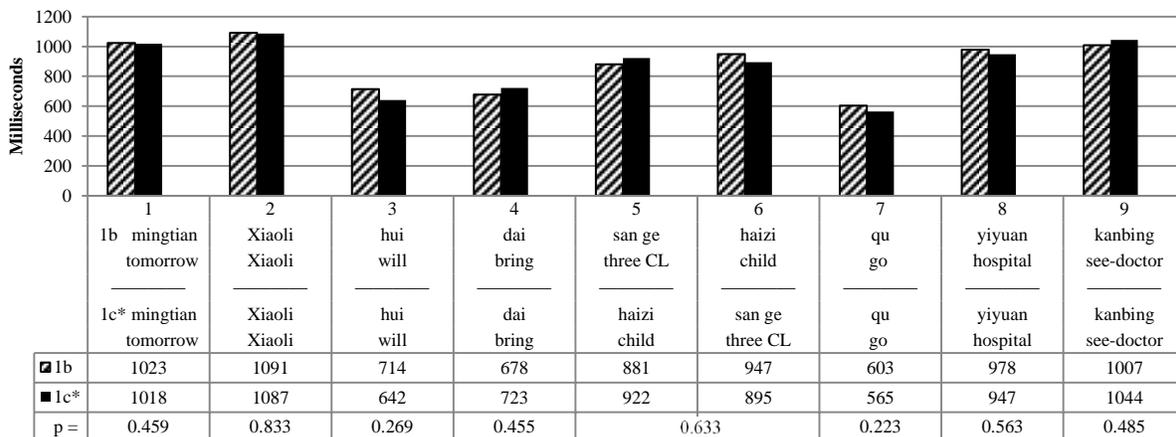
Figure 2 CnILs' group mean RTs on each segment in Chinese Condition 1b and 1c

	1	2	3	4	5	6	7	8	9
1b	mingtian tomorrow	Xiaoli Xiaoli	hui will	dai bring	san ge three CL	haizi child	qu go	yiyuan hospital	kanbing see-doctor
1c*	mingtian tomorrow	Xiaoli Xiaoli	hui will	dai bring	haizi child	san ge three CL	qu go	yiyuan hospital	kanbing see-doctor
1b	867	1030	679	725	897	810	587	982	1145
1c*	834	1147	708	769	875	866	624	985	1131
p =	0.723	0.170	0.479	0.377	0.798		0.316	0.839	0.685
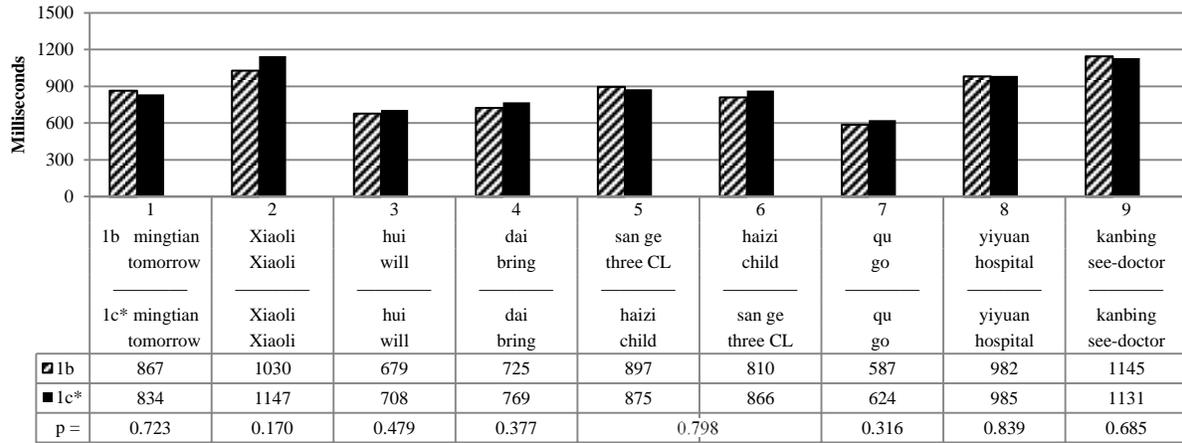
Figure 3 CnALs' group mean RTs on each segment in Chinese Condition 1b and 1c

	1	2	3	4	5	6	7	8	9
1b	mingtian tomorrow	Xiaoli Xiaoli	hui will	dai bring	san ge three CL	haizi child	qu go	yiyuan hospital	kanbing see-doctor
1c*	mingtian tomorrow	Xiaoli Xiaoli	hui will	dai bring	haizi child	san ge three CL	qu go	yiyuan hospital	kanbing see-doctor
1b	867	866	627	611	673	600	541	846	855
1c*	884	836	609	608	695	753	619	971	819
p =	0.783	0.530	0.551	0.968	0.013		0.027	0.039	0.522
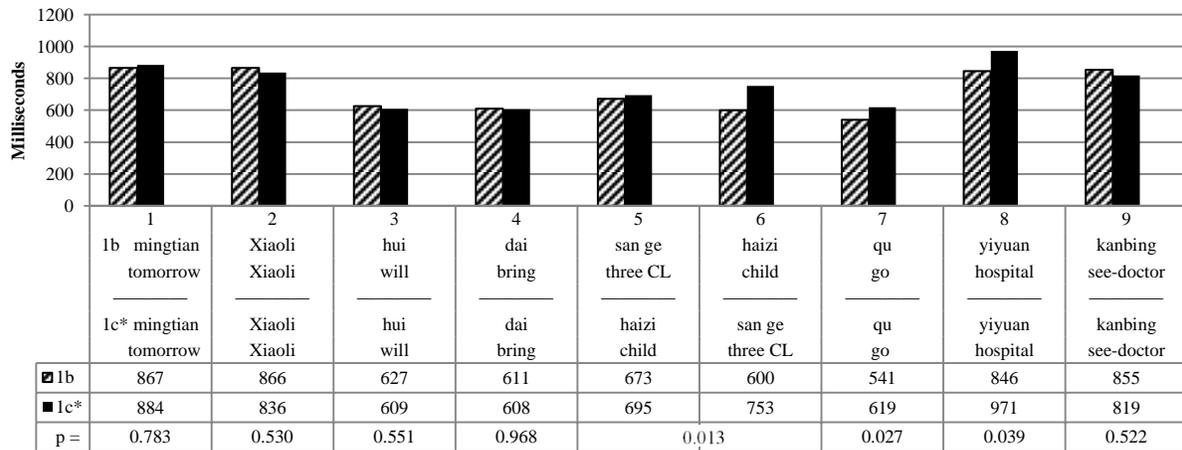
Figure 4 CnNSs' group mean RTs on each segment in Chinese Condition 1b and 1c

	1	2	3	4	5	6	7	8	9
1b	mingtian tomorrow	Xiaoli Xiaoli	hui will	dai bring	san ge three CL	haizi child	qu go	yiyuan hospital	kanbing see-doctor
1c*	mingtian tomorrow	Xiaoli Xiaoli	hui will	dai bring	haizi child	san ge three CL	qu go	yiyuan hospital	kanbing see-doctor
1b	234	219	233	227	233	241	242	263	325
1c*	226	207	219	219	218	219	253	277	381
p =	0.414	0.376	0.352	0.307	0.057		0.498	0.296	0.008

82
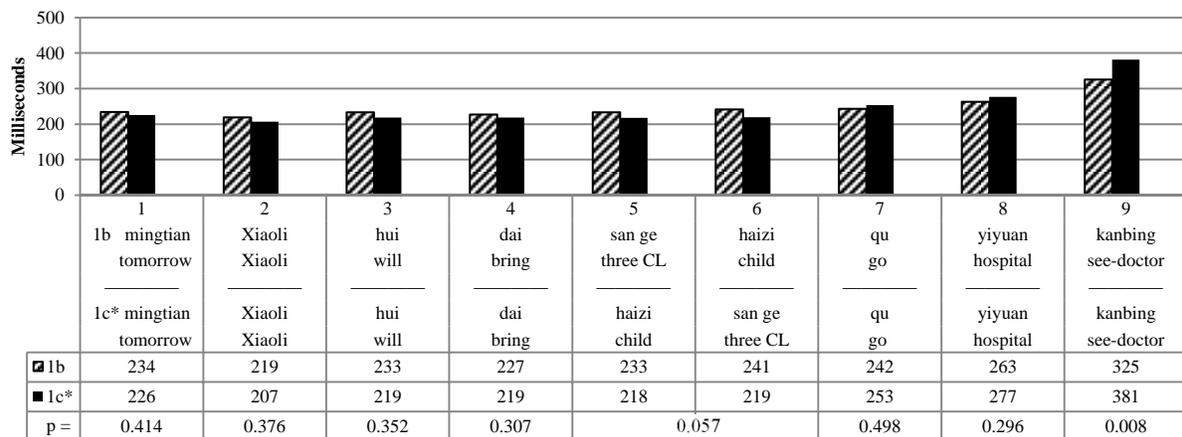
From Figure 1 – 4, we can see that all groups of participants spent a comparable amount of time at the pre-critical region (i.e. Segment 1-4) of Condition 1b and 1c, as none of the *p*-values from these segments is below the .05 significance level. This is an expected result since lexical items in these segments are the same in both conditions and they appear before the critical region (i.e. Segment 5-7). There is also no significance on CnBLs' and CnILs' RTs at other segments. Since the ungrammaticality effect is not found in beginners' and intermediate learners' groups, it is likely that these lower proficiency learners were not sensitive to ungrammaticality of the "noun + numeral + classifier" structure in Condition 1c during real-time processing.

CnALs and CnNSs, on the other hand, appeared to be sensitive to the ungrammaticality as they spent significantly longer time at one or more segments in the critical, post-critical and wrap-up regions of the ungrammatical condition. In particular, native speakers spent longer time at the wrap-up segment, with mean RTs of 325 ms in Condition 1b and 381 ms in Condition 1c; t(103) = -2.691, *p* = .008. Advanced learners spent longer time at the critical region, t(154) = -2.506, *p* = .013, and the two post-critical segments, namely t(155) = -2.229, *p* = .027 at Segment 7 and t(152) = -2.084, *p* = .039 at Segment 8.

RTs in Figure 1 – 4 also reveal some general trends regarding participants' reading behaviour. First, it can be seen quite clearly that native speakers read faster than learners. Take the first segment as an example. CnNS's mean RTs in Condition 1b and 1c are 234 and 226 ms respectively, while learners' RTs range from 834 to 1023 ms. The difference in reading speed can be seen throughout SPR results in this study. However, it does not affect our data analysis because our main concern is a comparison within the same group of participants, as argued in Section 5.1.1.

Another interesting observation is that Chinese native speakers' ungrammaticality effect (as shown by a difference in RTs when one of the conditions is ungrammatical) tends to occur at the end of test sentences. On the contrary, learners' ungrammaticality effect tends to occur at critical segments. The reason of such a difference between native speakers and learners is possibly related to the reading speed difference mentioned above. As native speakers often read at a faster pace (for example, their average RTs in Condition 1b and 1c are around 250 ms per segment, which means that they could read around 4 segments within one second), even though they might have started to notice ungrammaticality of Condition 1c at the critical region (Segment 5-7), their hands might not be able to react promptly to the sensitivity. As a result,

there can be a lag between a segment in which ungrammaticality is detected and a segment demonstrating prolonged RTs. (And this is also why we should include post-critical and wrap-up segments in our analysis.) Learners, on the other hand, often demonstrated their sensitivity (if any) at a critical segment because they usually spent longer time on each segment, giving an opportunity for the hands to react within the segment in which ungrammaticality was detected.

5.2.1.2 L2 Thai word orders

Thai test sentences in Set 1 were designed with a similar rationale to Chinese sentences in the previous section. That is, Condition 1a is a control; Condition 1b is an experimental condition that contains a correct TL word order; and Condition 1c is an experimental condition that contains an incorrect word order created based on learners' native language. Their examples are shown in (76) – (78).

(76) Thai 1a   phrûŋníi   sùʔdaa   càʔ   phaa   lûuklûuk   pay   rooŋpháyaabaan
                tomorrow   Suda   will   bring   child   go   hospital
                "Tomorrow Suda will take (her) children to a hospital."

(77) Thai 1b   phrûŋníi   sùʔdaa   càʔ   phaa   lûuklûuk   sǎam   khon   pay   rooŋpháyaabaan
                tomorrow   Suda   will   bring   child   three   CL   go   hospital
                "Tomorrow Suda will take three children to a hospital."

(78) Thai 1c   * phrûŋníi   sùʔdaa   càʔ   phaa   sǎam   khon   lûuklûuk   pay   rooŋpháyaabaan
                tomorrow   Suda   will   bring   three   CL   child   go   hospital
                "Tomorrow Suda will take three children to a hospital."

Again, we begin our analysis with AJT data from Condition 1a and 1b as shown in Table 7. For the control condition 1a, all four groups of participants performed well as their group mean scores are fairly high (all above 3.50) and everybody consistently accepted its test sentences (as shown by "100%" in the "accept 1a consistently" sub-column). These results indicate that participants in our study did not have a problem with a basic sentence structure in Set 1.

Table 7 AJT mean scores, p-values and the number of participants who responded consistently
on Thai test sentences in Condition 1a and 1b

	Mean scores		ANOVA	Individual consistency			
	1a	1b	*post hoc* *p*-value[38]	accept 1a consistently	reject 1a consistently	accept 1b consistently	reject 1b consistently
ThBL	3.62	3.16☆	.017	18 / 18 (100%)	0 / 18 (0%)	11 / 18 (61%)	1 / 18 (6%)
ThIL	3.67	3.57	.760	18 / 18 (100%)	0 / 18 (0%)	18 / 18 (100%)	0 / 18 (0%)
ThAL	3.74	3.61	.554	18 / 18 (100%)	0 / 18 (0%)	18 / 18 (100%)	0 / 18 (0%)
ThNS	3.82	3.72	.624	15 / 15 (100%)	0 / 15 (0%)	15 / 15 (100%)	0 / 15 (0%)

As for the experimental condition 1b which contains the correct Thai "noun + numeral + classifier" structure, Thai native speakers and Chinese learners at intermediate and advanced levels performed well, as indicated by their high mean scores (of 3.67, 3.74 and 3.82 for ThILs, ThALs and ThNSs respectively) which are not statistically significant from the control condition (p = .760, .554 and .624 for ThILs, ThALs and ThNSs). Moreover, all participants in these three groups also consistently accepted sentences in Condition 1b.

In contrast, Chinese beginning learners of Thai (ThBLs) may not have fully acquired the TL word order. Although their scores for Condition 1b are in a range of acceptance (i.e. averaged at 3.16, which is above the cut point of 3.00), the sentences were still rated with significantly lower scores compared to their counterparts in the control condition (p = .017). In addition, only 61% of ThBLs could consistently accept experimental sentences, whereas one person consistently rejected them and 6 people did not make a consistent judgment.

In general, the results suggest that a Thai [+NPmove] feature which underlies the "noun + numeral + classifier" structure in Condition 1b had been acquired by Chinese learners since the intermediate level. Similar to the case of L2 Chinese acquisition discussed in Section 5.2.1.1, the abundance of positive evidence for TL structure is likely to be a driving force behind the learners' relatively early acquisition of the feature, despite its being different from a feature in their native language.

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[38] Similar to a Chinese analysis in Section 5.2.1.1, *p*-values in Table 7 come from *post hoc* Scheffé's tests after ANOVAs between Condition 1a, 1b and 1c whose results are F(2,210) = 30.392, p = .000 for ThBLs; F(2,213) = 101.935, p = .000 for ThILs; F(2,213) = 236.481, p = .000 for ThALs; F(2,177) = 319.640, p = .000 for ThNSs.

Let us now look at Condition 1c which was designed to test whether Chinese learners could reject the incorrect Thai "numeral + classifier + noun" structure which is a result of a [–NPmove] feature transferred from their L1. In Table 8, it can be seen that Chinese advanced learners of Thai (ThALs) performed native-like. Both ThALs and ThNSs rated the ungrammatical condition 1c with low scores (averaged at 1.51 and 1.52 respectively) which are significantly lower than the control condition 1a ($p = .000$).[39] Moreover, all ThALs consistently rejected Condition 1c, just like ThNSs did.

ThBLs, in contrast, did not perform native-like. Although the learners rated Condition 1c with significantly lower scores than the control condition ($p = .000$) and 56% of them could consistently reject ungrammatical sentences in 1c, there were still 3 people who consistently accepted these ungrammatical sentences. Moreover, as a group, the learners' mean score for Condition 1c is above a cut point of 2.00, indicating that they were not very confident to reject 1c.

ThILs, on the other hand, fall into a borderline situation. Although they rated the ungrammatical condition 1c with significantly lower scores than the control condition ($p = .000$), their mean score for this condition is exactly at the cut point of 2.00. In addition, there were still 4 people in this group who could not consistently reject Condition 1c. Therefore, it may not be safe to say that the intermediate learners had reached a native-like state in disallowing the [–NPmove] feature.

Table 8 AJT mean scores, p-values and the number of participants who responded consistently on Thai test sentences in Condition 1a and 1c

	Mean scores		ANOVA	Individual consistency			
	1a	1c*	*post hoc* *p*-value	accept 1a consistently	reject 1a consistently	accept 1c* consistently	reject 1c* consistently
ThBL	3.62	2.39☆	.000	18 / 18 (100%)	0 / 18 (0%)	3 / 18 (17%)	10 / 18 (56%)
ThIL	3.67	2.00☆	.000	18 / 18 (100%)	0 / 18 (0%)	0 / 18 (0%)	14 / 18 (78%)
ThAL	3.74	1.51	.000	18 / 18 (100%)	0 / 18 (0%)	0 / 18 (0%)	18 / 18 (100%)
ThNS	3.82	1.52	.000	15 / 15 (100%)	0 / 15 (0%)	0 / 15 (0%)	15 / 15 (100%)

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[39] In addition, all groups' scores on the experimental condition 1c are also significant from their scores on the experimental condition 1b ($p = .000$).

Figure 5 ThBLs' group mean RTs on each segment in Thai Condition 1b and 1c

	1	2	3	4	5	6	7	8
	1b phrûŋníi	sù?daa	cà?	phaa	lûuklûuk	sǎam khon	pay	rooŋpháyaabaan
	tomorrow	Suda	will	bring	child	three CL	go	hospital
	1c* phrûŋníi	sù?daa	cà?	phaa	sǎam khon	lûuklûuk	pay	rooŋpháyaabaan
	tomorrow	Suda	will	bring	three CL	child	go	hospital
1b	1161	1229	708	818	1195	1435	543	1392
1c*	1287	1302	652	846	1443	1173	561	1326
p =	0.120	0.585	0.639	0.804	0.648		0.708	0.839
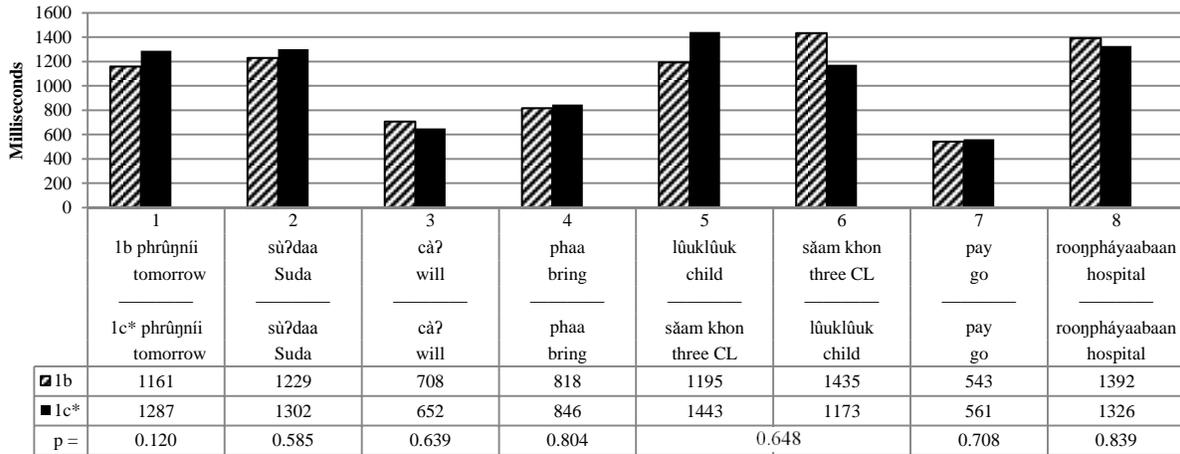
Figure 6 ThILs' group mean RTs on each segment in Thai Condition 1b and 1c

	1	2	3	4	5	6	7	8
	1b phrûŋníi	sù?daa	cà?	phaa	lûuklûuk	sǎam khon	pay	rooŋpháyaabaan
	tomorrow	Suda	will	bring	child	three CL	go	hospital
	1c* phrûŋníi	sù?daa	cà?	phaa	sǎam khon	lûuklûuk	pay	rooŋpháyaabaan
	tomorrow	Suda	will	bring	three CL	child	go	hospital
1b	1081	1232	666	840	1021	1235	584	1449
1c*	1086	1188	684	756	1408	928	663	1376
p =	0.774	0.644	0.480	0.279	0.666		0.084	0.454
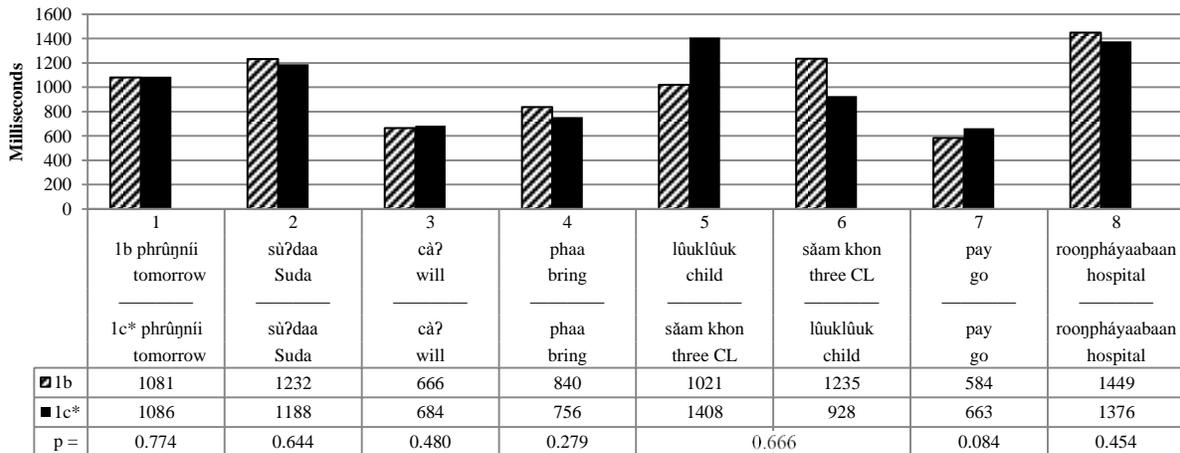
Figure 7 ThALs' group mean RTs on each segment in Thai Condition 1b and 1c

	1	2	3	4	5	6	7	8
	1b phrûŋníi	sù?daa	cà?	phaa	lûuklûuk	sǎam khon	pay	rooŋpháyaabaan
	tomorrow	Suda	will	bring	child	three CL	go	hospital
	1c* phrûŋníi	sù?daa	cà?	phaa	sǎam khon	lûuklûuk	pay	rooŋpháyaabaan
	tomorrow	Suda	will	bring	three CL	child	go	hospital
1b	1144	992	650	739	989	1128	629	1295
1c*	1061	987	644	704	1144	1118	678	1322
p =	0.303	0.817	0.919	0.447	0.019		0.385	0.784
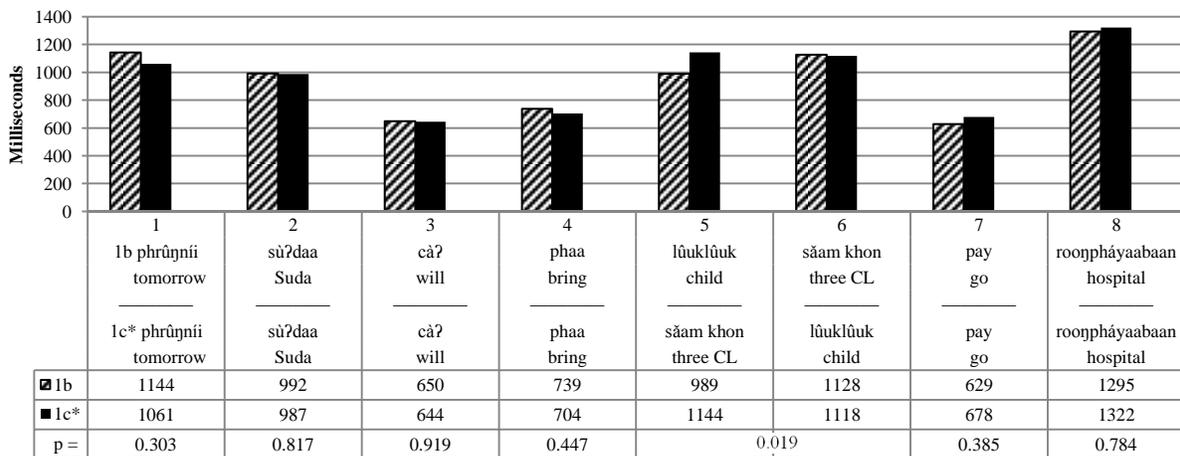
Figure 8 ThNSs' group mean RTs on each segment in Thai Condition 1b and 1c

	1	2	3	4	5	6	7	8
	1b phrûŋníi tomorrow	sùʔdaa Suda	càʔ will	phaa bring	lûuklûuk child	sǎam khon three CL	pay go	rooŋpháyaabaan hospital
	1c* phrûŋníi tomorrow	sùʔdaa Suda	càʔ will	phaa bring	sǎam khon three CL	lûuklûuk child	pay go	rooŋpháyaabaan hospital
1b	498	476	424	398	410	462	403	493
1c*	490	458	413	435	458	553	400	503
p =	0.790	0.503	0.791	0.319	0.015		0.931	0.794
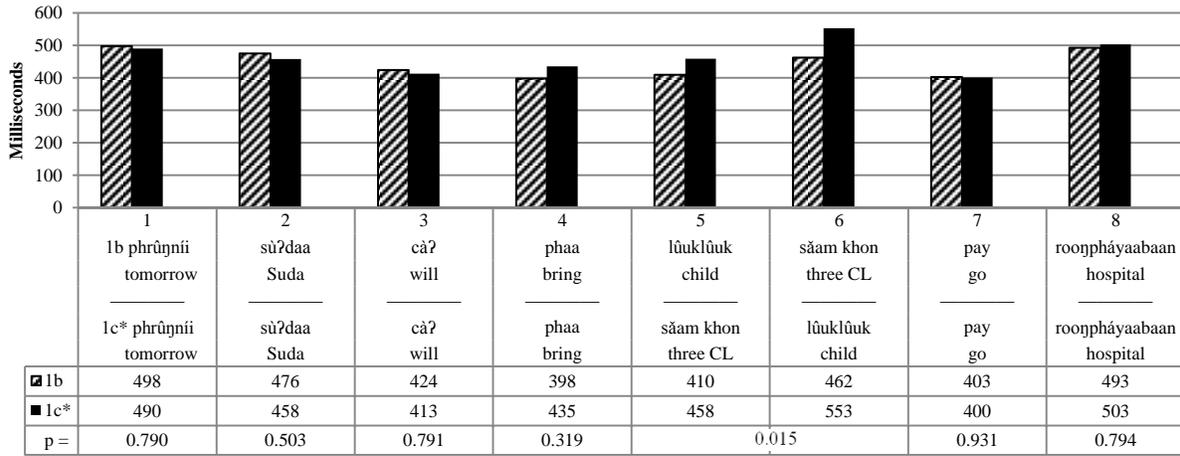
Figure 5 – 8 present SPR results of Condition 1b and 1c per each group of participants. Just like results from AJT, only advanced learners performed similarly to native speakers in this task. To begin with, we can see from Figure 8 that ThNSs were sensitive to ungrammaticality of the "numeral + classifier + noun" structure in Condition 1c as they spent significantly longer time at a critical region (comprised of Segment 5 and 6) in this condition compared to their RTs in the grammatical condition 1b; $t(113) = -2.486$, $p = .015$. Similar to ThNSs, ThALs also spent longer time at the critical region; $t(130) = -2.379$, $p = .019$ as shown in Figure 7.

ThBLs and ThILs, on the other hand, spent a comparable amount of time in both conditions at all compared positions ($p > .05$). As an ungrammaticality effect is not found in beginners and intermediate learners' groups, it is likely that the participants were not sensitive to ungrammaticality of the "numeral + classifier + noun" structure in Condition 1c during the SPR task. This result and the AJT data above suggest that Chinese learners' unlearning of the [–NPmove] feature might not have been successful until they reached an advanced level in Thai.

Just like our discussion in Section 5.2.1.1, the difficulty in rejection of an incorrect Thai "numeral + classifier + noun" structure faced by Chinese learners and the low proficiency learners' lack of sensitivity to its ungrammaticality are likely to be related to the lack of positive evidence in TL input. In other words, although Thai input which contains a "noun + numeral + classifier" structure can inform the learners that the noun-initial structure is grammatical, it does not provide direct evidence that the "numeral + classifier + noun" structure is ungrammatical. What should be noted, however, is that despite the lack of disconfirming input, the learners still

managed to eventually perform native-like at an advanced stage. This, again, suggests that a lack of disconfirming input does not necessarily lead to failure in L2 acquisition.

5.2.2 Set 2: Animacy restriction on collective markers

5.2.2.1 L2 Chinese collective marker

Our second set of test sentences aims to test an animacy restriction on collective markers. To recapitulate, Thai collective marker *phûak* can attach to both human and animal nouns while Chinese collective marker *men* can only attach to human nouns. Assuming an effect of L1 transfer, one of our research questions asks whether Thai learners of Chinese would be able to reject a Thai-like usage of a collective marker with animal nouns in their L2 Chinese.

To find out the answer, 4 types of test sentences were designed, namely Condition 2a–2d. Condition 2a and 2b serve as controls to ensure that participants did not have a problem with our test sentence structure and basic usages of *men* (such as its relative position to nouns and its compatibility with human nouns). Condition 2c is another control condition. It contains animal nouns and serves as a comparison counterpart in a minimal pair with an ungrammatical condition 2d which includes an incorrect usage of animal nouns with *men*. Examples of test sentences in the four conditions are provided in (79) – (82).

(79) Chinese 2a   xiaozhang   renwei   zhe-xie   xuesheng   tebie   congming

            principal   think   this-few   student   very   clever

            "The principal thinks these students are very clever."

(80) Chinese 2b   xiaozhang   renwei   zhe-xie   xuesheng-men   tebie   congming

            principal   think   this-few   student-*men*   very   clever

            "The principal thinks these students are very clever."

(81) Chinese 2c   baba   juede   zhe-xie   dongwu   bijiao   congming

            father   think   this-few   animal   quite   clever

            "My father thinks these animals are quite clever."

(82) Chinese 2d   * baba   juede   zhe-xie   dongwu-men   bijiao   congming

            father   think   this-few   animal-*men*   quite   clever

            "My father thinks these animals are quite clever."

We begin our analysis with Condition 2a and 2b. Main nominal phrases in the control condition 2a have a structure of "demonstrative + *xie* 'a few' + human noun", such as *zhe-xie xuesheng* (this-few-student) in (79), while those in Condition 2b additionally include the marker *men*, such as *zhe-xie xuesheng-men* (this-few-student-*men*) in (80). Based on a [+human] feature of *men*, Chinese native speakers' acceptability of Condition 2b should not differ from Condition 2a. Nonetheless, the [+human] feature is not the only factor that may affect acceptability of Condition 2b. As discussed in Section 2.3.4, the occurrence of *xie* "a few" can also have an effect on acceptability of *men* since the two words have slightly different semantics, i.e. *men* indicates a speaker's subjective construction of a group of referents while *xie* does not imply subjectivity. As a result, Chinese native speakers who are sensitive to such a distinction may not accept phrases in Condition 2b. It is, then, important for us to control for an effect of semantic discrepancy between *xie* and *men* on participants' judgment of the test sentences.

As a solution, in our further analysis of this set, I only include participants who did not demonstrate their disapproval of the use of *xie* with *men*, i.e. those who consistently accepted Condition 2b, which consist of 12 CnBLs, 11 CnILs, 19 CnALs and 10 CnNSs as shown in the "accept 2b consistently" column in Table 9. These participants also consistently accepted control sentences without *men* in Condition 2a. Their mean scores on Condition 2a and 2b are all over 3.00, indicating that they tended to accept both types of sentences. Moreover, their scores on Condition 2a and 2b are not statistically significant; $t(98) = -.858$, $p = .393$ for CnBLs; $t(83) = -1.462$, $p = .148$ for CnILs; $t(149) = 1.388$, $p = .167$ for CnALs; $t(78) = 1.737$, $p = .089$ for CnNSs. A finding that learners did not rate the two conditions in a statistically significant manner is expected because Chinese and Thai collective markers both carry a [+human] feature. Based on L1 transfer, Thai learners should have the [+human] feature in their L2 Chinese grammars since an initial stage, hence allowing them to accept the usage in Condition 2b.

The acceptability results in Condition 2b also help us to confirm that Thai learners in the current study did not have a problem with the position of *men*. Note that the Chinese marker *men* appears after a noun, such as *xuesheng-men* (student-*men*), while the Thai marker *phûak* appears before a noun, such as *phûak-nákrian* (*phûak*-student). Although the position of *men* is different from *phûak*, learners who are included in our further analysis all accepted test sentences in Chinese Condition 2b with *men* in its correct position. In other words, these Thai learners of Chinese seemed to have successfully acquired the position of *men* early in their L2 acquisition

process. Therefore, the difference in positions of *men* and *phûak* is unlikely to become a confounding factor during our further analysis.

Table 9 AJT mean scores, p-values and the number of participants who responded consistently on Chinese test sentences in Condition 2a and 2b

	Mean scores		T-test	Individual consistency			
	2a	2b	*p*-value	accept 2a consistently	reject 2a consistently	accept 2b consistently	reject 2b consistently
CnBL	3.04☆	3.18☆	.393	12 / 12 (100%)	0 / 12 (0%)	12 / 12 (100%)	0 / 12 (0%)
CnIL	3.31☆	3.53	.148	11 / 11 (100%)	0 / 11 (0%)	11 / 11 (100%)	0 / 11 (0%)
CnAL	3.61	3.49	.167	19 / 19 (100%)	0 / 19 (0%)	19 / 19 (100%)	0 / 19 (0%)
CnNS	3.95	3.70	.089	10 / 10 (100%)	0 / 10 (0%)	10 / 10 (100%)	0 / 10 (0%)

Table 10 AJT mean scores, p-values and the number of participants who responded consistently on Chinese test sentences in Condition 2c and 2d

	Mean scores		T-test	Individual consistency			
	2c	2d*	*p*-value	accept 2c consistently	reject 2c consistently	accept 2d* consistently	reject 2d* consistently
CnBL	3.20☆	3.08☆	.495	11 / 12 (92%)	0 / 12 (0%)	8 / 11 (73%)	1 / 11 (9%)
CnIL	3.37☆	3.30☆	.678	10 / 11 (91%)	0 / 11 (0%)	9 / 10 (90%)	0 / 10 (0%)
CnAL	3.42☆	3.16☆	.039	19 / 19 (100%)	0 / 19 (0%)	17 / 19 (89%)	2 / 19 (11%)
CnNS	3.95	1.68	.000	10 / 10 (100%)	0 / 10 (0%)	0 / 10 (0%)	9 / 10 (90%)

Let us now look at participants' judgment in Condition 2c and 2d as shown in Table 10. Condition 2c contains grammatical control sentences with animal nouns, and our participants performed quite well on this control. Chinese native speakers rated it with a very high mean score of 3.95, while Thai learners at all proficiency levels also rated it with mean scores above 3.00 which indicate their tendency to accept the sentences. In addition, all participants in the CnAL and CnNS groups demonstrated a consistent acceptance of the sentences, as can be seen in the "accept 2c consistently" sub-column. Among CnBLs and CnILs, apart from one person in each group who did not judge the sentences in a consistent manner, other participants could

accept them consistently. To sum up, our participants did not seem to have a problem with animal nouns in the control condition 2c.

In Condition 2d, the collective marker *men* was added to animal nouns, making the sentences ungrammatical because they violate the [−animal] feature of the marker. As expected, Chinese native speakers rated test sentences with low scores (averaged at 1.68) which are significantly lower than their rating of Condition 2c; t(78) = 16.780, p = .000. Moreover, 90% of them consistently rejected the sentences. Learners, however, performed very differently. They rated ungrammatical sentences with mean scores in an acceptance range, i.e. above 3.00, and a majority of them (namely 73% of CnBLs, 90% of CnILs and 89% of CnALs) accepted the ungrammatical sentences consistently.[40]

From results of T-tests, CnBLs and CnILs' scores to sentences with "animal nouns + *men*" (Condition 2d) do not significantly differ from those in the control condition 2c; t(97) = .685, p = .495 for CnBLs and t(79) = .417, p = .678 for CnILs. The result further confirms that learners at these proficiency levels did not reject a use of *men* with animal nouns.[41] Therefore, it seems to be the case that their L2 Chinese collective marker still carried a [+animal] feature just like the collective marker in their native language does. It can be speculated that, after a featural transfer at an initial stage, Thai learners would have had both [+human] and [+animal] features attached to their L2 Chinese collective marker. Later, TL input would confirm to them that the [+human] feature was indeed present in Chinese. However, it would not provide any disconfirming evidence regarding the [+animal] feature, making it difficult for the learners to reject the use of *men* with animal nouns.

Despite the difficulty, slight improvement can be observed when learners progressed to an advanced level as CnALs accepted sentences in Condition 2d to a significantly lower degree than their controls; t(150) = 2.087, p = .039. The statistical significance suggests that the

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[40] The percentages were calculated based on the number of participants who accepted the control condition. That is, only 11 CnBLs, 10 CnILs and 19 CnALs who consistently accepted Condition 2c were included in our calculation of individual consistency in Condition 2d.

[41] This statement is based on their overall group data including mean scores and percentages of people who could not consistently reject the experimental condition. However, in terms of individuals, there is an outlier who does not fit with the statement, i.e. a CnBL who consistently rejected Condition 2d.

advanced learners might have started to be sensitive to ungrammaticality of the [+animal] feature. Our data from the SPR task also support this finding, as will be discussed below.

In SPR analyses, I compared data in a slightly different way from AJT analyses above. In particular, I made a comparison between Condition 2a (with human nouns) and 2c (with animal nouns), and between Condition 2b (with human nouns and *men*) and 2d (with animal nouns and *men*). The reason for such pairings is to control for an effect of segment length on RTs, as critical segments in the first pair (2a vs. 2c) are equally two-character long while critical segments in the second pair (2b vs. 2d) are equally three-character long.[42] However, with these pairings, lexical elements in the contrasting conditions will become slightly different. For example, in the 2a-2c pair shown in Figure 9 – 12, nouns at the critical segment (Segment 4) in Condition 2a refer to human (such as *xuesheng* "student") while their counterparts in Condition 2c refer to animals (such as *dongwu* "animal"). To confirm that the difference in lexical items has a minimal effect on participants' RTs in our further analysis, Condition 2a and 2c are compared first to form a baseline.

Figure 9 CnBLs' group mean RTs on each segment in Chinese Condition 2a and 2c

	1	2	3	4	5	6
	2a xiaozhang principal	renwei think	zhe xie this-few	xuesheng student	tebie very	congming clever
	2c baba father	juede think	zhe xie this-few	dongwu animal	bijiao quite	congming clever
2a	904	916	939	903	756	1016
2c	1010	856	979	969	904	1066
p =	0.674	0.076	0.580	0.450	0.384	0.573

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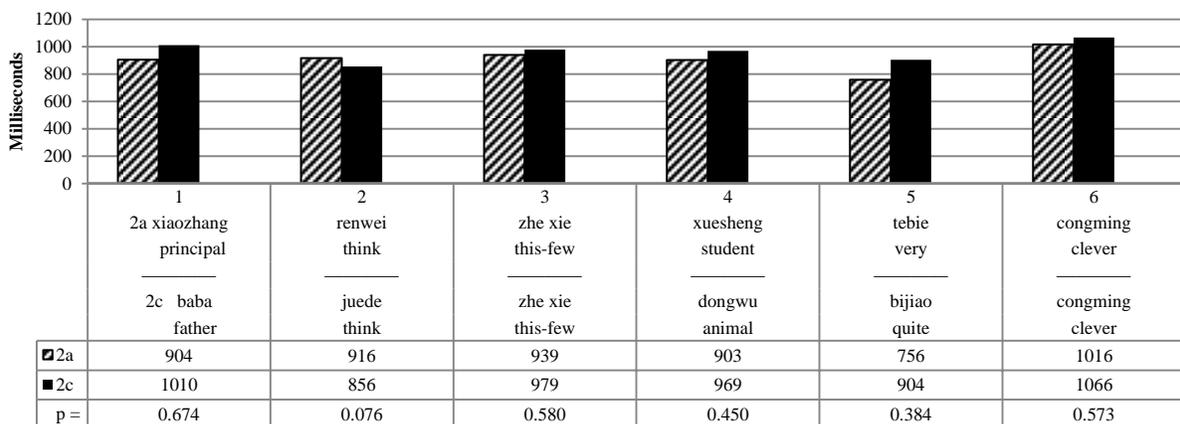
[42] Since I use *pinyin* to represent Chinese words in SPR result figures, the writing system may cause confusion about segment length. For example, in Figure 9, the first segments of Condition 2a and 2c are *xiaozhang* and *baba* respectively. According to the number of Latin alphabets in *pinyin*, *xiaozhang* is longer than *baba*. However, note that *pinyin* is used in the thesis for international readers. In the actual test, what participants read was Chinese characters, i.e. 校长 for *xiaozhang* and 爸爸 for *baba*, and both of them equally contain two characters.

Figure 10 CnILs' group mean RTs on each segment in Chinese Condition 2a and 2c

	1 2a xiaozhang principal / 2c baba father	2 renwei think / juede think	3 zhe xie this-few / zhe xie this-few	4 xuesheng student / dongwu animal	5 tebie very / bijiao quite	6 congming clever / congming clever
▨2a	936	915	960	968	850	1199
■2c	889	932	946	1017	931	1133
p =	0.343	0.923	0.748	0.211	0.485	0.303
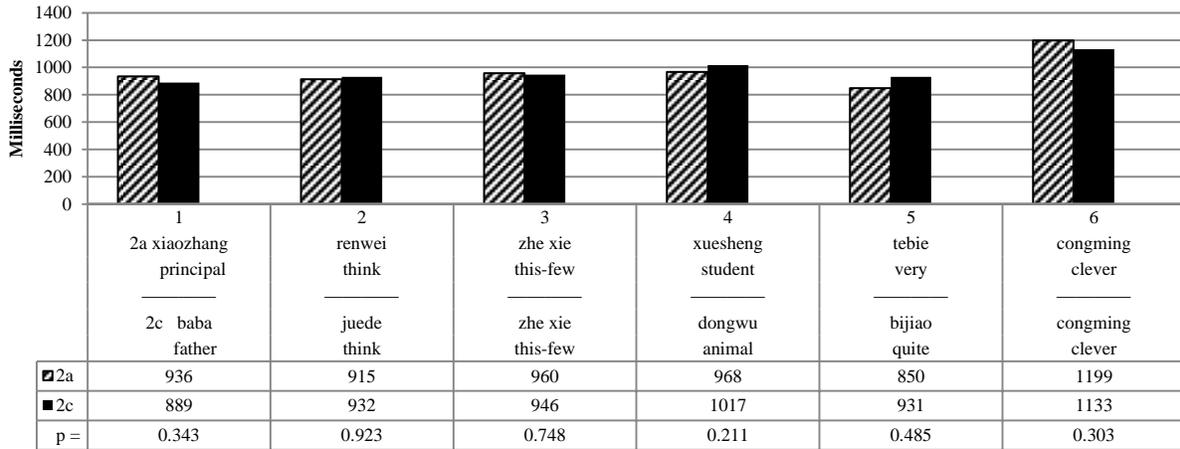
Figure 11 CnALs' group mean RTs on each segment in Chinese Condition 2a and 2c

	1 2a xiaozhang principal / 2c baba father	2 renwei think / juede think	3 zhe xie this-few / zhe xie this-few	4 xuesheng student / dongwu animal	5 tebie very / bijiao quite	6 congming clever / congming clever
▨2a	887	783	720	755	718	899
■2c	830	853	766	820	655	905
p =	0.533	0.194	0.250	0.235	0.140	0.744

Figure 12 CnNSs' group mean RTs on each segment in Chinese Condition 2a and 2c

	1 2a xiaozhang principal / 2c baba father	2 renwei think / juede think	3 zhe xie this-few / zhe xie this-few	4 xuesheng student / dongwu animal	5 tebie very / bijiao quite	6 congming clever / congming clever
▨2a	215	206	215	237	217	279
■2c	231	206	211	216	228	304
p =	0.148	0.945	0.826	0.343	0.488	0.463

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As can be seen in Figure 9 – 12, participants at all proficiency levels spent a comparable amount of time reading Condition 2a and 2c as their RTs are not statistically significant at any segment positions ($p > .05$). For the critical segment (Segment 4) in particular, T-test results are $t(67) = -0.759$, $p = .450$ for CnBLs; $t(68) = -1.266$, $p = .211$ for CnILs; $t(133) = -1.192$, $p = .235$ for CnALs; $t(75) = 0.958$, $p = .343$ for CnNSs. Because statistical significance is not found between Condition 2a and 2c, the result indicates that a difference in lexical items in these two conditions did not lead to significant difference in participants' RTs.

Next, Condition 2b and 2d will be compared, and I would like to first elaborate on a rationale behind such a comparison. Recall that, based on results in Figure 9 – 12, we found that a lexical difference in sentences with human nouns (Condition 2a) and sentences with animal nouns (Condition 2c) did not lead to a significant difference in RTs. It can, then, be assumed that if element X is added to both Condition 2a and 2c and grammaticality of both conditions is maintained, participants' RTs of the two conditions should be extended by a roughly similar amount of time (which is probably equal to the extra time required for their reading of element X). In contrast, if element Y is added to Condition 2a and 2c but RTs of the two conditions are not extended by the same amount of time, it is likely that element Y causes ungrammaticality to the condition of which RTs become longer. Put differently, element Y brings about an ungrammaticality effect in that condition. In our current study, the Chinese collective marker *men* is the said element X or Y. It was added to both Condition 2a and 2c to create Condition 2b and 2d respectively. If the addition of *men* does not affect grammaticality of either 2b or 2d, it is expected that participants' RTs will stay statistically insignificant. On the other hand, if the addition of *men* leads to ungrammaticality in one of the two conditions, it is expected that participants' RTs in the ungrammatical condition will be significantly longer than those in the grammatical condition.

Let us now look at results from a comparison between Condition 2b and 2d as shown in Figure 13 – 16. We can divide our participants into two groups: those who performed similarly in the two conditions and those who read significantly slower in Condition 2d. The first group of participants includes beginners (CnBLs) and intermediate learners (CnILs) who read both conditions at a similar pace ($p > .05$) at all segments, as can be seen in Figure 13 and 14. The lack of statistical significance suggests that the learners might not be sensitive to ungrammaticality of "animal noun + *men*" in Condition 2d during this task.

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The behaviour of lower proficiency learners mentioned above is in contrast with that of advanced learners and Chinese native speakers. CnNSs spent significantly longer time at the wrap-up segment (Segment 6) in Condition 2d than in Condition 2c as shown in Figure 16; t(71) = -2.056, *p* = .044. CnALs slowed down at critical and post-critical segments (Segment 4 and 5) in Condition 2d; t(131) = -2.904, *p* = .004 and t(131) = -2.143, *p* = .035 respectively.

Since the presence of "animal noun + *men*" in Condition 2d affects CnNSs and CnALs' reading speed compared to sentences with "human noun + *men*" in Condition 2b, there is likely to be an interaction between *men* and types of nouns. To elaborate, the slower RTs (i.e. the ungrammaticality effect) are observed in their response to Condition 2d. It is, therefore, very likely that the Chinese native speakers and the Thai advanced learners of Chinese perceived ungrammaticality of "animal noun + *men*" in that condition.

Figure 13 CnBLs' group mean RTs on each segment in Chinese Condition 2b and 2d

	1	2	3	4	5	6
	2b xiaozhang principal	renwei think	zhe xie this-few	xuesheng-men student-men	tebie very	congming clever
	2d* baba father	juede think	zhe xie this-few	dongwu-men animal-men	bijiao quite	congming clever
2b	1000	909	1000	1172	795	1014
2d*	947	893	906	1239	823	1026
p =	0.924	0.954	0.418	0.417	0.773	0.382

96
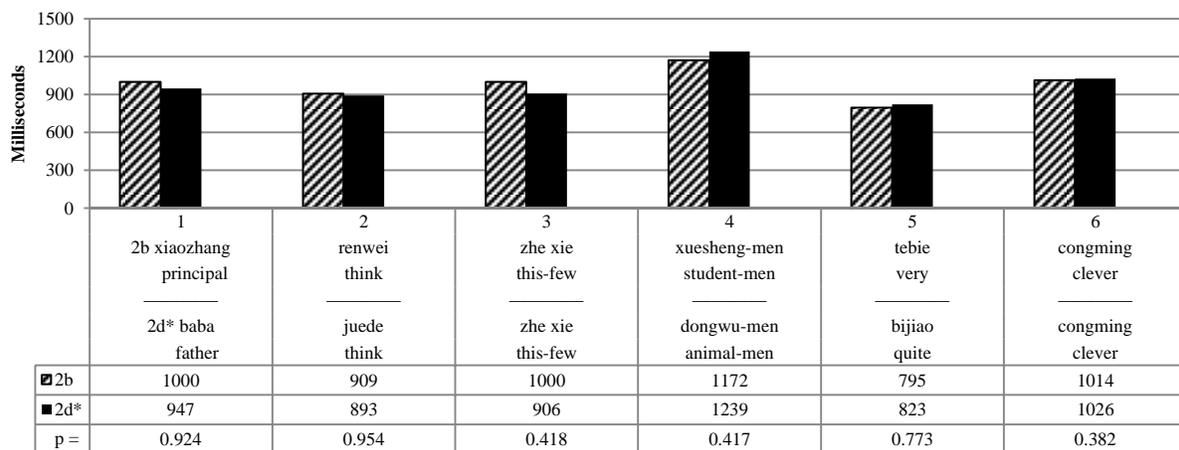
Figure 14 CnILs' group mean RTs on each segment in Chinese Condition 2b and 2d

	1	2	3	4	5	6
	2b xiaozhang principal —— 2d* baba father	renwei think —— juede think	zhe xie this-few —— zhe xie this-few	xuesheng-men student-men —— dongwu-men animal-men	tebie very —— bijiao quite	congming clever —— congming clever
2b	917	862	922	1133	819	1168
2d*	918	909	876	1139	859	1145
p =	0.762	0.312	0.397	0.972	0.604	0.955
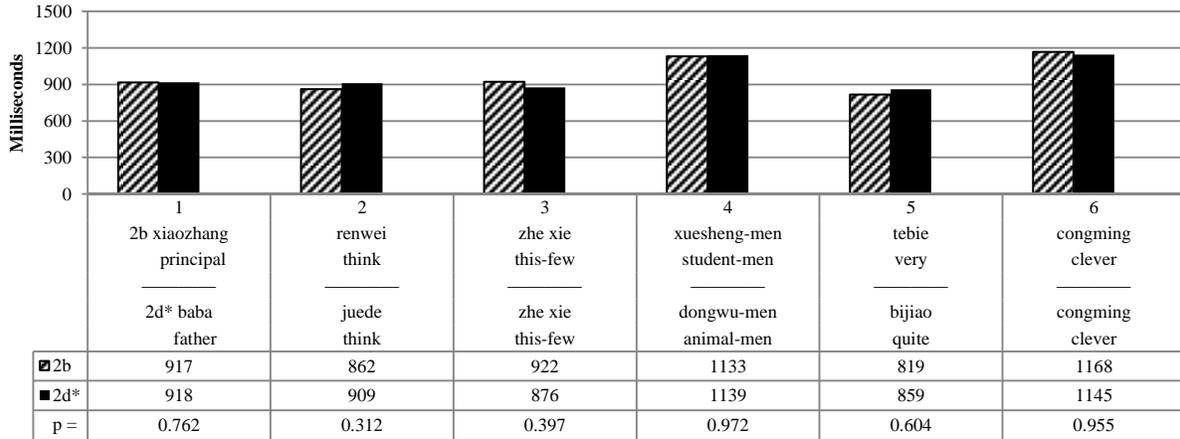
Figure 15 CnALs' group mean RTs on each segment in Chinese Condition 2b and 2d

	1	2	3	4	5	6
	2b xiaozhang principal —— 2d* baba father	renwei think —— juede think	zhe xie this-few —— zhe xie this-few	xuesheng-men student-men —— dongwu-men animal-men	tebie very —— bijiao quite	congming clever —— congming clever
2b	909	720	732	896	646	885
2d*	794	744	761	1089	731	945
p =	0.104	0.665	0.763	0.004	0.035	0.203
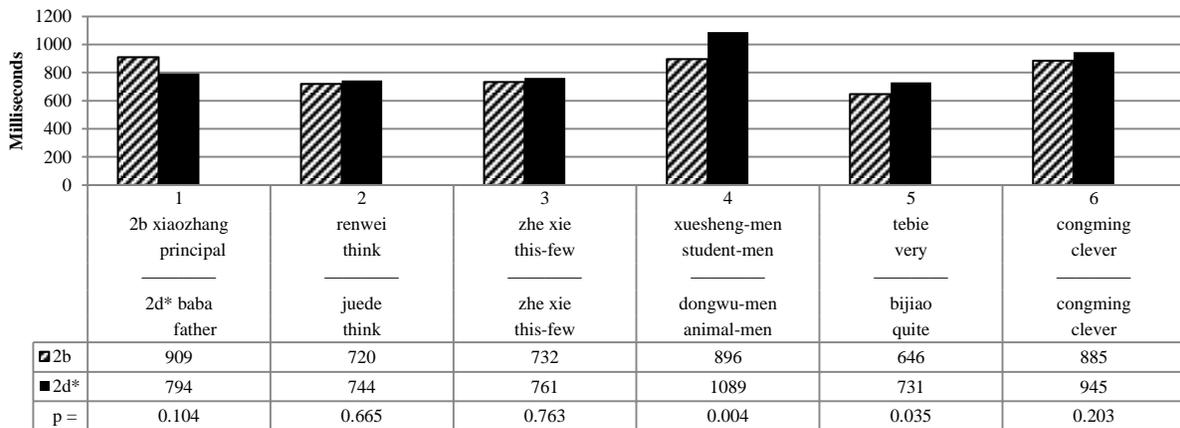
Figure 16 CnNSs' group mean RTs on each segment in Chinese Condition 2b and 2d

	1	2	3	4	5	6
	2b xiaozhang principal —— 2d* baba father	renwei think —— juede think	zhe xie this-few —— zhe xie this-few	xuesheng-men student-men —— dongwu-men animal-men	tebie very —— bijiao quite	congming clever —— congming clever
2b	234	198	199	223	242	302
2d*	217	203	215	223	255	361
p =	0.188	0.631	0.217	0.966	0.502	0.044
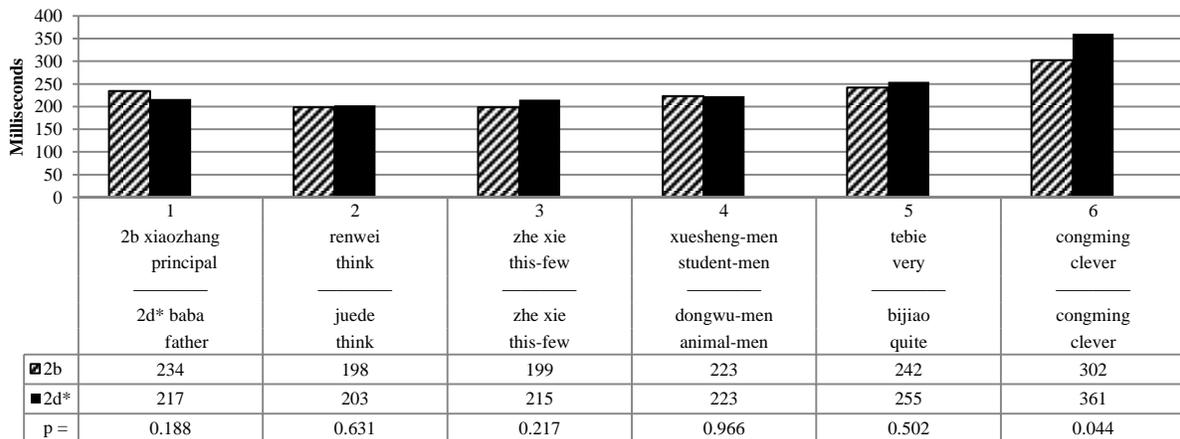
Combining AJT and SPR data, we can see that CnBLs and CnILs tended to accept sentences in which the collective marker *men* was incorrectly used with animal nouns. Therefore, it is likely that the L1-transferred [+animal] feature was still present in their L2 grammars. CnALs, on the other hand, seemed to be able to distinguish sentences with *men* and animal nouns from those with *men* and human nouns, as they accepted the former type of sentences to a lesser extent than the latter type and they read the two sentence types at a different speed. Since these CnAL behaviours are native-like, our tests reveal that it is possible for Thai learners to gain certain improvement in their acquisition of the [–animal] feature on *men* despite a lack of disconfirming input in TL.

Nonetheless, it should be noted that the improvement in L2 acquisition of the [–animal] feature happened rather late, i.e. at the advanced level. Also, it is not certain that Thai learners would eventually be able to perform totally native-like regarding this feature. For example, many advanced learners in the current study (17 out of 19 people) still consistently judged *men* with animal nouns (Condition 2d) as acceptable. It may be the case that, when Thai learners arrive at an advanced stage in L2 Chinese, they have received enough input to realise that *men* is not used as widely as *phûak* in Thai. However, they may be unable to completely determine how the absence of *men* is related to the [–animal] feature, possibly because there is no structure in Chinese input that can point them to ungrammaticality of the L1-transferred [+animal] feature.

5.2.2.2 L2 Thai collective marker

As Thai allows its collective marker to attach to both human and animal nouns while Chinese only allows its marker to attach to human nouns, in this section, we ask whether Chinese learners of Thai would be able to accept the use of Thai collective maker *phûak* with animal nouns. Four types of test sentences which are shown in (83) – (86) were designed with the same rationale as Chinese test sentences in Section 5.2.2.1. Essentially, main nominal phrases in Condition 2a – 2d contain human nouns, human nouns with *phûak*, animal nouns, and animal nouns with *phûak* respectively.

(83) Thai 2a mûakîi   khruuyày   phûutwâa   nákrian   làw-níi   nâarák   mâak
              just-now   principal   say   student   group-this   cute   very
              "The principal just said that these students were very cute."

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(84) Thai 2b   mûakîi   khruuyày   phûutwâa   phûak-nákrian   làw-níi   nâarák   mâak

               just-now   principal   say   *phûak*-student   group-this   cute   very

               "The principal just said that these students were very cute."

(85) Thai 2c   mûakîi   maalii   bɔ̀ɔkwâa   sùʔnák   làw-níi   nâarák   mâak

               just-now   Mali   say   dog   group-this   cute   very

               "Mali just said that these dogs were very cute."

(86) Thai 2d   mûakîi   maalii   bɔ̀ɔkwâa   phûak-sùʔnák   làw-níi   nâarák   mâak

               just-now   Mali   say   *phûak*-dog   group-this   cute   very

               "Mali just said that these dogs were very cute."

Before we discuss our main research question, participants' performance on Condition 2a and 2b will be analysed in order to confirm that participants included in our further analysis did not have a problem with a basic usage of *phûak*. Similar to our design of Chinese sentences, nominal phrases in Thai Condition 2a and 2b both contain human nouns but Condition 2b additionally has a collective marker attaching to the nouns. The latter condition was designed to be grammatical because *phûak* is compatible with human nouns. However, note that its main nominal phrases has a "*phûak* + human noun + *làw* 'group' + demonstrative" structure which, in terms of meaning, roughly corresponds to a Chinese "demonstrative + *xie* 'a few' + human noun + *men*" structure. Since the word *làw* "group" in Thai and the word *xie* "a few" in Chinese share a quantity-expressing function and both of them appear next to demonstratives, there is a possibility that Chinese learners map *làw* with *xie*. Moreover, as we have seen in Section 5.2.2.1 that some Chinese speakers do not accept the use of *xie* with a collective marker, it is possible that L1 transfer will lead them to reject the use of *làw* with a collective marker as well. As a result, a screening procedure was conducted to select only participants who consistently accepted Condition 2b (which contains *phûak* and *làw*), just like the way participants were screened in the Chinese test.

      After the screening process, 14 ThBLs, 13 ThILs, 15 ThALs and 15 ThNSs were included in our further analysis, as shown in Table 11. These participants not only accepted sentences with "*phûak* + human noun + *làw* 'group' + demonstrative" (Condition 2b), but also consistently accepted sentences which do not contain *phûak* (Condition 2a). Their AJT mean

scores on Condition 2a and 2b are also relatively high, being all above 3.00. Moreover, they did not rate the experimental condition 2b to a significantly lower degree than the control condition 2a; t(107) = .145, p = .885 for ThBLs; t(102) = -1.746, p = .084 for ThILs; t(116) = .424, p = 1.000 for ThALs; t(118) = .044, p = .106 for ThNSs. These results confirm that the selected participants did not have a problem with basic usages of *phûak*, including its co-occurrence with human nouns and its position at the left of a noun. As we have confirmed that learners were able to perform native-like in simple *phûak* structures, we can continue to investigate their acquisition of other properties of *phûak* such as the [+animal] feature which will be discussed below.

Table 11 AJT mean scores, p-values and the number of participants who responded consistently on Thai test sentences in Condition 2a and 2b

	Mean scores		T-test	Individual consistency			
	2a	2b	*p*-value	accept 2a consistently	reject 2a consistently	accept 2b consistently	reject 2b consistently
ThBL	3.26	3.24	.885	14 / 14 (100%)	0 / 14 (0%)	14 / 14 (100%)	0 / 14 (0%)
ThIL	3.35	3.63	.084	13 / 13 (100%)	0 / 13 (0%)	13 / 13 (100%)	0 / 13 (0%)
ThAL	3.56	3.56	1.000	15 / 15 (100%)	0 / 15 (0%)	15 / 15 (100%)	0 / 15 (0%)
ThNS	3.60	3.38	.106	15 / 15 (100%)	0 / 15 (0%)	15 / 15 (100%)	0 / 15 (0%)

Table 12 AJT mean scores, p-values and the number of participants who responded consistently on Thai test sentences in Condition 2c and 2d

	Mean scores		T-test	Individual consistency			
	2c	2d	*p*-value	accept 2c consistently	reject 2c consistently	accept 2d consistently	reject 2d consistently
ThBL	3.40	2.87☆	.001	12 / 14 (86%)	0 / 14 (0%)	7 / 12 (58%)	2 / 12 (17%)
ThIL	3.56	3.21	.015	12 / 13 (92%)	0 / 13 (0%)	10 / 12 (83%)	1 / 12 (8%)
ThAL	3.80	3.22	.000	15 / 15 (100%)	0 / 15 (0%)	12 / 15 (80%)	0 / 15 (0%)
ThNS	3.50	3.48	.897	15 / 15 (100%)	0 / 15 (0%)	14 / 15 (93%)	0 / 15 (0%)

Let us now look at AJT results of sentences whose main nominal phrases contain animal nouns. From Table 12, Thai native speakers accepted the use of animal nouns both without *phûak* (Condition 2c) and with *phûak* (Condition 2d). They rated the two conditions with mean scores of 3.50 and 3.48 respectively and these scores are not statistically significant; t(118) = .130,

p = .897. Moreover, 93% of participants in this group consistently accepted Condition 2d while no one consistently rejected it. Native speakers' results confirm that *phûak* indeed carries a [+animal] feature and can be used with animal nouns.

Chinese beginners' behaviour on Thai Condition 2d is different from native speakers'. In particular, their judgment scores in Condition 2d are averaged at 2.87. Since the average score is not far from the middle score of 2.50 in the 1-to-4 scale, it seems to be the case that the beginners were indeterminate about their acceptance of a "*phûak* + animal noun" structure. Their scores in this condition are also significantly lower than their scores for control sentences in Condition 2c; t(106) = 3.328, *p* = .001. Moreover, two people in this group consistently rejected sentences with "*phûak* + animal nouns". To sum up, there are some ThBLs who did not allow a [+animal] feature on their L2 Thai collective marker. It is likely that, in their L2 grammars, the marker still carried a [–animal] feature which had been transferred from their L1.

Compared to ThBLs, some improvement can be seen in a ThIL group. For example, a percentage of participants who consistently accepted the experimental condition 2d increases from 58% among ThBLs to 83% among ThILs and a percentage of participants who consistently rejected it decreases from 17% to 8%. Moreover, the intermediate learners' mean score to Condition 2d falls into an acceptance range (averaged at 3.21) although it is still significantly lower than its control counterpart; t(102) = 2.484, *p* = .015. ThALs performed in a similar way to ThILs, i.e. they judged the experimental condition with relatively high scores (averaged at 3.22) but the scores are still significantly lower than control sentences; t(115) = 4.299, *p* = .000. What is worth noting is that no learner in the ThAL group consistently rejected the experimental condition with "*phûak* + animal nouns".

Overall, AJT results from Chinese learners of Thai indicate that, as learners' L2 proficiency increased, their acceptance to the use of *phûak* with animal nouns also increased, while their L1-like rejection of the usage decreased. In other words, the learners seemed to have gradually acquired the [+animal] feature in Thai. Based on the fact that Chinese learners can receive Thai input that contains "*phûak* + animal nouns", the availability of positive evidence is likely to have triggered the learners' acceptance of the usage.

Results from SPR task support the finding that the higher the learners' overall L2 proficiency was, the more native-like they performed. But before presenting data that support the conclusion, we have to analyse data from Condition 2a and 2c first. Similar to a rationale for

SPR analysis in Section 5.2.2.1, Condition 2a (containing human nouns without *phûak*) and 2c (containing animal nouns without *phûak*) were compared to ensure that our participants did not respond to test sentences which contain different types of nouns differently. Results in Figure 17 – 20 confirm our expectation as participants in all proficiency groups spent a comparable amount of time in the two conditions. Their RTs are not statistically significant at any segment positions ($p > .05$). To be specific, T-test results of critical segments (Segment 4) which contain different types of nouns are $t(71) = -0.974$, $p = .333$ for ThBLs; $t(80) = -1.272$, $p = .207$ for ThILs; $t(100) = -1.125$, $p = .264$ for ThALs; $t(106) = -1.651$, $p = .102$ for ThNSs.

In short, a difference in lexical items between sentences with human nouns and sentences with animal nouns did not lead to a significant difference in response by any groups of participants. Based on this finding, we can try adding the collective marker *phûak* to each type of sentences. If there is no interaction between *phûak* and animacy characteristics of nouns in our test sentences, we expect RTs of sentences with "*phûak* + human nouns" and "*phûak* + animal nouns" to remain statistically insignificant. On the contrary, if the "*phûak* + animal noun" structure is ungrammatical in participants' grammars, we expect to find an ungrammatical effect in their RTs.

Figure 17 ThBLs' group mean RTs on each segment in Thai Condition 2a and 2c

	1	2	3	4	5	6	7
	2a mûakîi	khruuyày	phûutwâa	nákrian	làw-níi	nâarák	mâak
	just-now	principal	say	student	group-this	cute	very
	2c mûakîi	maalii	bɔ̀ɔkwâa	sùʔnák	làw-níi	nâarák	mâak
	just-now	Mali	say	dog	group-this	cute	very
▨ 2a	1071	1184	941	1358	1112	1454	656
■ 2c	1113	1190	1025	1497	1127	1248	701
p =	0.818	0.992	0.893	0.333	0.804	0.135	0.437
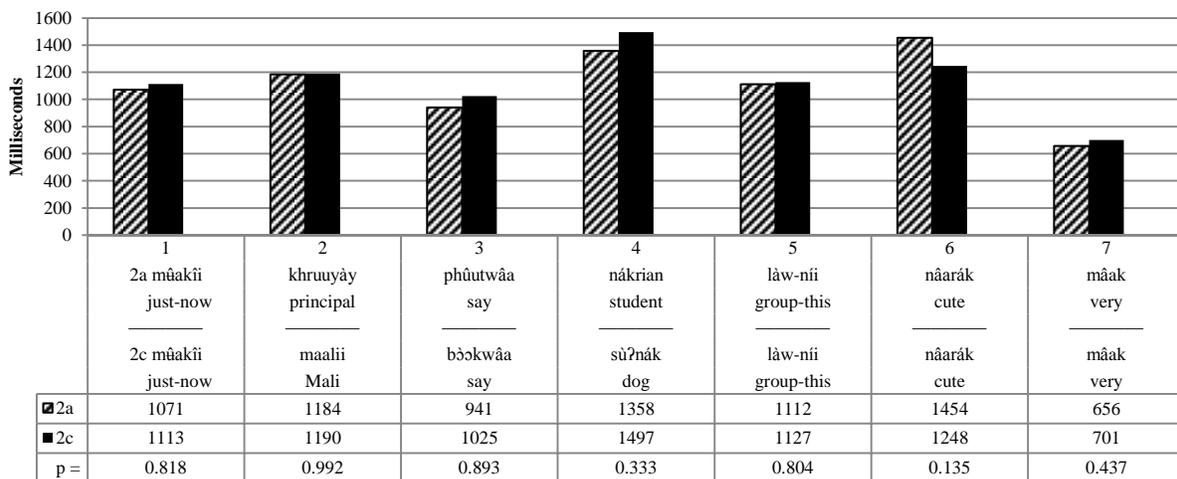
Figure 18 ThILs' group mean RTs on each segment in Thai Condition 2a and 2c

	1	2	3	4	5	6	7
	2a mûakîi	khruuyày	phûutwâa	nákrian	làw-níi	nâarák	mâak
	just-now	principal	say	student	group-this	cute	very
	2c mûakîi	maalii	bɔɔkwâa	sùʔnák	làw-níi	nâarák	mâak
	just-now	Mali	say	dog	group-this	cute	very
▨2a	1089	1207	1028	1128	1131	1300	652
■2c	1002	1153	1003	1222	1055	1297	598
p =	0.352	0.618	0.657	0.207	0.708	0.895	0.274
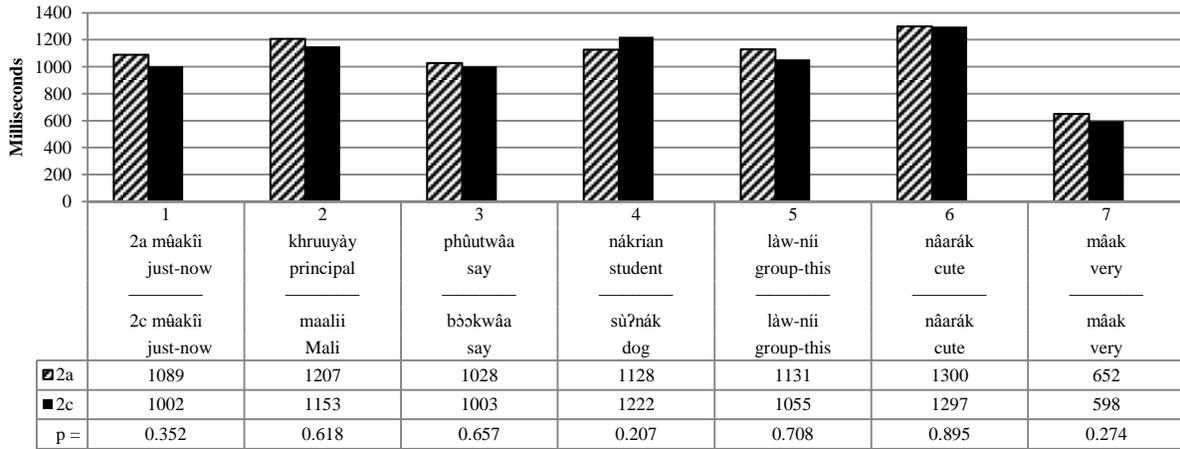
Figure 19 ThALs' group mean RTs on each segment in Thai Condition 2a and 2c

	1	2	3	4	5	6	7
	2a mûakîi	khruuyày	phûutwâa	nákrian	làw-níi	nâarák	mâak
	just-now	principal	say	student	group-this	cute	very
	2c mûakîi	maalii	bɔɔkwâa	sùʔnák	làw-níi	nâarák	mâak
	just-now	Mali	say	dog	group-this	cute	very
▨2a	1053	1193	989	1179	1047	1223	742
■2c	1073	1087	946	1259	1036	1158	720
p =	0.667	0.217	0.472	0.264	0.816	0.603	0.815
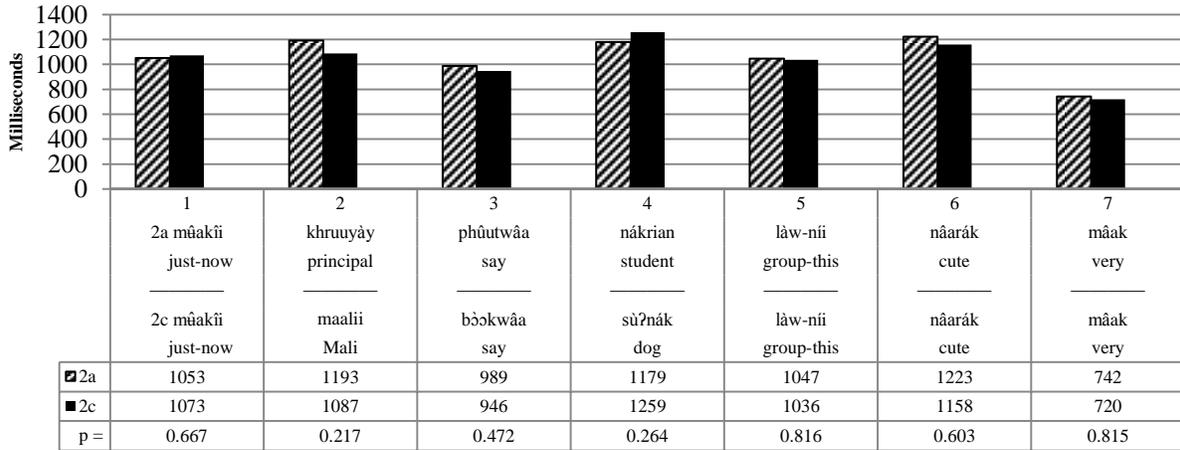
Figure 20 ThNSs' group mean RTs on each segment in Thai Condition 2a and 2c

	1	2	3	4	5	6	7
	2a mûakîi	khruuyày	phûutwâa	nákrian	làw-níi	nâarák	mâak
	just-now	principal	say	student	group-this	cute	very
	2c mûakîi	maalii	bɔɔkwâa	sùʔnák	làw-níi	nâarák	mâak
	just-now	Mali	say	dog	group-this	cute	very
▨2a	475	480	453	474	468	472	460
■2c	477	469	434	508	461	468	462
p =	0.750	0.641	0.330	0.102	0.854	0.884	0.724

103
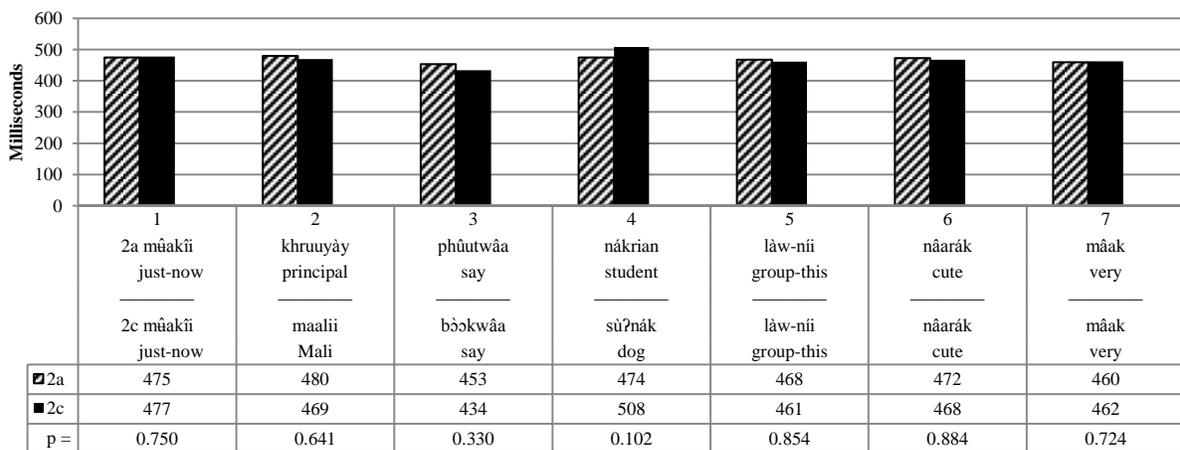
Condition 2b and 2d were designed based on Condition 2a and 2c by adding *phûak* to human nouns in 2a and animal nouns in 2c. Since *phûak* can attach to both human and animal nouns, we do not expect Thai native speakers to react to the two conditions differently. Results in Figure 24 support our prediction. ThNSs read both conditions at a similar pace at all segment positions ($p > .05$). Particularly, for the critical segment (Segment 4), their RTs of the two conditions are very close (averaged at 563 and 574 ms) and not statistically significant; $t(104) = -0.200$, $p = .842$. Likewise, ThALs spent a non-significant amount of time reading the two conditions. Their RTs are not significant at any segment positions and a comparison result of their RTs at the critical segment is $t(81) = -0.070$, $p = .944$. To sum up, an ungrammaticality effect is not observed in native speakers and advanced learners' groups.

In contrast, ThBLs and ThILs spent longer time at a critical segment (Segment 4) of Condition 2d compared to Condition 2b; $t(61) = -2.229$, $p = .030$ for ThBLs and $t(55) = -2.781$, $p = .007$ for ThILs, as shown in Figure 21 – 22. The prolonged RTs in these learners' groups suggest that the lower proficiency learners might have perceived ungrammaticality in Condition 2d. Since a difference between Condition 2b and 2d is that the former contains "*phûak* + human nouns" while the latter contains "*phûak* + animal nouns", it is likely that the learners considered "*phûak* + animal nouns" to be ungrammatical. In other words, a selection of nouns for the marker *phûak* in ThBLs and ThILs' L2 Thai grammars might still be influenced by a [–animal] feature which was transferred from the marker *men* in their native language.

Figure 21 ThBLs' group mean RTs on each segment in Thai Condition 2b and 2d

	1	2	3	4	5	6	7
	2b mûakîi just-now	khruuyày principal	phûutwâa say	phûak-nákrian phuak-student	làw-níi group-this	nâarák cute	mâak very
	2d mûakîi just-now	maalii Mali	bɔ̀ɔkwâa say	phûak-sù?nák phuak-dog	làw-níi group-this	nâarák cute	mâak very
▨ 2b	1064	1288	869	1618	1202	1388	649
■ 2d	1103	1221	970	1926	1141	1205	655
p =	0.847	0.802	0.194	0.030	0.447	0.406	0.825
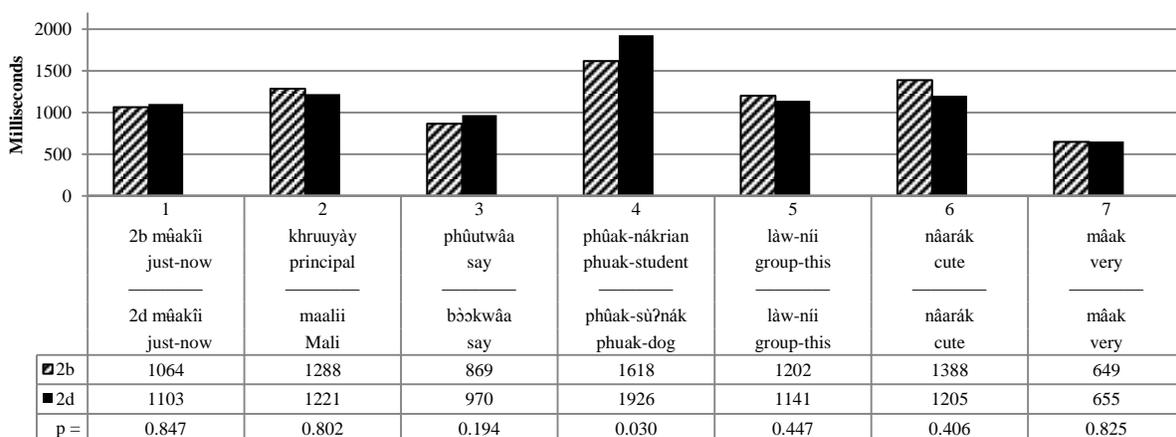
Figure 22 ThILs' group mean RTs on each segment in Thai Condition 2b and 2d

	1	2	3	4	5	6	7
	2b mûakîi	khruuyày	phûutwâa	phûak-nákrian	làw-níi	nâarák	mâak
	just-now	principal	say	phuak-student	group-this	cute	very
	2d mûakîi	maalii	bɔ̀ɔkwâa	phûak-sù?nák	làw-níi	nâarák	mâak
	just-now	Mali	say	phuak-dog	group-this	cute	very
2b	991	1248	997	1729	1076	1392	651
2d	1038	1175	1119	2007	1058	1352	620
p =	0.457	0.537	0.265	0.007	0.882	0.617	0.577
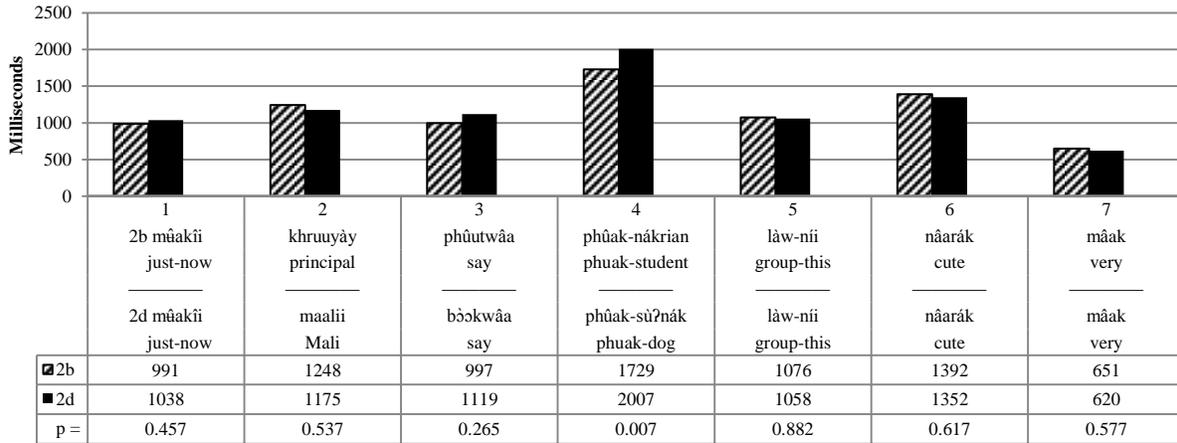
Figure 23 ThALs' group mean RTs on each segment in Thai Condition 2b and 2d

	1	2	3	4	5	6	7
	2b mûakîi	khruuyày	phûutwâa	phûak-nákrian	làw-níi	nâarák	mâak
	just-now	principal	say	phuak-student	group-this	cute	very
	2d mûakîi	maalii	bɔ̀ɔkwâa	phûak-sù?nák	làw-níi	nâarák	mâak
	just-now	Mali	say	phuak-dog	group-this	cute	very
2b	1020	1150	988	1609	1071	1218	709
2d	936	999	1111	1641	1127	1239	678
p =	0.433	0.097	0.189	0.944	0.657	0.833	0.248
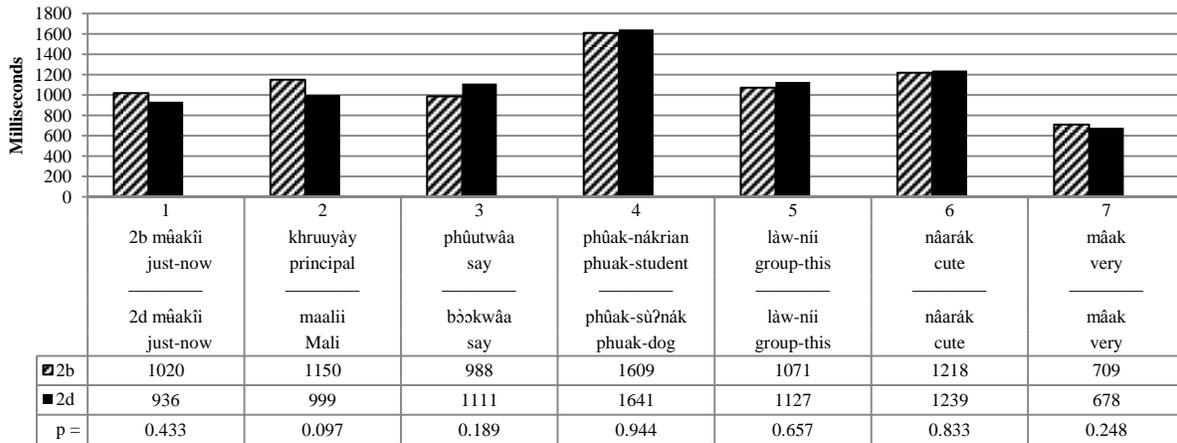
Figure 24 ThNSs' group mean RTs on each segment in Thai Condition 2b and 2d

	1	2	3	4	5	6	7
	2b mûakîi	khruuyày	phûutwâa	phûak-nákrian	làw-níi	nâarák	mâak
	just-now	principal	say	phuak-student	group-this	cute	very
	2d mûakîi	maalii	bɔ̀ɔkwâa	phûak-sù?nák	làw-níi	nâarák	mâak
	just-now	Mali	say	phuak-dog	group-this	cute	very
2b	447	510	470	563	502	510	454
2d	493	480	457	574	488	504	448
p =	0.215	0.272	0.630	0.842	0.760	0.341	0.676
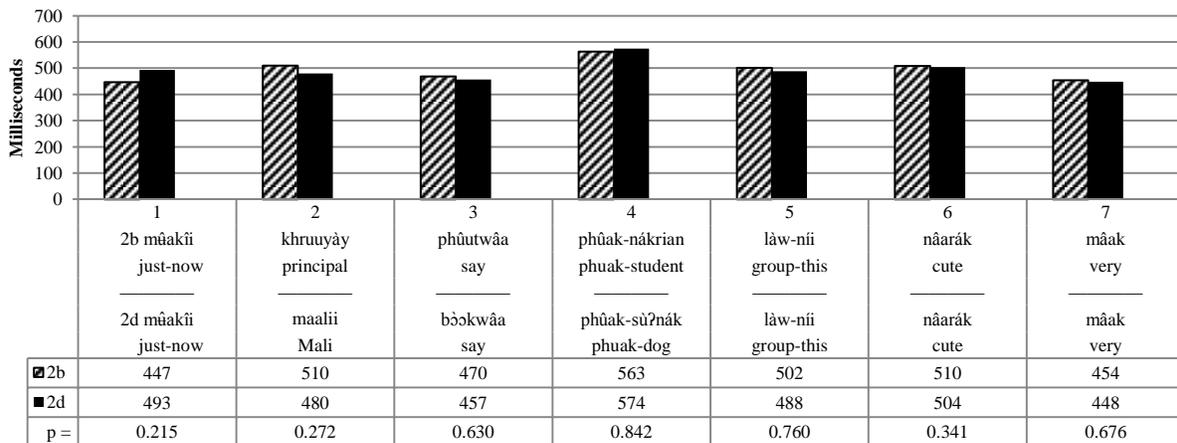
5.2.3 Set 3: Definiteness restriction on collective markers

5.2.3.1 L2 Chinese collective marker

In addition to the animacy restriction investigated in Set 2, collective markers in Chinese and Thai also differ in terms of a definiteness restriction. That is, Thai collective marker *phûak* can be used with either definite or indefinite nouns, hence having [+definite] and [+indefinite] features. In contrast, Chinese collective marker *men* can be used with definite but not indefinite nouns, hence having [+definite] but [–indefinite] features. Since it is predicted that Thai native speakers transfer the [+indefinite] feature to their L2 Chinese collective marker, one of our research questions asks whether the learners would be able to acquire the correct [–indefinite] feature and reject Chinese indefinite nominal phrases that contain a collective marker.

To design a test for this question, we had to ensure that main nominal phrases in our test sentences were indeed interpreted as indefinite by our participants. To achieve such certainty, I embedded the phrases in existential clauses, as the existential context universally requires its pivot nouns to be indefinite. Moreover, I also included a pair of prerequisite tests, of which Condition A contains grammatical existential sentences and serves as a control (see example (87)). Condition B of the prerequisite tests contains the same existential sentences but with an addition of "demonstrative + *xie* 'a few'" in order to make pivot nouns definite. For example, *xuesheng* "student" in (87) becomes *zhe-xie xuesheng* (this-few-student) "these students" in (88). If a participant only allows indefinite nouns to be in a pivot position of existential sentences, they are expected to accept Condition A and reject Condition B. Since there are 3 tokens per condition in the prerequisite tests, participants who accepted at least 2 tokens from Condition A and rejected at least 2 tokens from Condition B are considered being sensitive to the indefiniteness requirement of existential sentences and, therefore, included in our analysis of Condition 3a and 3b. They are 16, 16, 21 and 15 people from CnBL, CnIL, CnAL and CnNS groups respectively.

(87) Chinese Prerequisite A	you	xuesheng	zai	jiaoshi	li	shuijiao
	have	student	at	classroom	in	sleep

"There is/are (a) student(s) sleeping in the classroom."

(88) Chinese Prerequisite B * you zhe-xie xuesheng zai jiaoshi li shuijiao
                           have this-few student at classroom in sleep
                           "These students are sleeping in the classroom."

(89) Chinese 3a xiaozhang gangcai kanjian you xuesheng zai gongyuan li
                principal just see have student at park in
                tiqiu
                kick-ball
                "The principal just saw that there was/were (a) student(s) playing football in the park."

(90) Chinese 3b * xiaozhang gangcai kanjian you xuesheng-men zai gongyuan li
                principal just see have student-*men* at park in
                tiqiu
                kick-ball
                "The principal just saw that there were students playing football in the park."

Table 13 AJT mean scores, p-values and the number of participants who responded consistently
on Chinese test sentences in Condition 3a and 3b

	Mean scores		T-test	Individual consistency			
	3a	3b*	*p*-value	accept 3a consistently	reject 3a consistently	accept 3b* consistently	reject 3b* consistently
CnBL	3.02☆	3.15☆	.401	13 / 16 (81%)	1 / 16 (6%)	11 / 13 (85%)	0 / 13 (0%)
CnIL	3.13☆	3.23☆	.451	14 / 16 (88%)	0 / 16 (0%)	11 / 14 (79%)	0 / 14 (0%)
CnAL	3.45	3.31☆	.175	21 / 21 (100%)	0 / 21 (0%)	18 / 21 (86%)	2 / 21 (10%)
CnNS	3.70	1.80	.000	15 / 15 (100%)	0 / 15 (0%)	0 / 15 (0%)	15 / 15 (100%)

Let us now look at AJT results of main test sentences. Condition 3a serves as a control, with
human nouns in a pivot position of existential clauses which serve as a CP complement of the
verb *kanjian* "see". For example, in (89), the existential clause begins with *you* "have" and its
pivot noun is *xuesheng* "student". From results in Table 13, we can see that all groups of
participants rated the control condition with mean scores above 3.00. Moreover, all CnALs and
CnNSs consistently accepted sentences in this condition, while a majority of participants in
CnBL and CnIL groups (81% and 88%) also did so. The results suggest that, in general, our

participants did not have a problem with indefinite human nouns (without a collective marker) in control sentences.

In contrast, the difference between Chinese native speakers and Thai learners appears in Condition 3b in which a collective marker *men* is added to indefinite nouns. As expected, Chinese native speakers did not accept the addition of *men*. They rated sentences in Condition 3b with scores that are significantly lower than those in the control condition ($t(118) = 13.124$, $p = .000$) with an average of 1.80, and all of them consistently rejected the sentences. On the contrary, all groups of learners rated Condition 3b with high scores (averaged at 3.15 for CnBLs, 3.23 for CnILs and 3.31 for CnALs) that are not significantly lower than the control condition; $t(118) = -.843$, $p = .401$ for CnBLs; $t(126) = -.756$, $p = .451$ for CnILs; $t(166) = 1.361\ 7$, $p = .175$ for CnALs. Moreover, a majority of participants in the three learners' groups consistently accepted the use of *men* with indefinite nouns, as shown by percentages under the "accept 3b* consistently" sub-column in Table 13.

The AJT results suggest that after an initial transfer of a [+indefinite] feature from the Thai marker *phûak* to the Chinese marker *men*, Thai learners face difficulty unlearning the use of collective markers with indefinite nouns. The situation is similar to their difficulty unlearning the use of collective markers with animal nouns (discussed in Section 5.2.2.1) and these difficulties possibly share the same root cause. That is, in terms of availability of positive evidence, Thai learners' acquisition of animacy and definiteness restrictions of *men* cannot rely on disconfirming evidence in TL input because both types of restrictions lead to non-occurrence of target structures. Moreover, the fact that there are at least two restrictions governing the absence or presence of *men* can make it difficult for learners to figure out which of the features plays a role in a particular sentence.

Learners' difficulty in noticing ungrammaticality of Condition 3b is also reflected in their SPR performance, as will be discussed below. However, before interpreting data, I would like to draw readers' attention to the critical segment (Segment 5) in Figure 25 – 28. Note that, from the bar height and mean RTs under the bars, all groups of participants spent more time in Condition 3b than 3a at this segment, and RT differences between the two conditions are not small. For example, the differences are 261 ms, 219 ms and 124 ms among CnBLs, CnILs and CnALs respectively. Based on this information, we may expect to find statistical significance between the two conditions. However, our T-test results do not suggest a significance in any groups of

participants; t(98) = 0.888, p = 0.377 for CnBLs; t(117) = 0.801, p = 0.425 for CnILs; t(152) = 0.969, p = 0.334 for CnALs; t(112) = -1.059, p = 0.292 for CnNSs.

The reason for such discrepancy is that RT values shown in the figures are average values from raw RTs, but T-tests were conducted based on residual RTs. Recall that Segment 5 in Condition 3a contains 2-character words while its counterpart in Condition 3b contains the 2-character words plus *men*. Since segments with more characters often require a longer time to read (regardless of grammaticality), the effect of segment length has to be controlled when we compare RTs between the two conditions. To do so, I calculated residual RTs by submitting raw RTs to a regression equation in the SPSS software with word length as a predictor variable, as introduced in Section 5.1.4. The procedure subtracted parts of RTs that were results of a length difference. And after the effect of segment length is removed, it is found that our participants' RTs at Segment 5 in Condition 3a and 3b do not differ with statistical significance.

Let us now look at other segments in the test sentences. From Figure 28, it is found that Chinese native speakers slowed down in Condition 3b at Segment 8 and 9; t(114) = -2.600, p = .011 and t(114) = -2.745, p = .007 respectively. The slower reading speed suggests that the native speakers might have detected ungrammaticality in a previous segment, which is likely to be the critical segment as it is the only segment that is different in the two conditions. Their reaction, therefore, confirms that the use of *men* with inanimate nouns is ungrammatical in Chinese.

Thai learners of all proficiency levels, on the other hand, did not spend significantly longer time at any segment positions in Condition 3b (p > .05, as can be seen from the last rows of Figure 25 – 27). As the learners read Condition 3b at a normal speed (i.e. a speed which is comparable to that of the control condition 3a), it is likely that they perceive sentences with *men* attaching to indefinite nouns as being acceptable. The result suggests that the [+indefinite] feature might still be active on Thai learners' L2 Chinese collective marker even when they have reached an advanced level.

Figure 25 CnBLs' group mean RTs on each segment in Chinese Condition 3a and 3b

	1	2	3	4	5	6	7	8	9
	3a xiaozhang principal	gangcai just	kanjian see	you have	xuesheng student	zai at	gongyuan park	li in	tiqiu kick-ball
	3b* xiaozhang principal	gangcai just	kanjian see	you have	xuesheng-men student-men	zai at	gongyuan park	li in	tiqiu kick-ball
▨ 3a	902	811	857	676	816	577	1029	605	1045
■ 3b*	945	888	806	618	1077	560	987	555	966
p =	0.951	0.546	0.384	0.195	0.377	0.423	0.572	0.208	0.456
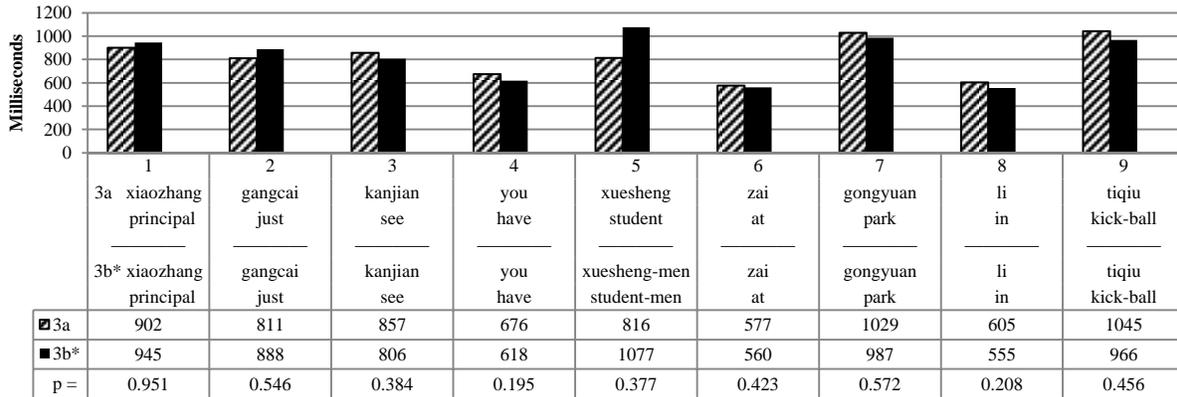
Figure 26 CnILs' group mean RTs on each segment in Chinese Condition 3a and 3b

	1	2	3	4	5	6	7	8	9
	3a xiaozhang principal	gangcai just	kanjian see	you have	xuesheng student	zai at	gongyuan park	li in	tiqiu kick-ball
	3b* xiaozhang principal	gangcai just	kanjian see	you have	xuesheng-men student-men	zai at	gongyuan park	li in	tiqiu kick-ball
▨ 3a	785	779	806	611	880	588	920	633	925
■ 3b*	895	781	737	680	1098	622	1017	598	878
p =	0.181	0.846	0.375	0.214	0.425	0.561	0.301	0.215	0.598
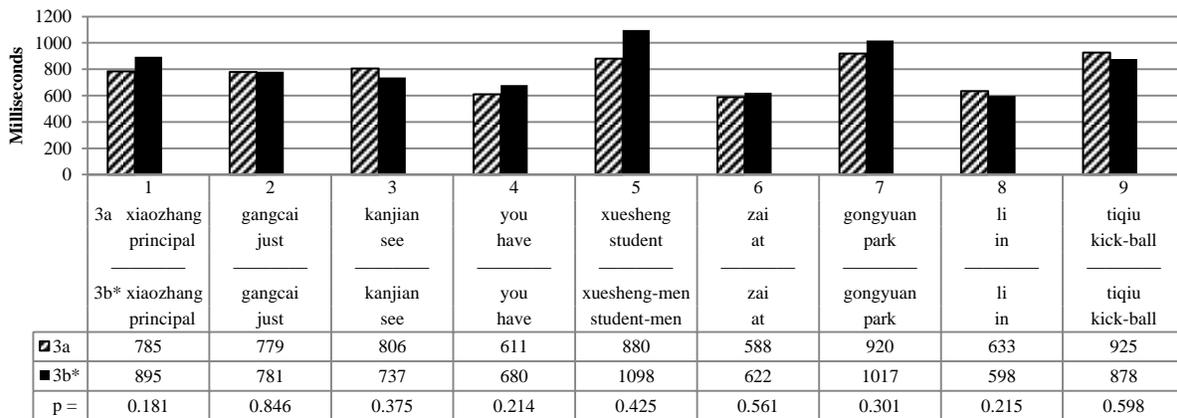
Figure 27 CnALs' group mean RTs on each segment in Chinese Condition 3a and 3b

	1	2	3	4	5	6	7	8	9
	3a xiaozhang principal	gangcai just	kanjian see	you have	xuesheng student	zai at	gongyuan park	li in	tiqiu kick-ball
	3b* xiaozhang principal	gangcai just	kanjian see	you have	xuesheng-men student-men	zai at	gongyuan park	li in	tiqiu kick-ball
▨ 3a	811	717	741	604	642	572	760	551	804
■ 3b*	744	697	665	645	766	565	778	552	796
p =	0.170	0.632	0.097	0.469	0.334	0.801	0.813	0.808	0.536

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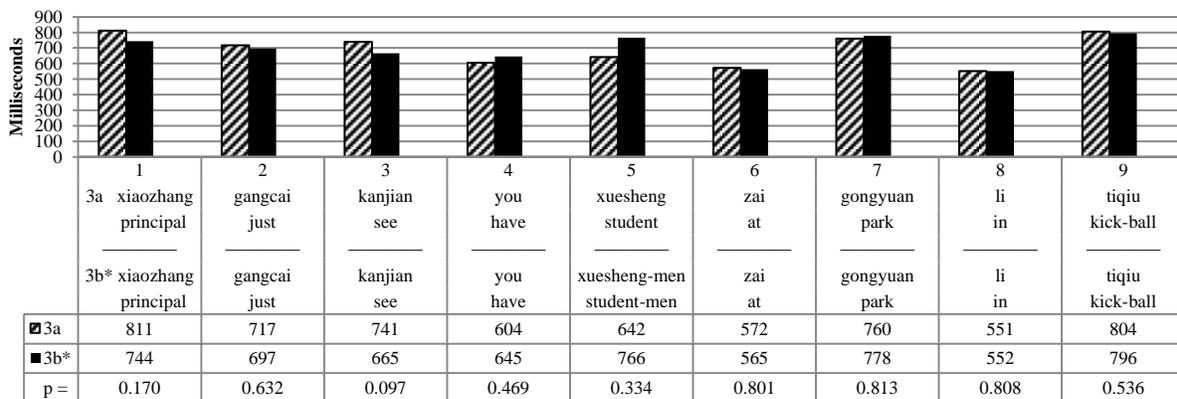
Figure 28 CnNSs' group mean RTs on each segment in Chinese Condition 3a and 3b

	1	2	3	4	5	6	7	8	9
3a	xiaozhang principal	gangcai just	kanjian see	you have	xuesheng student	zai at	gongyuan park	li in	tiqiu kick-ball
3b*	xiaozhang principal	gangcai just	kanjian see	you have	xuesheng-men student-men	zai at	gongyuan park	li in	tiqiu kick-ball
▨3a	217	201	209	217	231	259	264	287	323
■3b*	224	218	232	230	243	270	292	318	374
p =	0.375	0.075	0.094	0.278	0.292	0.494	0.100	0.011	0.007
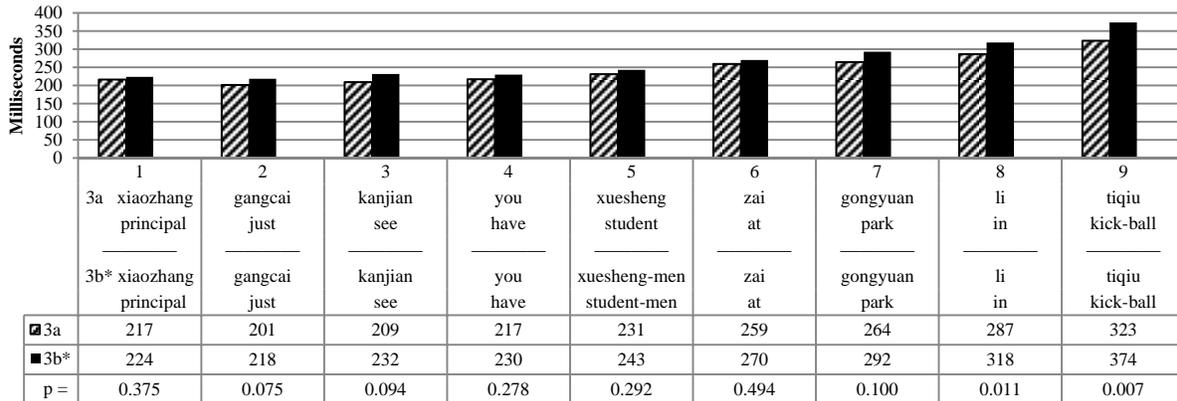
Before ending this section, a question may be asked why I did not compare Condition 3b with Condition 2b, as both of them contain human nouns with *men* but the context of Condition 2b allows the phrases to be interpreted as definite (hence grammatical) while the context of Condition 3b forces the phrases to be indefinite (hence ungrammatical). The reason I did not compare the two conditions is that there is a big difference in design of these conditions. Although their critical segments form a minimal pair, other parts of Condition 2b and 3b have different structures and length. Since these differences can also affect RTs, had Condition 2b and 3b been compared, it would have been very difficult to eliminate effects of confounding factors, making our results less reliable.

5.2.3.2 L2 Thai collective marker

In contrary to Chinese, Thai allows its collective marker to attach to indefinite nouns. To test whether Chinese native speakers would allow this kind of usage in their L2 Thai grammars, I put nouns in existential clauses to force an indefinite reading. Moreover, I also added prerequisite tests (shown in example (91) and (92)) to screen for participants who indeed only allowed nouns in existential structures to be interpreted as indefinite. Similar to the design of Chinese tests introduced in Section 5.2.3.1, Condition A of Thai prerequisite tests is a control condition with an existential sentence structure and Condition B is an ungrammatical condition in which pivot nouns of existential sentences were forced to be interpreted as definite by an addition of "*làw* 'group' + demonstrative". There are 3 tokens for each type of prerequisite tests, and only participants who accepted at least 2 tokens from Condition A and rejected at least 2 tokens from

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Condition B would be included in our further analysis of this set. They are comprised of 14 ThBLs, 17 ThILs, 18 ThALs and 15 ThNSs.

(91) Thai Prerequisite A   mii   nákrian   kamlaŋ   kinkhâaw   yùu-nay   rooŋʔaahǎan

                  have   student   PROG   eat-rice   PROG-in   cafeteria

                  "There is/are (a) students(s) eating in a cafeteria."

(92) Thai Prerequisite B   * mii   nákrian   làw-nán   kamlaŋ   kinkhâaw   yùu-nay   rooŋʔaahǎan

                    have   student   group-that   PROG   eat-rice   PROG-in   cafeteria

                    "Those students are eating in the cafeteria."

(93) Thai 3a   mûakîi   maalii   phûutwâa   mii   nákrian   kamlaŋ   kinkhâaw   yùu-nay

             just-now   Mali   say   have   student   PROG   eat-rice   PROG-in

             rooŋʔaahǎan

             cafeteria

             "Mali just said that there was/were (a) student(s) eating in the cafeteria."

(94) Thai 3b   mûakîi   maalii   phûutwâa   mii   phûak-nákrian   kamlaŋ   kinkhâaw   yùu-nay

             just-now   Mali   say   have   *phûak*-student   PROG   eat-rice   PROG-in

             rooŋʔaahǎan

             cafeteria

             "Mali just said that there were students eating in the cafeteria."

Table 14 AJT mean scores, p-values and the number of participants who responded consistently on Thai test sentences in Condition 3a and 3b

	Mean scores		T-test	Individual consistency			
	3a	**3b**	***p*-value**	**accept 3a consistently**	**reject 3a consistently**	**accept 3b consistently**	**reject 3b consistently**
ThBL	3.18☆	2.93☆	.154	12 / 14 (85%)	2 / 14 (14%)	7 / 12 (58%)	1 / 12 (8%)
ThIL	3.48	3.03☆	.001	15 / 17 (88%)	0 / 17 (0%)	11 / 15 (73%)	3 / 15 (20%)
ThAL	3.47	3.00☆	.001	17 / 18 (94%)	0 / 18 (0%)	14 / 17 (82%)	0 / 17 (0%)
ThNS	3.60	3.48	.361	15 / 15 (100%)	0 / 15 (0%)	14 / 15 (93%)	0 / 15 (0%)

Let us now look at main test sentences in Condition 3a and 3b. As mentioned above, the two types of sentences make use of a definiteness effect of existential structures. Condition 3a was designed to serve as a control while Condition 3b is an experimental condition with an additional collective marker *phûak* on pivot nouns. For example, existential clauses in (93) and (94) begin with *mi* "have". The pivot noun in (93) is *nákrian* "student" while the one in (94) is *phûak-nákrian* (*phûak*-student). Since pivot nouns must be interpreted as indefinite and *phûak* has a [+indefinite] feature which makes it compatible with indefinite nouns, we expect the Thai Condition 3b to be grammatical, just like the control condition 3a.

We can see in Table 14 that, as expected, all Thai native speakers (ThNSs) consistently accepted test sentences in the control condition 3a and rated them with high scores, averaged at 3.60. Learners in all proficiency groups also rated control sentences with scores in an acceptance range, i.e. having mean scores above 3.00. As for individual analysis, there are a few learners who could not consistently accept sentences in Condition 3a, namely 2 ThBLs, 2 ThILs and 1 ThAL. But except for these few participants, more than 80% of participants in these groups did not have a problem accepting control sentences.

As for the experimental condition 3b, ThNSs accepted it as expected. They gave high scores to test sentences (averaged at 3.48) and the scores are not statistically significant from those in the control condition; t(118) = .916, *p* = .361. Moreover, 93% of them consistently accepted the sentences, suggesting that it is indeed possible to use the collective marker *phûak* with indefinite nouns in Thai. Learners' performance, on the contrary, is more complicated. For example, although 14 out of 17 advanced learners (ThALs) consistently accepted Condition 3b and nobody consistently rejected it, their group mean score is exactly 3.00 which is at the border of the indeterminacy and acceptance categories. Also, they did not accept the experimental condition with *phûak* as much as the control condition without *phûak*; t(141) = 3.339, *p* = .001. Similar to ThALs, ThILs also rated the experimental condition with scores near the boundary of the acceptance category (averaged at 3.03) which are also significantly lower than their acceptance of the control condition; t(132) = 3.357, *p* = .001. Moreover, 20% of participants in this group (i.e. 3 out of 15 people who performed well on the control condition) consistently rejected the use of *phûak* with indefinite nouns, indicating that their L2 Thai collective marker may still carry a [–indefinite] feature just like the Chinese marker does.

For beginners, only around half of them (7 out of 12 people) could consistently accept sentences in Condition 3b, and their mean score for the sentences is only 2.93 which does not fall into the acceptance category. Their T-test results are also worth noticing. Instead of ThILs or ThALs, ThBLs were the ones who did not rate the experimental condition to a significantly lower degree than the control condition; $t(108) = 1.436$, $p = .154$. This is similar to native speakers' behaviour. However, the native-like performance among beginners seems accidental and it does not fit with results from the individual consistency and mean score analyses mentioned above. It may be the case that, because test sentences in Condition 3b are relatively long and complex, ThBLs had a difficulty accepting them regardless of the presence of *phûak*. This is why they rated both Condition 3a and 3b with relatively low scores, averaged at 3.18 and 2.93 respectively, leading to a lack of significant difference between the two conditions.

In sum, Chinese learners might not have fully acquired the Thai [+indefinite] feature at a beginning stage of L2 acquisition. However, their performance slightly improved and became more native-like when they reached higher levels of L2 proficiency, as shown by the higher rates of acceptance among ThILs and ThALs discussed above. The acquisition progress is also supported by SPR data below.

Figure 29 ThBLs' group mean RTs on each segment in Thai Condition 3a and 3b

	1	2	3	4	5	6	7	8	9
	3a mûakîi	maalii	phûutwâa	mii	nákrian	kamlaŋ	kinkhâaw	yùu-nay	rooŋʔaahǎan
	just-now	Mali	say	have	student	PROG	eat-rice	PROG-in	cafeteria
	3b mûakîi	maalii	phûutwâa	mii	phûak-nákrian	kamlaŋ	kinkhâaw	yùu-nay	rooŋʔaahǎan
	just-now	Mali	say	have	phuak-student	PROG	eat-rice	PROG-in	cafeteria
3a	1071	1216	1091	683	1122	766	1312	853	1249
3b	905	1144	977	630	1743	860	1193	756	1209
p =	0.152	0.605	0.250	0.388	0.008	0.149	0.105	0.146	0.811

Figure 30 ThILs' group mean RTs on each segment in Thai Condition 3a and 3b

	1	2	3	4	5	6	7	8	9
	3a mûakîi just-now	maalii Mali	phûutwâa say	mii have	nákrian student	kamlaŋ PROG	kinkhâaw eat-rice	yùu-nay PROG-in	rooŋʔaahǎan cafeteria
	3b mûakîi just-now	maalii Mali	phûutwâa say	mii have	phûak-nákrian phuak-student	kamlaŋ PROG	kinkhâaw eat-rice	yùu-nay PROG-in	rooŋʔaahǎan cafeteria
▨3a	846	1201	1008	743	1032	812	1189	765	1459
■3b	909	1305	990	717	1731	834	1159	789	1438
p =	0.114	0.510	0.662	0.746	0.000	0.873	0.837	0.670	0.984

Figure 31 ThALs' group mean RTs on each segment in Thai Condition 3a and 3b

	1	2	3	4	5	6	7	8	9
	3a mûakîi just-now	maalii Mali	phûutwâa say	mii have	nákrian student	kamlaŋ PROG	kinkhâaw eat-rice	yùu-nay PROG-in	rooŋʔaahǎan cafeteria
	3b mûakîi just-now	maalii Mali	phûutwâa say	mii have	phûak-nákrian phuak-student	kamlaŋ PROG	kinkhâaw eat-rice	yùu-nay PROG-in	rooŋʔaahǎan cafeteria
▨3a	954	1101	978	687	1024	841	1155	757	1413
■3b	939	1075	999	766	1460	762	1130	787	1325
p =	0.563	0.346	0.945	0.196	0.162	0.136	0.816	0.282	0.259

Figure 32 ThNSs' group mean RTs on each segment in Thai Condition 3a and 3b

	1	2	3	4	5	6	7	8	9
	3a mûakîi just-now	maalii Mali	phûutwâa say	mii have	nákrian student	kamlaŋ PROG	kinkhâaw eat-rice	yùu-nay PROG-in	rooŋʔaahǎan cafeteria
	3b mûakîi just-now	maalii Mali	phûutwâa say	mii have	phûak-nákrian phuak-student	kamlaŋ PROG	kinkhâaw eat-rice	yùu-nay PROG-in	rooŋʔaahǎan cafeteria
▨3a	470	473	454	418	414	412	438	466	569
■3b	442	459	431	414	479	444	435	447	567
p =	0.167	0.819	0.517	0.934	0.674	0.260	0.768	0.525	0.904

For SPR analysis, readers are reminded to pay attention to data presentation in Figure 29 – 32. Again, note that the critical segment (Segment 5) in Condition 3a and 3b contain lexical items with different length. In example sentences shown in the figures, the critical segment of Condition 3a is a 2-syllable word *nákrian* "student" while the one in Condition 3b is *phûak-nákrian* (*phûak*-student) which has 3 syllables. To allow for a fair comparison between the two conditions, RTs in our study were converted into residual RTs using a regression equation to reduce the effect of word length. Consequently, *p*-values in the last row of these figures represent results of T-tests which are based on adjusted RTs, unlike the bar height which represents raw RTs. This is a reason why, in Figure 31, although advanced learners' RTs at Segment 5 of Condition 3a and 3b look very different (having average values of 1024 ms and 1460 ms respectively), the T-test result does not indicate statistical significance between the two conditions; $t(111) = -1.411$, $p = .162$.

Despite the treatment to remove an effect of segment length, a statistical significance is still found in ThBLs and ThILs' RTs at Segment 5, as shown in Figure 29 and 30. Learners in the two groups spent significantly longer time at the critical segment in Condition 3b than in 3a; $t(68) = -2.766$, $p = .008$ for ThBLs and $t(91) = -3.706$, $p = .000$ for ThILs. Since the ungrammaticality effect is observed in sentences with "*phûak* + indefinite nouns", it is likely that these learners perceived the use of *phûak* with indefinite nouns to be ungrammatical, implying the absence of the [+indefinite] feature in their L2 grammars. In contrast, ThALs and ThNSs did not seem to have a problem with "*phûak* + indefinite nouns" because such a usage did not trigger an ungrammaticality effect during their reading. Their RTs of the two conditions are not significant at any segment positions. For the critical segment in particular, T-test results are $t(111) = -1.411$, $p = .162$ for ThALs and $t(99) = -0.422$, $p = .674$ for ThNSs.

To sum up, our SPR results show an acquisition trend of the [+indefinite] feature which is similar to that from AJT results, i.e. higher proficiency learners performed more native-like than lower proficiency learners. It is likely to be the case that the presence of positive evidence in Thai input (such as the use of *phûak* in existential sentences) played a role in informing Chinese learners about the presence of the [+indefinite] feature. Nonetheless, the effect of positive evidence seems to be partially limited as ThALs still failed to accept AJT sentences with "*phûak* + indefinite nouns" as much as they accepted the controls. Perhaps, because the use of *phûak* can be superficially optional to learners (as they cannot always correctly predict when a speaker will

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refer to referents as a group), even when positive evidence informs them that *phûak* can be used with indefinite nouns, they are still not completely certain about the presence of the [+indefinite] feature.

5.3 Summary of empirical data

Table 15 provides a summary of empirical data in Section 5.2 along with their corresponding featural characteristics from Chapter 3. The first three columns contain information previously presented in Table 2. When these columns are in grey, it indicates that sentences in these conditions are controls and they do not contain tested features. The last four super-columns summarise results from an individual consistency analysis of AJT judgment, AJT mean scores, ANOVA or T-test comparison of AJT scores and T-test comparison of SPR RTs respectively. Criteria for a summary are as follows.

For the AJT consistency super-column, the numbers indicate percentages of participants in a particular group who consistently judged test sentences correctly. For example, for Chinese Condition 1a which is *grammatical*, the number "100" under the "NS" sub-column indicates that 100% of participants in the CnNS group consistently *accepted* it. On the contrary, for Chinese Condition 1c which is *ungrammatical* (as can be seen by the * symbol in the "Condition" column), the number "93" under the "NS" sub-column indicates that 93% of participants in the group consistently *rejected* it. In addition, I take 80% as a cut point for passing the criterion. For example, our data show that 90% of CnBLs consistently accepted test sentences in Chinese Condition 1a. Since 90% represents an overwhelming majority of a group and is higher than the 80% cut point, I consider the learners to have performed native-like (or at least very near-native) as a group under this criterion.

For AJT mean scores, the summary is based on group mean scores and grammaticality of each condition. The symbol ○ is used to indicate that participants passed a criterion of this analysis method. To be specific, when test sentences are *grammatical* such as those in Condition 1a, a group will be marked with ○ if participants' mean score for that condition is between 3 and 4, i.e. falling into an *acceptance* range. In contrast, when test sentences are *ungrammatical* such as those in Condition 1c, a group will be marked with ○ if participants' mean score is between 1 and 2, i.e. falling into a *rejection* range.

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For ANOVAs and T-tests of AJT data, as results are drawn from comparisons between experimental conditions and their controls, only one data point is available for each pair of comparison and it will be presented in the same row as experimental conditions. Areas corresponding to control conditions are, instead, marked in grey. For grammatical experimental conditions such as 1b, a group will be marked with $\bigcirc$ if participants did not judge experimental and control sentences in a statistically significant manner ($p > 0.05$). On the contrary, for ungrammatical experimental conditions such as 1c, a group will be marked with $\bigcirc$ if participants rated the ungrammatical condition with scores which are significantly lower than its control ($p < 0.05$), indicating a possibility that they are sensitive to the ungrammaticality.

Lastly, for the SPR T-test super-column, conditions for which no comparison data are available also have a grey background. Based on a similar criterion to "AJT ANOVA/T-test" mentioned above, when experimental sentences are grammatical (such as those in Thai Condition 2d and 3b), a group will be marked with $\bigcirc$ if participants' RTs did not demonstrate an ungrammaticality effect in any compared regions. In contrast, when experimental sentences are ungrammatical (such as those in Condition 1c), a group will be marked with $\bigcirc$ if participants demonstrate an ungrammaticality effect by spending significantly longer time at any non-pre-critical regions in the ungrammatical condition.

Because data in the last four super-columns of Table 15 come from different analysis methods, they can provide us with insights into participants' behaviour from different perspectives such as an individual perspective (based on AJT individual consistency data), a group perspective (based on AJT mean scores) and a comparative perspective (based on AJT and SPR statistical comparisons). Consequently, I choose to keep these data separated and will not combine the findings together to arrive at a single conclusion whether a group of participants had successfully acquired certain features or not.

Some general trends can be observed from data in Table 15. First, our participants performed quite well on control conditions, namely Condition 1a, 2a, 2b, 2c and 3a in both Chinese and Thai tests. From AJT consistency results, a majority (defined as 80% or more) of participants in all proficiency groups consistently accepted the control conditions. Moreover, their AJT mean scores are always in an acceptance range. Participants' acceptance of control conditions makes us rather certain that they did not have a problem with general structures of our

test sentences, allowing us to continue to investigate their responses to tested features in experimental conditions.

Secondly, native speakers performed as expected in experimental conditions. For example, Chinese native speakers indeed accepted a "numeral + classifier + noun" structure (Condition Cn 1b) and rejected a "noun + numeral + classifier" structure (Cn 1c). Meanwhile, Thai native speakers accepted a "noun + numeral + classifier" structure (Th 1b) and rejected a "numeral + classifier + noun" structure (Th 1c). As for collective markers, Chinese native speakers rejected sentences in which *men* is used with animals or indefinite nouns (in Cn 2d and Cn 3b respectively). Thai native speakers, on the other hand, accepted sentences in which *phûak* is used with animals and indefinite nouns (in Th 2d and Th 3b).

Thirdly, learners' performance seems to vary a lot depending on their L2 proficiency and tested elements. Among all features in the current study, what seems to be the easiest to acquire is TL word orders. As can be seen in Table 15, Thai learners of Chinese accepted the "numeral + classifier + noun" structure in Chinese Condition 1b and performed well according to the three criteria since they were beginners. Chinese learners of Thai also performed relatively well in Thai Condition 1b which contains the Thai "noun + numeral + classifier" structure. They started to show acceptance towards the structure at the beginners' level and fully accepted it at the intermediate level.

In contrast, what seems to be the most difficult to acquire is the [−animal] and [−indefinite] features of Chinese collective marker. Looking at Thai learners' performance in Chinese Condition 2d and 3b, we can see that the learners hardly passed criteria of the four analysis methods. Even advanced learners faced a difficulty rejecting our test sentences, as only 11% and 10% of them could consistently reject ungrammatical sentences in which *men* appeared with animal nouns and indefinite nouns respectively.

We end this chapter by answering four research questions posed in Section 4.1. Based on results of our empirical study, it is found that:

1. Thai learners were able to acquire and accept the Chinese "numeral + classifier + noun" structure since they were beginners. They started to be sensitive to ungrammaticality of the Thai-like "noun + numeral + classifier" word order in Chinese since a beginning level and were able to completely reject it at an advanced level.

2. Chinese learners tended to accept the Thai "noun + numeral + classifier" structure since they were beginners and completely accepted it when they reached an intermediate level. They started to be sensitive to ungrammaticality of the Chinese-like "numeral + classifier + noun" word order in Thai since a beginning level and were able to completely reject it at an advanced level.

3. As a group, Thai learners were not able to reject Chinese nominal phrases that referred to animals and contained the collective marker *men*, although advanced learners showed some sensitivity to its ungrammaticality. The learners were also unable to reject indefinite nominal phrases that contained *men* and did not show sensitivity to its ungrammaticality. On an individual level, however, a small number of learners were able to reject the two incorrect usages.

4. As a group, Chinese learners were able to accept the use of Thai collective marker *phûak* with animal nouns since an intermediate level. They were able to accept its use with indefinite nouns at an advanced level. Nonetheless, their acceptance was not as high as that of normal grammatical sentences.

Table 15 Summary of empirical data

Tested feature	Positive evidence	Form-function connection	Condition	AJT consistency				AJT mean scores				AJT ANOVA/T-test				SPR T-test			
				NS	AL	IL	BL	NS	AL	IL	BL	NS	AL	IL	BL	NS	AL	IL	BL
			Cn 1a	100	100	100	90	O	O	O	O								
[–NPmove]	available	transparent	Cn 1b	100	100	94	84	O	O	O	O	O	O	O	O				
[+NPmove]	not available	transparent	Cn 1c *	93	100	61	37	O	O			O	O	O	O	O	O		
			Cn 2a	100	100	100	100	O	O	O	O								
			Cn 2b	100	100	100	100	O	O	O	O	O	O	O	O				
			Cn 2c	100	100	91	92	O	O	O	O					O	O	O	O
[–animal]	not available	not transparent	Cn 2d *	90	11	0	9	O				O	O			O	O		
			Cn 3a	100	100	88	81	O	O	O	O								
[–indefinite]	not available	not transparent	Cn 3b *	100	10	0	0	O				O				O			
			Th 1a	100	100	100	100	O	O	O	O								
[+NPmove]	available	transparent	Th 1b	100	100	100	61	O	O	O	O	O	O	O					
[–NPmove]	not available	transparent	Th 1c *	100	100	78	56	O	O	O		O	O	O	O	O	O		
			Th 2a	100	100	100	100	O	O	O	O								
			Th 2b	100	100	100	100	O	O	O	O	O	O	O	O				
			Th 2c	100	100	92	86	O	O	O	O					O	O	O	O
[+animal]	available	not transparent	Th 2d	93	80	83	58	O	O	O		O				O	O		
			Th 3a	100	94	98	86	O	O	O	O								
[+indefinite]	available	not transparent	Th 3b	93	82	73	58	O	O	O		O			O	O	O		

Notes. Under the "Condition" column, *Cn* and *Th* indicate whether test sentences in these conditions are in Chinese or Thai.

Chapter 6: Discussion

6.1 L2 acquisition when positive evidence is available in a target language

Results from our study indicate that positive evidence in TL can play a facilitating role in L2 acquisition. In particular, learners seemed to acquire a new language structure earlier when positive evidence was available than when it was not. This is evident in both acquisition of word orders and collective markers. In the case of word orders, we can look at learners' performance on Condition 1b and compare it with Condition 1c. Recall that Condition 1b includes a grammatical TL structure for which learners can receive positive evidence while Condition 1c includes an ungrammatical structure which does not generate positive evidence. Both Thai and Chinese learners showed relatively early acquisition in Condition 1b in their respective TL. In particular, Thai learners of Chinese accepted the "numeral + classifier + noun" structure in Chinese Condition 1b and performed native-like under the AJT consistency, AJT mean score and AJT ANOVA criteria since they were at a beginner level, as can be seen in Table 15 in Chapter 5. As for the "noun + numeral + classifier" structure in Thai Condition 1b, Chinese learners in our study also performed native-like under the AJT mean score criterion since they were at a beginner level. They passed the AJT consistency and AJT ANOVA criteria at an intermediate level. These performances are in contrast with Condition 1c, as both Chinese and Thai learners could not pass all criteria of analysis in this condition unless they had reached an advanced level of proficiency.

Learners' relatively early acceptance of TL word orders is likely to be related to their early contact with the structures and the abundance of examples in TL input. Let us look at input from textbooks as an example. In *Boya Chinese Elementary Starter 1* textbook by Peking University (Ren & Xu 2005), the Chinese "numeral + classifier + noun" structure starts to appear in Lesson 9 and continues to appear several times in Lesson 10, 18, 22, 23, 24, etc. despite not being a "grammatical key point" in those lessons. Similarly, in *Shiyong Taiyu Jiaocheng* [Practical Thai Tutorial] (Huang & Lin 2003), a Thai textbook written for Chinese learners, the "noun + classifier + numeral" structure first appears in Lesson 10 and continues to appear in Lesson 21, 22, 23, 27, etc. Although input from textbooks is likely to be only part of the total input learners receive and may not be a perfect representation of general input, the fact that the

structures appear many times in textbooks (which usually have limited space, hence limited slots for occurrence of each structure) implies the importance and inevitability of the structures in natural input.

There are two more topics related to textbooks which are worth discussing. First, the two textbooks mentioned above do not provide information about word orders in an explicit manner. Despite many occurrences of nominal phrase structures, there is neither explanation about the Chinese "numeral + classifier + noun" and Thai "noun + classifier + numeral" structures, nor a cross-linguistic comparison regarding word orders. Since the textbooks do not provide specific rules for learners, we can be reasonably certain that learners' acquisition of these word orders is mainly based on positive evidence from structural input (which may include dialogues in the textbooks and language interaction in real life). Secondly, I did not perform an extensive research on textbooks that had been used by participants in the current study. Therefore, it is not necessary that all of our participants had used and only used *Boya Chinese Elementary Starter 1* and *Shiyong Taiyu Jiaocheng* mentioned above. Nonetheless, since these are ones of the popular textbooks in their respective language, to a certain degree, they can represent the types of learning materials our participants were likely to have encountered.

Back to the topic of positive evidence, our finding about learners' early acquisition of a new TL word order matches with Muroya's (2013b) finding previously introduced in Section 3.2.1 that Japanese learners of English can acquire a word order of English *wh*-questions quite early on. Similar to the current research, it is also possible to explain learners' behaviour in her study in terms of abundance of positive evidence, since questions are commonly used expressions in English and they are likely to generate a considerable amount of input for learners.

The facilitating role of positive evidence can also be seen in acquisition of collective markers when we compare learners' performance in L2 Chinese and L2 Thai. Recall that the Chinese marker *men* and the Thai marker *phûak* differ in terms of their compatibility with animal and indefinite nouns. Chinese learners of Thai can encounter input showing that "*phûak* + animal noun" and "*phûak* + indefinite noun" structures are possible, while Thai learners of Chinese cannot hear or see structures that indicate ungrammaticality of "animal nouns + *men*" or "indefinite nouns + *men*". In other words, positive evidence is available for learners of Thai but not for learners of Chinese. Based on availability of positive evidence, accepting the grammatical

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structures in Thai is, then, predicted to be easier than rejecting the ungrammatical structures in Chinese.

Our results support the prediction. Thai learners of Chinese indeed seemed to face difficulty rejecting the "animal noun + *men*" and "indefinite noun + *men*" structures (in Chinese Condition 2d and 3b respectively) even when they had an overall advanced proficiency. Chinese learners of Thai, on the other hand, could perform native-like at intermediate or advanced levels. For example, the intermediate and advanced learners (ThILs and ThALs) rated Thai test sentences that contain "*phûak* + animal nouns" (Condition 2d) and "*phûak* + indefinite nouns" (Condition 3b) with AJT mean scores in a range of acceptance, i.e. above 3.00. Moreover, 80% or more of people in these groups accepted Condition 2d consistently and 82% of the advanced learners accepted Condition 3b consistently.[43]

Our finding about Chinese learners' relatively successful acquisition of Thai collective marker corresponds to Lee (2015) and Lee & Lardiere's (2016) finding previously introduced in Section 3.2.3 that it is not very difficult for learners to acquire a new usage of a Korean plural marker (which is comparable to collective markers discussed here). Positive evidence can serve to inform learners that there are TL structures which are additional to how collective/plural markers are used in their native language and, therefore, trigger a change in learners' grammars (Gass & Selinker 2008; Maftoon & Esfandiari 2015; Smith 2013).

Above, we only discuss effects of positive evidence on features that are different in Chinese and Thai, namely [+/–NPmove], [+/–animal] and [+/–indefinite] features. But of course, positive evidence can assist L2 acquisition when L1 and TL features are similar as well. To give an example, let us look at a [+human] feature on collective markers which lead to their compatibility with human nouns. The feature is present in both Chinese and Thai. It is speculated that, after a mapping of L1 and TL collective markers, learners will transfer the [+human] feature from their L1 to a TL marker. Then, they are likely to receive TL input that includes the use of

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[43] Nonetheless, the difference between Chinese and Thai participants' performance on L2 collective markers is not definitive when it comes to AJT T-test and SPR T-test analyses as both groups did not seem to have native-like sensitivity to test sentences. In particular, Thai learners of Chinese were not able to distinguish between grammatical and ungrammatical sentences in Chinese Condition 3a and 3b during their AJT judgment and SPR processing. Chinese learners of Thai also could not accept grammatical experimental conditions 2d and 3b as much as their controls in AJT judgment.

the marker with human nouns. As the evidence confirms the presence of the [+human] feature, it continues to stay in the L2 system. We can see the presence of the feature in our participants' grammars by looking at Condition 2b which contains a "human noun + *men*" structure in Chinese and a "*phûak* + human noun" structure in Thai. Both Chinese and Thai learners performed well in this sentence type since they were beginners as they accepted test sentences in their TL to a high degree (i.e. rating them with high AJT scores that are not statistically significant from the control condition 2a).

Incidentally, I would like to point out that a bi-directional design of the current study can lead us to be more certain that some of the results described above indeed exemplify the effect of positive evidence, not other factors. For example, it has been proposed that computational complexity may affect L2 acquisition of structures related to movement (Jakubowicz 2011; Yuan 2015) with (95) below as a specific metric described in Yuan (2015). What is relevant to us is the first part of the metric about merging (which includes Internal Merge, i.e. Move). Simply put, the metric postulates that the fewer merging/movement operations there are, the less complex a computation is, and consequently the easier the structure is to acquire.

(95) Computation Complexity Metric
a. Merging α_i n times gives rise to a less complex computation than merging α_i (n+1) times.
b. Feature checking of α gives rise to a less complex computation than feature checking of α+β.

Based on our analysis of Chinese and Thai nominal phrase structures in Chapter 2, there is no movement in the "numeral + classifier + noun" structure while there is an NP movement in the "noun + numeral + classifier" structure. According to the Computation Complexity Metric, since there is fewer merging operation in the former structure, it should be easier for learners to acquire than the latter structure. And since our data indeed show that Thai learners performed native-like earlier in Chinese Condition 1b which contains "numeral + classifier + noun" than in Condition 1c which contains "noun + numeral + classifier", the data might be used to support the Computation Complexity Metric.

However, if we look at data from Chinese learners of Thai, the Computation Complexity Metric cannot provide a good explanation for learners' behaviour. In particular, note that Thai Condition 1b contains "noun + numeral + classifier" which is more complex than "numeral +

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classifier + noun" in Thai Condition 1c. Based on the metric, 1b is now predicted to be harder to acquire than 1c. However, our data still suggest that learners performed better in 1b. For example, at a beginner level, 61% of learners (ThBLs) passed the individual consistency criterion of Thai Condition 1b while 56% of them did so in Condition 1c. At an intermediate level, although percentages of native-like performance increase in both conditions (i.e. increasing to 100% in Condition 1b and 78% in Condition 1c), learners' tendency to perform better in Condition 1b than 1c still remains.

Since our design of Chinese and Thai sentences in Set 1 is based on the same rationale but the metric can only explain results of L2 Chinese, computational complexity is probably not the main factor that causes differences in the learners' performance. Instead, since Chinese and Thai data both show better performance in Condition 1b than 1c and since the two conditions differ in terms of availability of positive evidence, the positive evidence factor can explain our findings in both L2s. To conclude, the purpose of my discussion here is not to discard the proposal about effects of computational complexity on L2 acquisition.[44] Instead, I use this example to illustrate that an experimental design with data from different directions of acquisition is valuable in terms of limiting a choice of possible explanations (Gabriele 2009).

6.2 L2 acquisition when positive evidence is not available in a target language

In this section, we focus on a situation when positive evidence is not available in TL. To recapitulate relevant results, it took learners in the current study quite a long time to perform well in Chinese and Thai Condition 1c (which aim to test incorrect TL word orders related to [+/–NPmove] features), Chinese Condition 2d (which contains an "animal noun + *men*" structure that is used to test a [–animal] feature) and Chinese Condition 3b (which contains an "indefinite noun + *men*" structure that is used to test a [–indefinite] feature). In particular, it was not until an

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[44] It is also not my intention to evaluate the Computation Complexity Metric by comparing data from Chinese Condition 1b (which has positive evidence and is structurally less complex) with those from Thai Condition 1b (which has positive evidence but is structurally more complex), because in this study I did not control for proficiency levels cross-linguistically (and in reality it is very difficult to do so). In other words, beginners in the L2 Chinese group may not be at the exact same level of proficiency as beginners in the L2 Thai group. Therefore, even when we found that learners performed worse in the Thai condition, we could not confidently conclude that the difficulty was a result of the Thai structure being more complex. It might be the case that participants recruited in the L2 Thai group had slightly lower L2 proficiency than ones in the L2 Chinese group.

advanced level that a majority of learners (defined as more than 80% of a group) could consistently reject ungrammatical word orders in Chinese and Thai Condition 1c. As for Chinese Condition 2d and 3b, even when learners were at an advanced level of proficiency, most of them still could not reject the incorrect usages of *men*.

Note that features in above conditions have one thing in common. They are all related to non-occurrence of certain structures. To be specific, the [–animal] and [–indefinite] features are related to absence of "animal noun + *men*" and "indefinite nouns + *men*" structures in Chinese. The [+/–NPmove] features are related to absence of the "numeral + classifier + noun" structure in Thai and absence of the "noun + numeral + classifier" structure in Chinese. As a result of non-occurrence, learners do not receive structural input or positive evidence when they acquire a TL configuration of these features. The lack of positive evidence is, then, possibly a reason behind late acquisition in these test conditions.

Take Thai learners' acquisition of word orders in Chinese as an example. After the learners transfer the [+NPmove] feature to their L2 numerals, we predict that they will allow a "noun + numeral + classifier" structure in their L2 Chinese at an initial stage. Later, during their contact with Chinese input, they may learn that a "numeral + classifier + noun" structure is available in Chinese. However, the input does not serve as direct evidence for ungrammaticality of the Thai-like "noun + numeral + classifier" structure. This is likely to be why Thai learners in the current study found it difficult to reject the Thai-like word order in our test sentences. Our finding that it is quite difficult for learners to disallow a usage which is possible in their L1 but not present in TL matches with those in Gabriele (2009), Ionin & Montrul (2010), Inagaki (2001), Lee (2015), Lee & Lardiere (2016), Trahey (1996) and Yuan (2014).

In contrast to our explanation above, readers who are familiar with Chinese may propose another explanation of why some Thai learners could not reject the ungrammatical "noun + numeral + classifier" structure. It may be argued that the structure is actually present in Chinese, as can be seen by the *shouyinji yi tai* (radio-one-CL) "one radio" part of (96), and this kind of input may serve as positive evidence confirming the transferred [+NPmove] feature, making Thai learners continue to accept the Thai-like structure.

(96) jintian shou dao shouyinji yi   tai
      today   receive   radio   one   CL
      "One radio received today."

Regarding this proposal, I would like to argue that, despite grammaticality of (96), the "noun + numeral + classifier" structure is in fact very rare in Chinese and hence unlikely to be a reason why Thai learners could not reject our test sentences in Chinese Condition 1c. To begin with, it is mentioned in Section 2.2.1 that the structure is limited to very small areas of usage, such as in ancient Chinese and lists with formal writing styles. In other words, it rarely appears in general Chinese input. To validate this claim, I performed searches for "numeral + classifier + noun" and "noun + numeral + classifier" combinations on *Guojia Yuwei Xiandai Hanyu Pingheng Yuliaoku* (State Language Commission's Balanced Corpus of Modern Chinese).[45] The first combination yields a result of 47875 sentences. From the first 100 sentences, 90 instances of the actual "numeral + classifier + noun" structure are found.[46] The second combination, on the other hand, yields a result of 6526 sentences, but only 7 instances of the actual "noun + numeral + classifier" structure are found in the first 100 sentences. These include the *shoubiao liu shi er zhi* (watch-sixty-two-CL) "sixty two watches", *dianshiji liu shi yi tai* (television-sixty-one-CL) "sixty one televisions" and *zixingche si shi er liang* (bicycle-forty-two-CL) "forty two bicycles" phrases in (97). Based on the abovementioned samples, the number of valid "numeral + classifier + noun" structures in this corpus is expected to be around 43088 (calculated with 47875 search results ÷ 100 samples x 90 valid phrases) while the number of valid "noun + numeral + classifier"

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[45] Data were retrieved from http://www.cncorpus.org/CnCindex.aspx on 18 May 2017. For the "numeral + classifier + noun" structure, the search term used was "/m /q /n" in which *m* represents numerals; *q* represents classifiers; and *n* represents nouns as defined by the website. For the "noun + numeral + classifier" structure, the search term was "/n /m /q".

[46] There are a few reasons why not all search results contain a structure being searched for. First, the system not only provides results for search terms in a subsequent order, but also results with other words between the terms. In the latter case, a numeral, a classifier and a noun may not actually be in the same phrase. Secondly, even for the numeral, classifier and noun that appear in succession, sometimes they do not have a quantificational relationship but a modificational one, hence not included in my counting. Thirdly, the noun category in this corpus covers a wide range of words including *hou* "after", *yishang* "above" and *shi* "at … time" which are often analysed as nouns in Chinese (Beijing Daxue Zhongwenxi Xiandai Hanyu Jiaoyanshi 2006) but do not have a quantificational relationship with numerals.

structures is expected to be around 457 (calculated with 6526 search results ÷ 100 samples x 7 valid phrases). The ratio of the two structures is, then, 43088:457 which is almost equal to 100:1. Based on the corpus data, we can confirm that the Chinese "noun + numeral + classifier" structure is indeed rare.

(97) jin   jin   san shi nian lai,   jiu   gou-jin   shoubiao liu shi er   zhi,
     just   recent   thirty   year so-far even   buy-in   watch   sixty-two   CL
     dianshiji   liu shi yi   tai,   zixingche   si shi er   liang,   …
     television   sixty-one   CL   bicycle   forty-two   CL
     "Just in the last thirty years, (they) even bought sixty two watches, sixty one televisions, forty two bicycles, …"

In addition to the rare occurrence of the "noun + numeral + classifier" structure, as most Thai learners of Chinese in the current study were university students majoring in business Chinese, they were likely to learn Chinese for a modern usage. As a result, it is unlikely that they had received a significant amount of input with the "noun + numeral + classifier" structure from ancient Chinese or any sources. The structure, therefore, should not be considered to have had a significant effect on the learners' inability to reject test sentences in Chinese Condition 1c.

Now let us move on to the next topic of discussion. As introduced in Section 3.2.4, a few hypotheses have been proposed regarding L2 acquisition under a lack of positive evidence, including the dormant feature hypothesis and the probabilistic learning hypothesis. In what follows, I will compare my results with them one by one.

For the dormant feature hypothesis (Yuan 2014), one of its main ideas is that long-term absence of either confirming or disconfirming evidence in TL input can lead to difficulty in L2 acquisition and hence non-native-like grammars. This prediction is confirmed by our data. As discussed at the beginning of this section, it took learners in our study until an advanced stage to perform native-like under all measures of word order tests in Condition 1c. And for collective marker tests in Chinese Condition 2d and 3b, even advanced learners failed to perform native-like in terms of consistent rejection of test sentences. In short, lack of disconfirming evidence indeed presented a challenge to the learners.

Yuan also proposes that effects of the lack of confirming or disconfirming evidence can apply to various types of features, including morphosyntactic, semantic and discourse ones. This is also supported by our data as the [+/–NPmove], [–animal] and [–indefinite] features belong to different types. To elaborate, [+/–NPmove] features belong to a syntactic type (i.e. the type of features that are relevant to syntax and not affected by semantics or discourse) because they account for NP movement or non-movement which is solely determined by a syntactic requirement of each language. The [–animal] feature, on the other hand, is related to semantics because it places a restriction on presence or absence of Chinese collective marker based on animacy levels of nouns (i.e. whether they refer to human, animals or inanimate objects). The [–indefinite] feature is semantics- and discourse-based because it restricts presence or absence of the Chinese marker based on nouns' definiteness (which is a semantic characteristic) which, in turn, is determined by whether or not a referent is familiar or already established in a discourse (Kibort 2008). In sum, the current study supports the claim that lack of positive evidence can have an impact on morphosyntactic, semantic and discourse-related features.

Another prediction based on Yuan's results is that lack of positive evidence affects learners' performance in terms of their inability to confidently reject ungrammatical structures; however, it may not prevent learners from being able to distinguish ungrammatical structures from grammatical ones. For example, when tested with AJT whose options range from *completely unacceptable* to *completely acceptable*, learners will not be able to judge ungrammatical sentences that lack positive evidence in an *unacceptable* range, regardless of whether their judgment scores to the sentences are significantly lower than control sentences or not. Our results of the [–animal] feature in Chinese Condition 2d support this prediction. That is, most Thai learners indeed could not consistently reject Chinese sentences containing an ungrammatical "animal noun + *men*" structure and only a small number of learners in each proficiency group could do so, namely 1 CnBL (9% of participants the group), 0 CnIL (0%) and 2 CnALs (11%). By comparing the number of learners who performed well in the three proficiency groups, we can see that the learners almost did not gain improvement in terms of their rejection of "animal nouns + *men*" despite their increase in overall L2 proficiency. Nonetheless, the learners had gained an ability to distinguish ungrammatical sentences in Chinese Condition 2d from its control sentences in 2c. In particular, CnALs could make a significant distinction between the two conditions and accepted sentences with "animal nouns +

men" (Condition 2d) to a lower degree than sentences with animal nouns only (Condition 2c);
p = .039.

Lastly, I would like to focus on the dormant feature hypothesis's prediction about L2 ultimate attainment. Based on Yuan (2014), features which do not receive confirming nor disconfirming evidence are predicted to become fossilised, i.e. ceasing to develop in spite of being short of native-like attainment. Moreover, learners are predicted to show random behaviours (i.e. inconsistent acceptance or rejection) on structures that reflects a dormant feature. There are two ways in which our data do not support the predictions. First, under lack of positive evidence, features in the current study did not always fossilise. As shown by performance in Chinese Condition 1c which was designed to test whether participants could reject an incorrect "noun + numeral + classifier" structure, all advanced learners (CnALs) were able to consistently reject test sentences as well as showed sensitivity to its ungrammaticality in both AJT and SPR tasks.[47] The results indicate their rejection of an L1-transferred [+NPmove] feature. Similarly, Chinese advanced learners of Thai (ThALs) were also able to reject an incorrect "numeral + classifier + noun" structure in Thai, indicating that they were able to unlearn an L1-transferred [–NPmove] feature.

Secondly, our study finds that learners' behaviours related to dormant features were not necessarily random. Even for Chinese Condition 2d and 3b in which advanced learners (CnALs) generally could not perform native-like, there were in fact some individuals in the group who could consistently reject our test sentences, namely two people who rejected "animal nouns + *men*" in 2d and two people who rejected "indefinite nouns + *men*" in 3b.[48] Nonetheless, our analysis method may be criticised as not being strict enough as our criterion for consistent rejection is the rating of "1" or "2" on at least *3 out of 4* sentences, allowing people who did not reject 1 of the 4 sentences to be considered performing consistently. Therefore, the data were analysed again using *4 out of 4* as a criterion for consistent rejection. And even with this strict method, we still find participants who consistently rejected test sentences, namely the two

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[47] For Condition 1c, its control in AJT and SPR analyses are Condition 1a and 1b respectively. For a detailed argument for such choices of comparison, see Section 5.2.1.1.

[48] Individuals who consistently rejected Condition 2d and 3b include one person who consistently rejected both conditions, a person who rejected Condition 2d and another person who rejected Condition 3b.

CnALs in Condition 2d. To sum up, despite a lack of disconfirming evidence, some learners were still able to reject an ungrammatical structure correctly and consistently.

As there were some learners who could successfully unlearn L1-transferred features, it is interesting how they could do so despite the lack of positive evidence. It may be hypothesised that probabilistic learning has guided them to a correct featural configuration. Based on Clark & Lappin (2009) and Plough (1995), the following speculation about L2 acquisition processes can be made. After L1 transfer at an initial stage, learners would expect to find TL structures that reflected their L1-transferred features, including a "numeral + classifier + noun" structure which reflected the [–NPmove] feature in Chinese, a "noun + numeral + classifier" structure which reflected the [+NPmove] feature in Thai, a use of a collective marker with animal nouns which reflected the [+animal] feature in Thai and a use of a collective marker with indefinite nouns which reflected the [+indefinite] feature in Thai. However, since the abovementioned usages are ungrammatical in their respective TL, after having kept track of the number of occurrences in applicable contexts for a certain amount of time, learners could infer that the expected structures had a low probability of occurrence. For example, instead of hearing the "noun + numeral + classifier" structure, Thai learners of Chinese heard the "numeral + classifier + noun" structure in the same context. Or instead of hearing a collective marker with animal or indefinite nouns, the learners never heard it. Based on the comparatively low probability of L1-like structures, they could be aware that the transferred features did not fit with TL data. As a result, they were motivated to remove the transferred features and reject the relevant structures. In short, with probabilistic learning, a lack of positive evidence is also a type of evidence (i.e. indirect negative evidence) because it can provide information about ungrammaticality to learners.

An important part of probabilistic learning is that it relies on probabilistic calculation. As it takes time for learners to gather a reasonable number of data before they can calculate and be confident that a certain structure has a low probability of occurrence, L2 acquisition which is based on probabilistic learning can hardly be successful at an early stage of acquisition (cf. Boyd & Goldberg 2011; Mai & Yuan 2016; Yang 2015; Zyzik 2009). For example, in this study, it is not until an advanced stage that learners could reject L1-like word orders (based on probabilistic learning), contrasting with their success in accepting new TL word orders (based on positive evidence) at beginner or intermediate stages.

Additionally, it is likely that different individuals have different thresholds for ungrammaticality in their mind. For example, some people may consider a certain level of probability as low enough to trigger a rejection of a relevant structure while some people may need the probability to be even lower before they are certain that a structure is ungrammatical.[49] It is also likely that input encountered by different learners varies in terms of quantity and quality. As a result, we can hardly pinpoint the time needed for probabilistic learning to be completed. This can be a reason why two CnALs in our study could completely reject Condition 2d while other learners at the same proficiency level could not do so.

Before ending this section, I would like to address possible questions from readers, which are whether probabilistic learning based on indirect negative evidence is the only explanation for success in L2 acquisition when positive evidence is not available and, more specifically, whether we can explain the success among our participants by direct negative evidence. These questions are indeed valid because most of the times L2 learners not only learn a TL in natural settings but also in classrooms where they may receive corrections (i.e. negative evidence) from teachers. To me, I agree that negative evidence can have a role in L2 acquisition (Schachter 1991; White 1987, 1991). However, in the current study, we did not set out to test an effect of negative evidence. Therefore, our experiment was not designed to control for its availability. Neither did we collect information about negative evidence our participants had received prior to the test. (Practically it is very difficult to gather comprehensive data about all negative feedback a learner has received.) Without data about previous contact with negative evidence or designing an experiment with negative evidence as an independent variable, we are not in a position to discuss its effect on learners' performance. However, I would like to point out that teachers are unlikely to be able to provide negative feedback and explanation on all learners' errors because sometimes linguistic rules can be subtle and difficult to articulate. In this case, if a linguistic phenomenon belongs to ones without positive evidence, successful acquisition still has to rely on indirect negative evidence.

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[49] Note that these thresholds are likely to be obscure. It is unlikely that a learner can identify the time he/she realises a certain structure is ungrammatical. It is also unlikely that we can demand a learner to adjust his/her thresholds so that he/she can re-assemble a feature earlier.

6.3 L2 acquisition and form-function transparency

In Section 6.2, data from Chinese Condition 1c, 2d and 3b and Thai Condition 1c are used to demonstrate phenomena related to a lack of positive evidence, including late native-like performance and a probabilistic learning strategy. However, readers may notice that acquisition outcomes of the four conditions are not identical. For Condition 1c which tests [+/−NPmove] features, both Chinese and Thai learners were able to perform native-like under all four criteria (i.e. AJT consistency, AJT mean scores, AJT ANOVA and SPR T-test) summarised in Table 15 in Chapter 5 when they reached an advanced level of proficiency. In contrast, Thai learners could not pass all criteria in Chinese Condition 2d and 3b which test [−animal] and [−indefinite] features on Chinese collective marker *men*. Even advanced learners rated ungrammatical sentences in these conditions with high scores, and only a small number of them could consistently reject the sentences, namely 11% and 10% of CnALs in Condition 2d and 3b respectively. These results suggest that there may be other factors which lead to more difficulty in acquisition of the collective marker.

One possible factor for such difficulty is that features on collective markers are less transparent than those responsible for word orders. To recapitulate our discussion in Chapter 3, word orders and collective marker usages in the current study differ in terms of optionality, and optionality can lead to less transparency of a feature and hence more difficulty in L2 acquisition (DeKeyser 2005). Let us first look at acquisition of word orders. The "numeral + classifier + noun" structure in Chinese and the "noun + numeral + classifier" structure in Thai are not optional because the word order is fixed in each language. Also, numerals carrying [+/−NPmove] features cannot be alternatively present or absent.[50] Therefore, a form-function connection of word orders is quite transparent.

An acquisition process of L2 Chinese or Thai word orders is likely to be as follows. After an initial transfer, learners start to encounter a TL word order which is different from that in their L1. They will, then, make a mental note about a presence of the TL structure and an absence of an L1-like structure in applicable contexts (i.e. contexts where a numeral is used with a noun), as

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[50] As mentioned in Section 2.2, the only case where a numeral might be absent in the structures is when the numeral is "one", i.e. *yi* in Chinese and *nueng* in Thai. Nonetheless, the omission of "one" is also not optional (Li 2013, Chapter 9). Therefore, the fact that "one" may be absent in a certain context should not be used as evidence for lack of transparency of its related "numeral + classifier + noun" or "noun + numeral + classifier" structures.

well as count the number of occurrences of each structure. With a certain amount of input, they will notice that a probability of the TL structure being used in applicable contexts is almost 100%. At the same time, there is almost 0% probability of the L1-like structure in the same contexts.[51] Because word orders are not optional, the input they receive will keep confirming this observation. As a result, it does not take learners very long time to be certain that the observed TL structure is grammatical and the L1-like structure is ungrammatical.

On the other hand, collective markers can appear to be optional to learners. As the use of collective markers is based on speaker's perspectives, learners (who are listeners) cannot know with certainty whether referents are referred to as a group or not. Therefore, there may be times when learners assume that referents are referred to as a group and expect to hear a collective marker but do not hear it. This kind of superficial optionality leads to lack of transparency between the marker and its functions in learners' grammars. Based on this assumption, what happens during L2 acquisition of the [–animal] feature on Chinese collective marker *men* may be speculated as follows.[52] After an initial transfer of the [+animal] feature from Thai to Chinese, Thai learners will expect the marker to appear with animal nouns. However, they will not encounter the usage in Chinese input. At this point, the learners have two choices to analyse non-occurrence of "animal nouns + *men*", namely: 1) to take it as another instance of the optionality of the marker (i.e. believing that the marker is actually compatible with animal nouns, but a speaker just optionally omits it in a particular sentence); or 2) to take it as evidence that the marker is incompatible with animal nouns. Assuming that one instance of non-occurrence can be taken as supporting evidence for only one of the two analyses mentioned above, as long as some of the instances are assigned to the first category, the probability of the second category will not be as high as 100%. And without a sufficiently high probability, Thai learners may never be confident enough to consider the "animal noun + *men*" structure ungrammatical. This is why they fail to reject the [+animal] feature.

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[51] For a structure without any optionality, probabilities of a TL structure and an L1-like structure should be 100% and 0% respectively. However, as discussed in Section 2.2 and 6.2, the real language use is not perfectly absolute as there are some infrequent usages of a Chinese "noun + numeral + classifier" structure. Nonetheless, note that the usages are not optional because they are limited to certain contexts such as ancient Chinese and lists with formal writing styles, and its chance of occurrence is very low. Therefore, it should not affect our discussion here.

[52] Here, I use the [–animal] feature as an example. As the [–indefinite] feature is also related to *men* and also lacks form-function transparency, I believe its acquisition progresses in a similar manner.

Still, it is worth noting that there were two CnALs who were consistent in their rejection of test sentences which carried the [+animal] feature in Chinese Condition 2d. What exactly had helped them to overcome the optionality of the collective marker is an interesting topic for further studies, probably with a collection of longitudinal data to observe a changing point in learners' judgment. Available data in the current study unfortunately cannot provide an answer to the question.

To summarise our findings so far, it seems to be the case that when features are not transparent, it is more difficult for learners to apply probabilistic learning to L2 acquisition, leading to a late (or lack of) success in acquisition. Nonetheless, an attention may be called to the fact that form-function transparency is not the only difference between the [+/–NPmove], [+/–animal] and [+/–indefinite] features, and one may hypothesise that it is in fact a difference in feature types that caused such a discrepancy in acquisition outcomes. To elaborate, recall that [+/–NPmove] are syntactic features while [+/–animal] and [+/–indefinite] are semantic features. If it was the case that morphosyntactic features were inherently easy to acquire, then feature types might be what made learners in our study acquire [+/–NPmove] earlier than [–animal] and [–indefinite].

However, I would like to argue against such a hypothesis, as it is not difficult for one to find evidence that morphosyntactic features are not inherently easy to acquire. For example, although the English third person singular verb ending morpheme –s only carries morphosyntactic features such as [singular], not semantic or discourse features (Adger 2003, Chapter 2), it is not at all easy to acquire. Studies have found that even L2 learners with an advanced level of English still failed to use the morpheme consistently (Hironymous 1992; Picón Jara 2015). In other words, a morphosyntactic characteristic does not guarantee that a feature will be acquired early. Moreover, I would like to suggest that, instead of looking at feature types, we can actually find an explanation of why English –s is difficult to acquire using a concept of form-function transparency. Note that the morpheme is not only used as a third person singular marker on verbs, but also as a plural marker on nouns as well as a possessive marker and a contractible singular form of *to be* (written as *'s* in the last two cases). As the multiple usages create opacity in form-function connections related to the morpheme, its retrieval during sentence production becomes complicated, hence being difficult to acquire.

Let us now return to results in the current study. Our data not only show that form-function transparency has an effect on L2 acquisition under a lack of positive evidence (as discussed at the beginning of this section), but also on acquisition based on positive evidence. This can be seen by comparing our results from Chinese and Thai Condition 1b with Thai Condition 2d and 3b. These four conditions contain TL structures which can be acquired based on positive evidence, namely Chinese "numeral + classifier + noun", Thai "noun + numeral + classifier", "*phûak* + animal noun" and "*phûak* + indefinite noun" structures. What is different among them is that Chinese and Thai word orders (tested in Chinese and Thai Condition 1b) have a transparent form-function connection while Thai collective marker *phûak* (tested in Thai Condition 2d and 3b) does not have transparent features because of its superficial optionality.

Based on an effect of form-function transparency discussed above (i.e. the less transparent, the more difficult), it is predicted to be easier for learners to perform native-like on word orders than on *phûak*. This is confirmed by our results. In particular, both Chinese and Thai learners performed well on sentences with correct TL word orders in Condition 1b since they were at an intermediate level (see data from CnILs and ThILs in Table 15). They demonstrated consistent acceptance of test sentences (shown by AJT consistency data) at an acceptance level which is comparable to that of a control condition (shown by AJT mean scores and AJT ANOVA data). In contrast, for acquisition of *phûak*, intermediate learners' (ThILs) scores to Thai Condition 2d and 3b are significantly lower than their scores to control conditions (shown by AJT T-test data). This kind of non-native-like acceptance also existed among advanced learners (ThALs), indicating that they still could not completely accept sentences with "*phûak* + animal nouns" or "*phûak* + indefinite nouns".

As for an explanation in terms of acquisition process, it is speculated that after an initial transfer of [−animal] and [−indefinite] features from *men* to *phûak*, Chinese learners will begin to receive input containing usages of the Thai marker with animal or indefinite nouns. With this, they will start to hypothesise about the presence of [+animal] and [+indefinite] features in the TL and test this hypothesis by observing the use of *phûak* in upcoming contexts in which indefinite or animal nouns are referred to as a group. If they indeed hear *phûak*, the features will be confirmed and gain more strength. But if they do not hear it, the presence of those features may be questioned and their strength will be lowered. The latter situation can happen when learners understand that particular noun referents are mentioned in a collective manner and expected to

hear *phûak* but do not hear it. As a result, the rate of confirmation of the [+animal] and [+indefinite] features may never reach a 100% level, and the learners will not be completely certain about the features.

6.4 Relative effects of factors on L2 acquisition

In previous sections, we saw that L2 acquisition can be affected by different factors which include (but are not limited to) availability of positive evidence and form-function transparency. In this section, I would like to elaborate on the fact that effects of these factors are not across the board. As we have seen, despite a facilitating effect of positive evidence, features that generate positive evidence to learners are not necessarily easy to acquire (see learners' non-native-like performance on *phûak* in Thai Condition 2d and 3b under the AJT T-test criterion, as summarised in Table 15 in Chapter 5). Meanwhile, L2 acquisition that does not rely on positive evidence is not destined to fail (see advanced learners' native-like performance under all criteria of Condition 1c in both Chinese and Thai). Likewise, although form-function transparency has a facilitating effect in general, features with transparent form-function connection are not guaranteed to be acquired at an early stage (again, see Condition 1c in which beginning and intermediate learners still failed to perform native-like under some criteria). Less transparent features, on the other hand, also have a chance to be acquired (see advanced learners' native-like performance under the AJT consistency, AJT mean score and SPR T-test criteria of Thai Condition 2d and 3b). In short, our results indicate that availability of positive evidence and form-function transparency indeed have a broad effect on ease or difficulty of L2 acquisition, but they do not necessarily determine its success or failure.

A relative effect of factors in L2 acquisition can also be articulated in terms of interaction between availability of positive evidence and form-function transparency. Let us compare [+/–NPmove] features (in Chinese Condition 1c and Thai Condition 1c) with [–animal] and [–indefinite] features (in Chinese Condition 2d and 3b) as an example. These four conditions all test acquisition of features under lack positive evidence. However, features in Condition 1c have a transparent form-function connection while those in Condition 2d and 3b are less transparent. When two non-facilitating factors are present on the same feature, as in the case of the [–animal] and [–indefinite] features which lack positive evidence and are not transparent, it is particularly difficult for learners to successfully acquire a correct usage. This is likely to be why almost all

advanced learners (CnALs) could not perform native-like in these two conditions. On the other hand, when one of the factors is non-facilitating (e.g. lack of positive evidence) but the other one is facilitating (e.g. high transparency), the features are not as difficult to acquire. This can be seen by successful acquisition of word orders by advanced learners (CnALs and ThALs) in Condition 1c in their respective TL.

To sum up, a relative effect of the two factors observed in our data supports a view that success or failure in L2 acquisition depends on a number of variables (White 2011; Yuan 2010). Previous studies have shown that linguistic factors affecting a relative ease or difficulty of L2 acquisition include knowledge of previously known language(s), frequency of TL items, perceptual salience, semantic complexity, detectability of features in the speech signal, whether a feature represents a primary function of a lexical item, etc. (Cho 2012; Cho & Slabakova 2014; Gass & Selinker 2008, Chapter 5; Slabakova & Gajdos 2008; Yuan 2010). The current study shows that availability of positive evidence and form-function transparency can also affect acquisition outcomes. As many factors can play a role in L2 acquisition, it seems to be inappropriate to make across-the-board generalisations about acquisition outcomes based on a specific factor (White 2011). Nonetheless, with more research like the current study, we can have a clearer picture about effects of each factor as well as their interaction. And with these results combined, we should be able to make more accurate predictions about learners' behaviour and develop a more precise theory about L2 acquisition.

6.5 Summary

Based on learners' behaviour and characteristics of features in the empirical study, effects of positive evidence, indirect negative evidence and form-function transparency can be summarised as follows:

1. Positive evidence (i.e. linguistic data to which learners are exposed) has a facilitating role in L2 acquisition. Learners tend to acquire TL features and structures relatively early when positive evidence is available in TL input.

2. When positive evidence is not available, it is unlikely that L2 learners can successfully acquire features or structures at an early stage of acquisition. However, it is not necessary that the features will become dormant (cf. Yuan 2014).

3. When positive evidence is unavailable, learners may use a probabilistic learning strategy to acquire TL features or structures by calculating a probability of occurrence of each structure in applicable contexts. With enough data, they can take a lack of occurrence of certain structures as indirect negative evidence indicating that the structures are ungrammatical.

4. As probabilistic learning relies on calculation based on the number of examples that learners receive from the input, this type of learning can take time.

5. L2 learners tend to acquire TL features relatively early when a form-function connection on lexical items is transparent, such as when a structure has a fixed word order or when lexical items are not perceived as optionally present or absent.

6. Success or failure in L2 acquisition depends on a number of variables and there is an interaction between factors affecting L2 acquisition.

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Appendices

All test sentences are listed below along with their phonetic transcription, English gloss and English translation. In the experiment, these sentences were presented in their native scripts, i.e. Chinese characters or Thai alphabets, as shown in the first row of each sentence.

Appendix A – List of Chinese test sentences

Chinese Condition 1a

- 明天　　　小李　会　带　　孩子　去　医院　　看病
  mingtian　Xiaoli　hui　dai　　haizi　qu　yiyuan　　kanbing
  tomorrow　Xiaoli　will　bring　child　go　hospital　see-doctor
  "Tomorrow Xiaoli will take (her) child(ren) to see a doctor at a hospital."

- 明天　　　小李　会　陪　　　朋友　　去　商店　　　购物
  mingtian　Xiaoli　hui　pei　　pengyou　qu　shangdian　gouwu
  tomorrow　Xiaoli　will　go-with　friend　go　store　　shop
  "Tomorrow Xiaoli will go shopping at stores with (her) friend(s)."

- 明年　　　小王　　会　陪　　同学　　去　工厂　　　实习
  mingnian　Xiaowang　hui　pei　　tongxue　qu　gongchang　shixi
  next-year　Xiaowang　will　go-with　classmate　go　factory　do-fieldwork
  "Next year Xiaowang will go to do a fieldwork at a factory with (his) classmate(s)."

- 明年　　　校长　　会　派　老师　　去　中国　　开会
  mingnian　xiaozhang　hui　pai　laoshi　qu　zhongguo　kaihui
  next-year　principal　will　send　teacher　go　China　　attend-meeting
  "Next year the principal will send (a) teacher(s) to attend a meeting in China."

- 明晚　　　　　小李　会　请　同学　　　去　饭店　　吃饭
  mingwan　　　Xiaoli　hui　qing　tongxue　qu　fandian　chifan
  tomorrow-evening　Xiaoli　will　invite　classmate　go　restaurant　eat-rice
  "Tomorrow evening Xiaoli will invite (her) classmate(s) to have a meal at a restaurant."

- 明天　　小李　会　陪　　朋友　　去　寺庙　拜佛

  mingtian　Xiaoli　hui　pei　　pengyou　qu　simiao　baifo

  tomorrow　Xiaoli　will　go-with　friend　　go　temple　pray-to-Buddha

  "Tomorrow Xiaoli will go to a temple to pray to Buddha with (her) friend(s)."

- 明年　　小王　　会　陪　　朋友　　去　中国　　旅行

  mingnian　Xiaowang　hui　pei　　pengyou　qu　zhongguo　lüxing

  next-year　Xiaowang　will　go-with　friend　　go　China　　travel

  "Next year Xiaowang will go to travel in China with (his) friend(s)."

- 明年　　校长　　会　派　老师　　去　美国　　　学习

  mingnian　xiaozhang　hui　pai　laoshi　　qu　meiguo　　xuexi

  next-year　principal　will　send　teacher　go　United States　study

  "Next year the principal will send (a) teacher(s) to study in the United States."

- 明天　　小王　　会　请　同学　　去　剧院　看戏

  mingtian　Xiaowang　hui　qing　tongxue　　qu　juyuan　kanxi

  tomorrow　Xiaowang　will　invite　classmate　go　theatre　watch-a-play

  "Tomorrow Xiaowang will invite (his) classmate(s) to watch a play at a theatre."

- 明天　　小明　　会　陪　　朋友　　去　公园　　踢球

  mingtian　Xiaoming　hui　pei　　pengyou　qu　gongyuan　tiqiu

  tomorrow　Xiaoming　will　go-with　friend　　go　park　　kick-ball

  "Tomorrow Xiaoming will go to play football in a park with (his) friend(s)."

- 明天　　小李　会　带　　孩子　去　学校　　上学

  mingtian　Xiaoli　hui　dai　　haizi　qu　xuexiao　shangxue

  tomorrow　Xiaoli　will　bring　child　go　school　　attend-school

  "Tomorrow Xiaoli will take (her) child(ren) to school."

- 明年　　校长　　会　派　学生　　去　外国　　　　实习

  mingnian　xiaozhang　hui　pai　xuesheng　qu　waiguo　　　shixi

  next-year　principal　will　send　student　　go　foreign-country　do-fieldwork

  "Next year the principal will send (a) student(s) to do a fieldwork in a foreign country."

Chinese Condition 1b

- 明天　　小李　会　带　三　个　孩子　去　医院　　看病

  mingtian　Xiaoli　hui　dai　san　ge　haizi　qu　yiyuan　kanbing

  tomorrow　Xiaoli　will　bring　three　CL　child　go　hospital　see-doctor

  "Tomorrow Xiaoli will take three children to see a doctor at a hospital."

- 明天　　小李　会　陪　　三　个　朋友　　去　商店　　　购物

  mingtian　Xiaoli　hui　pei　　san　ge　pengyou　qu　shangdian　gouwu

  tomorrow　Xiaoli　will　go-with　three　CL　friend　　go　store　　　shop

  "Tomorrow Xiaoli will go shopping at stores with three friends."

- 明年　　小王　　会　陪　　四　个　同学　　去　工厂　　实习

  mingnian　Xiaowang　hui　pei　　si　ge　tongxue　qu　gongchang　shixi

  next-year　Xiaowang　will　go-with　four　CL　classmate　go　factory　　do-fieldwork

  "Next year Xiaowang will go to do a fieldwork at a factory with four classmates."

- 明年　　校长　　会　派　五　个　老师　去　中国　　开会

  mingnian　xiaozhang　hui　pai　wu　ge　laoshi　qu　zhongguo　kaihui

  next-year　principal　will　send　five　CL　teacher　go　China　　attend-meeting

  "Next year the principal will send five teachers to attend a meeting in China."

- 明晚　　　小李　会　请　十　个　同学　　去　饭店　　吃饭

  mingwan　　Xiaoli　hui　qing　shi　ge　tongxue　qu　fandian　chifan

  tomorrow-evening　Xiaoli　will　invite　ten　CL　classmate　go　restaurant　eat-rice

  "Tomorrow evening Xiaoli will invite ten classmates to have a meal at a restaurant."

- 明天　　小李　会　陪　　四　个　朋友　　去　寺庙　拜佛

  mingtian　Xiaoli　hui　pei　　si　ge　pengyou　qu　simiao　baifo

  mingtian　Xiaoli　hui　pei　　si　ge　pengyou　qu　simiao　baifo

  tomorrow　Xiaoli　will　go-with　four　CL　friend　　go　temple　pray-to-Buddha

  "Tomorrow Xiaoli will go to a temple to pray to Buddha with four friends."

- 明年　　小王　　会　陪　　三　个　朋友　　去　中国　　旅行

  mingnian　Xiaowang　hui　pei　　san　ge　pengyou　qu　zhongguo　lüxing

  next-year　Xiaowang　will　go-with　three　CL　friend　　go　China　　travel

  "Next year Xiaowang will go to travel in China with three friends."

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- 明年　　　校长　　　会　派　八　　个　老师　　去　美国　　　　学习

  mingnian　Xiaozhang　hui　pai　ba　　ge　laoshi　　qu　meiguo　　　　xuexi

  next-year　principal　　will　send　eight　CL　teacher　go　United States　study

  "Next year the principal will send eight teachers to study in the United States."

- 明天　　　小王　　　会　请　十　个　同学　　　去　剧院　看戏

  mingtian　Xiaowang　hui　qing　shi　ge　tongxue　　qu　juyuan　kanxi

  tomorrow　Xiaowang　will　invite　ten　CL　classmate　go　theatre　watch-a-play

  "Tomorrow Xiaowang will invite ten classmates to watch a play at a theatre."

- 明天　　　小明　　　会　陪　四　　个　朋友　　去　公园　　　踢球

  mingtian　Xiaoming　hui　pei　si　　ge　pengyou　qu　gongyuan　tiqiu

  tomorrow　Xiaoming　will　go-with　four　CL　friend　　go　park　　　kick-ball

  "Tomorrow Xiaoming will go to play football in a park with four friends."

- 明天　　　小李　会　带　三　　个　孩子　去　学校　　上学

  mingtian　Xiaoli　hui　dai　san　　ge　haizi　qu　xuexiao　shangxue

  tomorrow　Xiaoli　will　bring　three　CL　child　go　school　attend-school

  "Tomorrow Xiaoli will take three children to school."

- 明年　　　校长　　　会　派　七　　个　学生　　　去　外国　　　　实习

  mingnian　xiaozhang　hui　pai　qi　　ge　xuesheng　qu　waiguo　　　　shixi

  next-year　principal　　will　send　seven　CL　student　　go　foreign-country　do-fieldwork

  "Next year the principal will send seven students to do a fieldwork in a foreign country."

Chinese Condition 1c *

*　明天　　　小李　会　带　孩子　三　　个　去　医院　　看病

　mingtian　Xiaoli　hui　dai　haizi　san　　ge　qu　yiyuan　　kanbing

　tomorrow　Xiaoli　will　bring　child　three　CL　go　hospital　see-doctor

　"Tomorrow Xiaoli will take three children to see a doctor at a hospital."

*　明天　　　小李　会　陪　朋友　　三　　个　去　商店　　　购物

　mingtian　Xiaoli　hui　pei　pengyou　san　　ge　qu　shangdian　gouwu

　tomorrow　Xiaoli　will　go-with　friend　　three　CL　go　store　　　shop

　"Tomorrow Xiaoli will go shopping at stores with three friends."

* 明年　　　小王　　　会　陪　　　同学　　　四　个　去　工厂　　　实习

mingnian　Xiaowang　hui　pei　　tongxue　　si　ge　qu　gongchang　shixi

next-year　Xiaowang　will　go-with　classmate　four　CL　go　factory　　do-fieldwork

"Next year Xiaowang will go to do a fieldwork at a factory with four classmates."

* 明年　　　校长　　　会　派　老师　　五　个　去　中国　　　开会

mingnian　xiaozhang　hui　pai　laoshi　wu　ge　qu　zhongguo　kaihui

next-year　principal　will　send　teacher　five　CL　go　China　　attend-meeting

"Next year the principal will send five teachers to attend a meeting in China."

* 明晚　　　　　　小李　会　请　　同学　　　十　个　去　饭店　　吃饭

mingwan　　　　Xiaoli　hui　qing　tongxue　　shi　ge　qu　fandian　chifan

tomorrow-evening　Xiaoli　will　invite　classmate　ten　CL　go　restaurant　eat-rice

"Tomorrow evening Xiaoli will invite ten classmates to have a meal at a restaurant."

* 明天　　　小李　会　陪　　　朋友　　　四　个　去　寺庙　　拜佛

mingtian　Xiaoli　hui　pei　　pengyou　　si　ge　qu　simiao　baifo

tomorrow　Xiaoli　will　go-with　friend　　four　CL　go　temple　pray-to-Buddha

"Tomorrow Xiaoli will go to a temple to pray to Buddha with four friends."

* 明年　　　小王　　　会　陪　　　朋友　　　三　个　去　中国　　旅行

mingnian　Xiaowang　hui　pei　　pengyou　　san　ge　qu　zhongguo　lüxing

next-year　Xiaowang　will　go-with　friend　　three　CL　go　China　　travel

"Next year Xiaowang will go to travel in China with three friends."

* 明年　　　校长　　　会　派　老师　　八　个　去　美国　　　学习　明年

mingnian　Xiaozhang　hui　pai　laoshi　ba　ge　qu　meiguo　　xuexi

next-year　principal　will　send　teacher　eight　CL　go　United States　study

"Next year the principal will send eight teachers to study in the United States."

* 明天　　　小王　　　会　请　　同学　　　十　个　去　剧院　　看戏

mingtian　Xiaowang　hui　qing　tongxue　　shi　ge　qu　juyuan　kanxi

tomorrow　Xiaowang　will　invite　classmate　ten　CL　go　theatre　watch-a-play

"Tomorrow Xiaowang will invite ten classmates to watch a play at a theatre."

* 明天　　　小明　　　会　陪　　　朋友　　　四　个　去　公园　　　踢球

mingtian　Xiaoming　hui　pei　　pengyou　si　ge　qu　gongyuan　tiqiu

tomorrow　Xiaoming　will　go-with　friend　　four　CL　go　park　　　kick-ball

"Tomorrow Xiaoming will go to play football in a park with four friends."

* 明天　　　小李　会　带　　孩子　三　　个　去　学校　　　上学

mingtian　Xiaoli　hui　dai　haizi　san　ge　qu　xuexiao　shangxue

tomorrow　Xiaoli　will　bring　child　three　CL　go　school　　attend-school

"Tomorrow Xiaoli will take three children to school."

* 明年　　　校长　　　会　派　　学生　　　七　　个　去　外国　　　　实习

mingnian　xiaozhang　hui　pai　xuesheng　qi　　ge　qu　waiguo　　shixi

next-year　principal　will　send　student　　seven　CL　go　foreign-country　do-fieldwork

"Next year the principal will send seven students to do a fieldwork in a foreign country."

Chinese Condition 2a

• 校长　　　　认为　　这些　　　学生　　　特别　　聪明

xiaozhang　renwei　zhe-xie　xuesheng　tebie　congming

principal　　think　　this-few　student　　very　clever

"The principal thinks these students are very clever."

• 医生　　认为　　这些　　　孩子　非常　　　健康

yisheng　renwei　zhe-xie　haizi　feichang　jiankang

doctoc　think　　this-few　child　very　　　healthy

"The doctor thinks these children are very healthy."

• 妈妈　　认为　　那些　　　孩子　特别　有趣

mama　renwei　na-xie　haizi　tebie　youqu

mother　think　　that-few　child　very　interesting

"My mother thinks those children are very interesting."

• 小李　觉得　这些　　　老师　　非常　　年轻

Xiaoli　juede　zhe-xie　laoshi　feichang　nianqing

Xiaoli　think　this-few　teacher　very　　　young

"Xiaoli thinks these teachers are very young."

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- 姐姐　　　觉得　那些　　孩子　非常　　可爱
  jiejie　　　juede　na-xie　haizi　feichang　ke'ai
  older-sister　think　that-few　child　very　cute
  "My older sister thinks those children are very cute."

- 小王　　　觉得　那些　　老师　　非常　　漂亮
  Xiaowang　juede　na-xie　laoshi　feichang　piaoliang
  Xiaowang　think　that-few　teacher　very　pretty
  "Xiaowang thinks those teachers are very pretty."

- 老师　　认为　　这些　　学生　　　非常　　听话
  laoshi　renwei　zhe-xie　xuesheng　feichang　tinghua
  teacher　think　this-few　student　very　obedient
  "The teacher thinks these students are very obedient."

- 校长　　　认为　　那些　　学生　　非常　　努力
  xiaozhang　renwei　na-xie　xuesheng　feichang　nuli
  principal　think　that-few　student　very　diligent
  "The principal thinks those students are very diligent."

- 老师　　觉得　那些　　学生　　特别　活泼
  laoshi　juede　na-xie　xuesheng　tebie　huopo
  teacher　think　that-few　student　very　lively
  "The teacher thinks those students are very lively."

- 校长　　　认为　　这些　　老师　　非常　　能干
  xiaozhang　renwei　zhe-xie　laoshi　feichang　nenggan
  principal　think　this-few　teacher　very　competent
  "The principal thinks these teachers are very competent."

- 妈妈　　觉得　这些　　孩子　非常　　优秀
  mama　juede　zhe-xie　haizi　feichang　youxiu
  mother　think　this-few　child　very　outstanding
  "My mother thinks these children are very outstanding."

- 校长　　　认为　　　这些　　　老师　　非常　　　努力
  xiaozhang　renwei　zhe-xie　laoshi　feichang　nuli
  principal　think　this-few　teacher　very　diligent
  "The principal thinks these teachers are very diligent."

Chinese Condition 2b

- 校长　　　认为　　　这些　　　学生们　　　特别　聪明
  xiaozhang　renwei　zhe-xie　xuesheng-men　tebie　congming
  principal　think　this-few　student-*men*　very　clever
  "The principal thinks these students are very clever."

- 医生　　认为　　这些　　孩子们　　非常　　健康
  yisheng　renwei　zhe-xie　haizi-men　feichang　jiankang
  doctoc　think　this-few　child-*men*　very　healthy
  "The doctor thinks these children are very healthy."

- 妈妈　　认为　　那些　　孩子们　　特别　有趣
  mama　renwei　na-xie　haizi-men　tebie　youqu
  mother　think　that-few　child-*men*　very　interesting
  "My mother thinks those children are very interesting."

- 小李　觉得　这些　　老师们　　非常　　年轻
  Xiaoli　juede　zhe-xie　laoshi-men　feichang　nianqing
  Xiaoli　think　this-few　teacher-*men*　very　young
  "Xiaoli thinks these teachers are very young."

- 姐姐　　觉得　那些　　孩子们　　非常　　可爱
  jiejie　juede　na-xie　haizi-men　feichang　ke'ai
  older-sister　think　that-few　child-*men*　very　cute
  "My older sister thinks those children are very cute."

- 小王　　觉得　那些　　老师们　　非常　　漂亮
  Xiaowang　juede　na-xie　laoshi-men　feichang　piaoliang
  Xiaowang　think　that-few　teacher-*men*　very　pretty
  "Xiaowang thinks those teachers are very pretty."

- 老师　　认为　　这些　　学生们　　　　非常　　听话

  laoshi　renwei　zhe-xie　xuesheng-men　feichang　tinghua

  teacher　think　this-few　student-*men*　very　obedient

  "The teacher thinks these students are very obedient."

- 校长　　　认为　　那些　　学生们　　　　非常　　努力

  xiaozhang　renwei　na-xie　xuesheng-men　feichang　nuli

  principal　think　that-few　student-*men*　very　diligent

  "The principal thinks those students are very diligent."

- 老师　　觉得　　那些　　学生们　　　　特别　活泼

  laoshi　juede　na-xie　xuesheng-men　tebie　huopo

  teacher　think　that-few　student-*men*　very　lively

  "The teacher thinks those students are very lively."

- 校长　　　认为　　这些　　老师们　　　非常　　能干

  xiaozhang　renwei　zhe-xie　laoshi-men　feichang　nenggan

  principal　think　this-few　teacher-*men*　very　competent

  "The principal thinks these teachers are very competent."

- 妈妈　　觉得　　这些　　孩子们　　　非常　　优秀

  mama　juede　zhe-xie　haizi-men　feichang　youxiu

  mother　think　this-few　child-*men*　very　outstanding

  "My mother thinks these children are very outstanding."

- 校长　　　认为　　这些　　老师们　　　非常　　努力

  xiaozhang　renwei　zhe-xie　laoshi-men　feichang　nuli

  principal　think　this-few　teacher-*men*　very　diligent

  "The principal thinks these teachers are very diligent."

Chinese Condition 2c

- 爸爸　　觉得　　这些　　动物　　比较　　聪明

  baba　juede　zhe-xie　dongwu　bijiao　congming

  father　think　this-few　animal　quite　clever

  "My father thinks these animals are quite clever."

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- 姐姐　　　觉得　这些　　狮子　特别　可怕

  jiejie　　　juede　zhe-xie　shizi　tebie　kepa

  older-sister　think　this-few　lion　very　frightening

  "My older sister thinks these lions are very frightening."

- 小王　　　觉得　那些　　猴子　　比较　聪明

  Xiaowang　juede　na-xie　　houzi　　bijiao　congming

  Xiaowang　think　that-few　monkey　quite　clever

  "Xiaowang thinks those monkeys are quite clever."

- 小明　　　认为　那些　　虫子　　非常　　讨厌

  Xiaoming　renwei　na-xie　　chongzi　feichang　taoyan

  Xiaoming　think　that-few　insect　very　　disgusting

  "Xiaoming thinks those insects are very disgusting."

- 小张　　　认为　那些　　老虎　比较　可怕

  Xiaozhang　renwei　na-xie　　laohu　bijiao　kepa

  Xiaozhang　think　that-few　tiger　quite　frightening

  "Xiaozhang thinks those tigers are quite frightening."

- 妹妹　　　　觉得　那些　　老鼠　　非常　　恶心

  meimei　　　juede　na-xie　laoshu　feichang　exin

  younger-sister　think　that-few　mouse　very　　nauseating

  "My younger sister thinks those mice are very nauseating."

- 姐姐　　　觉得　这些　　猴子　　比较　难看

  jiejie　　　juede　zhe-xie　houzi　　bijiao　nankan

  older-sister　think　this-few　monkey　quite　ugly

  "My older sister thinks these monkeys are quite ugly."

- 小李　认为　那些　　老鼠　特别　讨厌

  Xiaoli　renwei　na-xie　laoshu　tebie　taoyan

  Xiaoli　think　that-few　mouse　very　disgusting

  "Xiaoli thinks those mice are very disgusting."

- 哥哥　　　　觉得　这些　　　蚊子　　　特别　讨厌

  gege　　　　juede　zhe-xie　wenzi　　tebie　taoyan

  older-brother　think　this-few　mosquito　very　disgusting

  "My older brother thinks these mosquitoes are very disgusting."

- 小李　觉得　这些　　　青蛙　　十分　难看

  Xiaoli　juede　zhe-xie　qingwa　shifen　nankan

  Xiaoli　think　this-few　frog　　　very　　ugly

  "Xiaoli thinks these frogs are very ugly."

- 姐姐　　　　觉得　那些　　　虫子　　　特别　难看

  jiejie　　　juede　na-xie　　chongzi　tebie　nankan

  older-sister　think　that-few　insect　　very　ugly

  "My older sister thinks those insects are very ugly."

- 妈妈　　认为　　这些　　动物　　特别　可怕

  mama　　renwei　zhe-xie　dongwu　tebie　kepa

  mother　think　　this-few　animal　　very　frightening

  "My mother thinks these animals are very frightening."

Chinese Condition 2d *

*　爸爸　觉得　这些　　　动物们　　　比较　聪明

　baba　juede　zhe-xie　dongwu-men　bijiao　congming

　father　think　this-few　animal-*men*　quite　clever

　"My father thinks these animals are quite clever."

*　姐姐　　　　觉得　这些　　狮子们　　特别　可怕

　jiejie　　　juede　zhe-xie　shizi-men　tebie　kepa

　older-sister　think　this-few　lion-*men*　very　frightening

　"My older sister thinks these lions are very frightening."

*　小王　　　觉得　那些　　猴子们　　　比较　聪明

　Xiaowang　juede　na-xie　houzi-men　bijiao　congming

　Xiaowang　think　that-few　monkey-*men*　quite　clever

　"Xiaowang thinks those monkeys are quite clever."

* 小明　　　认为　　那些　　　虫子们　　　非常　　　讨厌

Xiaoming　renwei　na-xie　chongzi-men　feichang　taoyan

Xiaoming　think　that-few　insect-*men*　very　disgusting

"Xiaoming thinks those insects are very disgusting."

* 小张　　　认为　　那些　　老虎们　　比较　可怕

Xiaozhang　renwei　na-xie　laohu-men　bijiao　kepa

Xiaozhang　think　that-few　tiger-*men*　quite　frightening

"Xiaozhang thinks those tigers are quite frightening."

* 妹妹　　　　觉得　那些　　老鼠们　　　非常　　恶心

meimei　　juede　na-xie　laoshu-men　feichang　exin

younger-sister　think　that-few　mouse-*men*　very　nauseating

"My younger sister thinks those mice are very nauseating."

* 姐姐　　　觉得　这些　　猴子们　　比较　难看

jiejie　　juede　zhe-xie　houzi-men　bijiao　nankan

older-sister　think　this-few　monkey-*men*　quite　ugly

"My older sister thinks these monkeys are quite ugly."

* 小李　认为　那些　　老鼠们　　特别　讨厌

Xiaoli　renwei　na-xie　laoshu-men　tebie　taoyan

Xiaoli　think　that-few　mouse-*men*　very　disgusting

"Xiaoli thinks those mice are very disgusting."

* 哥哥　　　觉得　这些　　蚊子们　　　特别　讨厌

gege　　juede　zhe-xie　wenzi-men　tebie　taoyan

older-brother　think　this-few　mosquito-*men*　very　disgusting

"My older brother thinks these mosquitoes are very disgusting."

* 小李　觉得　这些　　青蛙们　　十分　难看

Xiaoli　juede　zhe-xie　qingwa-men　shifen　nankan

Xiaoli　think　this-few　frog-*men*　very　ugly

"Xiaoli thinks these frogs are very ugly."

* 姐姐　　　觉得　那些　　虫子们　　　特别　难看

jiejie　　　juede　na-xie　chongzi-men　tebie　nankan

older-sister　think　that-few　insect-*men*　very　ugly

　"My older sister thinks those insects are very ugly."

* 妈妈　　认为　　这些　　　动物们　　　特别　可怕

mama　　renwei　zhe-xie　dongwu-men　tebie　kepa

mother　think　this-few　animal-*men*　very　frightening

　"My mother thinks these animals are very frightening."

Chinese Condition 3a

• 校长　　　刚才　　看见　有　学生　　在　公园　　里　踢球

xiaozhang　gangcai　kanjian　you　xuesheng　zai　gongyuan　li　tiqiu

principal　just　　see　have　student　at　park　　　in　kick-ball

"The principal just saw that there was/were (a) student(s) playing football in the park."

• 校长　　　刚才　　看见　有　老师　　在　剧院　里　看戏

xiaozhang　gangcai　kanjian　you　laoshi　zai　juyuan　li　kanxi

principal　just　　see　have　teacher　at　theatre　in　watch-a-play

"The principal just saw that there was/were (a) teacher(s) watching a play in the theatre."

• 校长　　　刚才　　看见　有　老师　　在　医院　里　看病

xiaozhang　gangcai　kanjian　you　laoshi　zai　yiyuan　li　kanbing

principal　just　　see　have　teacher　at　hospital　in　see-doctor

"The principal just saw that there was/were (a) teacher(s) seeing a doctor in the hospital."

• 妈妈　　刚才　　看见　有　孩子　在　公园　　里　踢球

mama　　gangcai　kanjian　you　haizi　zai　gongyuan　li　tiqiu

principal　just　　see　have　child　at　park　　in　kick-ball

"My mother just saw that there was/were (a) child(ren) playing football in the park."

• 校长　　　刚才　　看见　有　老师　　在　餐厅　　里　吃饭

xiaozhang　gangcai　kanjian　you　laoshi　zai　canting　li　chifan

principal　just　　see　have　teacher　at　restaurant　in　eat-rice

"The principal just saw that there was/were (a) teacher(s) eating in the restaurant."

- 校长　　　刚才　　看见　　有　　学生　　　在　教室　　　里　吃饭

  xiaozhang　gangcai　kanjian　you　xuesheng　zai　jiaoshi　li　chifan

  principal　just　　see　　have　student　at　classroom　in　eat-rice

  "The principal just saw that there was/were (a) student(s) eating in the classroom."

- 小王　　　刚才　　看见　　有　　学生　　　在　教室　　　里　睡觉

  Xiaowang　gangcai　kanjian　you　xuesheng　zai　jiaoshi　li　shuijiao

  Xiaowang　just　　see　　have　student　at　classroom　in　sleep

  "Xiaowang just saw that there was/were (a) student(s) sleeping in the classroom."

- 爸爸　　刚才　　看见　　有　　孩子　在　公园　　　里　打架

  baba　　gangcai　kanjian　you　haizi　zai　gongyuan　li　dajia

  father　just　　see　　have　child　at　park　　　in　fight

  "My father just saw that there was/were (a) child(ren) fighting in the park."

- 妈妈　　刚才　　看见　　有　　孩子　在　学校　　　里　打架

  mama　　gangcai　kanjian　you　haizi　zai　xuexiao　li　dajia

  mother　just　　see　　have　child　at　school　　in　fight

  "My mother just saw that there was/were (a) child(ren) fighting in the school."

- 爸爸　　刚才　　看见　　有　　孩子　在　教室　　　里　唱歌

  baba　　gangcai　kanjian　you　haizi　zai　jiaoshi　li　changge

  father　just　　see　　have　child　at　classroom　in　sing

  "My father just saw that there was/were (a) child(ren) singing in the classroom."

- 小李　　刚才　　看见　　有　　学生　　　在　寺庙　　里　拜佛

  Xiaoli　gangcai　kanjian　you　xuesheng　zai　simiao　li　baifo

  Xiaoli　just　　see　　have　student　at　temple　in　pray-to-Buddha

  "Xiaoli just saw that there was/were (a) student(s) praying to Buddha at the temple."

- 校长　　　刚才　　看见　　有　　老师　在　商店　　　里　购物

  xiaozhang　gangcai　kanjian　you　laoshi　zai　shangdian　li　gouwu

  principal　just　　see　　have　teacher　at　store　　　in　shop

  "The principal just saw that there was/were (a) teacher(s) shopping in the store."

Chinese Condition 3b *

* 校长   刚才   看见   有   学生们   在 公园   里 踢球

xiaozhang gangcai kanjian you xuesheng-men zai gongyuan li tiqiu

principal   just   see   have student-*men* at   park   in kick-ball

"The principal just saw that there were students playing football in the park."

* 校长   刚才   看见   有   老师们   在 剧院   里 看戏

xiaozhang gangcai kanjian you laoshi-men zai juyuan li kanxi

principal   just   see   have teacher-*men* at theatre in watch-a-play

"The principal just saw that there were teachers watching a play in the theatre."

* 校长   刚才   看见   有   老师们   在 医院   里 看病

xiaozhang gangcai kanjian you laoshi-men zai yiyuan li kanbing

principal   just   see   have teacher-*men* at hospital in see-doctor

"The principal just saw that there were teachers seeing a doctor in the hospital."

* 妈妈   刚才   看见   有   孩子们   在 公园   里 踢球

mama   gangcai kanjian you haizi-men zai gongyuan li tiqiu

principal just   see   have child-*men* at   park   in kick-ball

"My mother just saw that there were children playing football in the park."

* 校长   刚才   看见   有   老师们   在 餐厅   里 吃饭

xiaozhang gangcai kanjian you laoshi-men zai canting li chifan

principal   just   see   have teacher-*men* at restaurant in eat-rice

"The principal just saw that there were teachers eating in the restaurant."

* 校长   刚才   看见   有   学生们   在 教室   里 吃饭

xiaozhang gangcai kanjian you xuesheng-men zai jiaoshi li chifan

principal   just   see   have student-*men* at classroom in eat-rice

"The principal just saw that there were students eating in the classroom."

* 小王   刚才   看见   有   学生们   在 教室   里 睡觉

Xiaowang gangcai kanjian you xuesheng-men zai jiaoshi li shuijiao

Xiaowang just   see   have student-*men* at classroom in sleep

"Xiaowang just saw that there were students sleeping in the classroom."

* 爸爸　　刚才　　看见　　有　　孩子们　　在　公园　　里　打架

baba　　gangcai　kanjian　you　haizi-men　zai　gongyuan　li　dajia

father　just　　see　　have　child-*men*　at　park　　　in　fight

"My father just saw that there were children fighting in the park."

* 妈妈　　刚才　　看见　　有　　孩子们　　在　学校　　里　打架

mama　　gangcai　kanjian　you　haizi-men　zai　xuexiao　li　dajia

mother　just　　see　　have　child-*men*　at　school　　in　fight

"My mother just saw that there were children fighting in the school."

* 爸爸　　刚才　　看见　　有　　孩子们　　在　教室　　里　唱歌

baba　　gangcai　kanjian　you　haizi-men　zai　jiaoshi　　li　changge

father　just　　see　　have　child-*men*　at　classroom　in　sing

"My father just saw that there were children singing in the classroom."

* 小李　　刚才　　看见　　有　　学生们　　　在　寺庙　　里　拜佛

Xiaoli　gangcai　kanjian　you　xuesheng-men　zai　simiao　li　baifo

Xiaoli　just　　see　　have　student-*men*　　at　temple　in　pray-to-Buddha

"Xiaoli just saw that there were students praying to Buddha at the temple."

* 校长　　　刚才　　看见　　有　　老师们　　在　商店　　里　购物

xiaozhang　gangcai　kanjian　you　laoshi-men　zai　shangdian　li　gouwu

principal　just　　see　　have　teacher-*men*　at　store　　　in　shop

"The principal just saw that there were teachers shopping in the store."

Chinese Prerequisite A for test sentences in Set 3

- 有　　学生　　　在　教室　　　里　睡觉

you　xuesheng　zai　jiaoshi　　li　shuijiao

have　student　　at　classroom　in　sleep

"There is/are (a) student(s) sleeping in the classroom."

- 有　　孩子　在　公园　　　里　踢球

you　haizi　zai　gongyuan　li　tiqiu

have　child　at　park　　　in　kick-ball

"There is/are (a) child(ren) playing football in the park."

- 有　　老师　　在　餐厅　　　里　吃饭

  you　laoshi　zai　canting　li　chifan

  have　teacher　at　restaurant　in　eat-rice

  "There is/are (a) teacher(s) eating in a restaurant."

Chinese Prerequisite B for test sentences in Set 3 *

* 有　　这些　　学生　　　在　教室　　　里　睡觉

  you　zhe-xie　xuesheng　zai　jiaoshi　li　shuijiao

  have　this-few　student　at　classroom　in　sleep

  "These students are sleeping in the classroom."

* 有　　那些　　孩子　在　公园　　　里　踢球

  you　na-xie　haizi　zai　gongyuan　li　tiqiu

  have　that-few　child　at　park　　　in　kick-ball

  "Those students are playing football in the park."

* 有　　那些　　老师　　在　餐厅　　　里　吃饭

  you　na-xie　laoshi　zai　canting　li　chifan

  have　that-few　teacher　at　restaurant　in　eat-rice

  "Those teachers are eating in a restaurant."

Appendix B – List of Thai test sentences

Thai Condition 1a

- พรุ่งนี้　　สุดา　　จะ　พา　ลูก ๆ　　ไป　โรงพยาบาล

  phrûŋníi　sùʔdaa　càʔ　phaa　lûuklûuk　pay　rooŋpháyaabaan

  tomorrow　Suda　will　bring　child　　go　hospital

  "Tomorrow Suda will take (her) children to a hospital."

- ปีหน้า　　ครูใหญ่　　จะ　ส่ง　คุณครู　　　ไป　ประเทศจีน

  piinâa　khruuyày　càʔ　sòŋ　khunkhruu　pay　pràʔthêetciin

  next-year　principal　will　send　teacher　　go　China

  "Next year the principal will send (a) teacher(s) to China."

- ปีหน้า สมชาย จะ ส่ง ลูก ๆ ไป ต่างประเทศ

  piinâa sŏmchaay cà? sòŋ lûuklûuk pay tàaŋprà?thêet

  next-year Somchai will send child go foreign-country

  "Next year Somchai will send (his) children to a foreign country."

- ปีหน้า เจ้านาย จะ ส่ง พนักงาน ไป ต่างจังหวัด

  piinâa câwnaay cà? sòŋ phánákŋaan pay tàaŋcaŋwàt

  next-year boss will send employee go out-of-town

  "Next year the boss will send (an) employee(s) out of town."

- พรุ่งนี้ เจ้านาย จะ พา พนักงาน ไป ต่างจังหวัด

  phrûŋníi câwnaay cà? phaa phánákŋaan pay tàaŋcaŋwàt

  tomorrow boss will bring employee go out-of-town

  "Tomorrow the boss will take (an) employee(s) out of town."

- ปีหน้า มาลี จะ พา ลูก ๆ ไป ต่างประเทศ

  piinâa maalii cà? phaa lûuklûuk pay tàaŋprà?thêet

  next-year Mali will bring child go foreign-country

  "Next year Mali will take (her) children to a foreign country."

- ปีหน้า ครูใหญ่ จะ ชวน คุณครู ไป ประเทศจีน

  piinâa khruuyày cà? chuan khunkhru pay prà?thêetciin

  next-year principal will ask teacher go China

  "Next year the principal will ask (a) teacher(s) to go to China together."

- พรุ่งนี้ มานะ จะ พา ลูก ๆ ไป ต่างจังหวัด

  phrûŋníi maaná? cà? phaa lûuklûuk pay tàaŋcaŋwàt

  tomorrow Mana will bring child go out-of-town

  "Tomorrow Mana will take (his) children out of town."

- พรุ่งนี้ สมชาย จะ เชิญ คุณครู ไป ร้านอาหาร

  phrûŋníi sŏmchaay cà? chəən khunkhruu pay ráan?aahăan

  tomorrow Somchai will invite teacher go restaurant

  "Tomorrow Somchai will invite (a) teacher(s) to a restaurant."

- พรุ่งนี้   สมชาย   จะ   ชวน   เพื่อน ๆ   ไป   โรงภาพยนตร์

  phrûŋníi   sǒmchaay   càʔ   chuan   phɯ̂anphɯ̂an   pay   rooŋphâappháyon

  tomorrow   Somchai   will   ask   friend   go   cinema

  "Tomorrow Somchai will ask (his) friends to go to a cinema together."

- ปีหน้า   สุดา   จะ   ชวน   เพื่อน ๆ   ไป   ประเทศจีน

  piinâa   sùʔdaa   càʔ   chuan   phɯ̂anphɯ̂an   pay   pràʔthêetciin

  next-year   Suda   will   ask   friend   go   China

  "Next year Suda will ask (her) friends to go to China together."

- พรุ่งนี้   คุณครู   จะ   พา   นักเรียน   ไป   โรงพยาบาล

  phrûŋníi   khunkhruu   càʔ   phaa   nákrian   pay   rooŋpháyaabaan

  tomorrow   teacher   will   bring   student   go   hospital

  "Tomorrow the teacher will take (a) student(s) to a hospital."

Thai Condition 1b

- พรุ่งนี้   สุดา   จะ   พา   ลูก ๆ   สาม   คน   ไป   โรงพยาบาล

  phrûŋníi   sùʔdaa   càʔ   phaa   lûuklûuk   sǎam   khon   pay   rooŋpháyaabaan

  tomorrow   Suda   will   bring   child   three   CL   go   hospital

  "Tomorrow Suda will take three children to a hospital."

- ปีหน้า   ครูใหญ่   จะ   ส่ง   คุณครู   ห้า   คน   ไป   ประเทศจีน

  piinâa   khruuyày   càʔ   sòŋ   khunkhruu   hâa   khon   pay   pràʔthêetciin

  next-year   principal   will   send   teacher   five   CL   go   China

  "Next year the principal will send five teachers to China."

- ปีหน้า   สมชาย   จะ   ส่ง   ลูก ๆ   สาม   คน   ไป   ต่างประเทศ

  piinâa   sǒmchaay   càʔ   sòŋ   lûuklûuk   sǎam   khon   pay   tàaŋpràʔthêet

  next-year   Somchai   will   send   child   three   CL   go   foreign-country

  "Next year Somchai will send three children to a foreign country."

- ปีหน้า   เจ้านาย   จะ   ส่ง   พนักงาน   แปด   คน   ไป   ต่างจังหวัด

  piinâa   câwnaay   càʔ   sòŋ   phánákŋaan   pὲὲt   khon   pay   tàaŋcaŋwàt

  next-year   boss   will   send   employee   eight   CL   go   out-of-town

  "Next year the boss will send eight employees out of town."

- พรุ่งนี้   เจ้านาย   จะ   พา   พนักงาน   เก้า   คน   ไป   ต่างจังหวัด

  phrûŋníi   câwnaay   càʔ   phaa   phánákŋaan   kâw   khon   pay   tàaŋcaŋwàt

  tomorrow   boss   will   bring   employee   nine   CL   go   out-of-town

  "Tomorrow the boss will take nine employees out of town."

- ปีหน้า   มาลี   จะ   พา   ลูก ๆ   สอง   คน   ไป   ต่างประเทศ

  piinâa   maalii   càʔ   phaa   lûuklûuk   sɔ̌ɔŋ   khon   pay   tàaŋpràʔthêet

  next-year   Mali   will   bring   child   two   CL   go   foreign-country

  "Next year Mali will take two children to a foreign country."

- ปีหน้า   ครูใหญ่   จะ   ชวน   คุณครู   สอง   คน   ไป   ประเทศจีน

  piinâa   khruuyày   càʔ   chuan   khunkhru   sɔ̌ɔŋ   khon   pay   pràʔthêetciin

  next-year   principal   will   ask   teacher   two   CL   go   China

  "Next year the principal will ask two teachers to go to China together."

- พรุ่งนี้   มานะ   จะ   พา   ลูก ๆ   สอง   คน   ไป   ต่างจังหวัด

  phrûŋníi   maanáʔ   càʔ   phaa   lûuklûuk   sɔ̌ɔŋ   khon   pay   tàaŋcaŋwàt

  tomorrow   Mana   will   bring   child   two   CL   go   out-of-town

  "Tomorrow Mana will take two children out of town."

- พรุ่งนี้   สมชาย   จะ   เชิญ   คุณครู   สิบ   คน   ไป   ร้านอาหาร

  phrûŋníi   sǒmchaay   càʔ   chəən   khunkhruu   sìp   khon   pay   ráanʔaahǎan

  tomorrow   Somchai   will   invite   teacher   ten   CL   go   restaurant

  "Tomorrow Somchai will invite ten teachers to a restaurant."

- พรุ่งนี้   สมชาย   จะ   ชวน   เพื่อน ๆ   สิบ   คน   ไป   โรงภาพยนตร์

  phrûŋníi   sǒmchaay   càʔ   chuan   phɯ̂anphɯ̂an   sìp   khon   pay   rooŋphâappháyon

  tomorrow   Somchai   will   ask   friend   ten   CL   go   cinema

  "Tomorrow Somchai will ask ten friends to go to a cinema together."

- ปีหน้า   สุดา   จะ   ชวน   เพื่อน ๆ   ห้า   คน   ไป   ประเทศจีน

  piinâa   sùʔdaa   càʔ   chuan   phɯ̂anphɯ̂an   hâa   khon   pay   pràʔthêetciin

  next-year   Suda   will   ask   friend   five   CL   go   China

  "Next year Suda will ask five friends to go to China together."

• พรุ่งนี้ คุณครู จะ พา นักเรียน สิบ คน ไป โรงพยาบาล

phrûŋníi khunkhruu càʔ phaa nákrian sìp khon pay rooŋpháyaabaan

tomorrow teacher will bring student ten CL go hospital

"Tomorrow the teacher will take ten students to a hospital."

Thai Condition 1c *

* พรุ่งนี้ สุดา จะ พา สาม คน ลูก ๆ ไป โรงพยาบาล

phrûŋníi sùʔdaa càʔ phaa sǎam khon lûuklûuk pay rooŋpháyaabaan

tomorrow Suda will bring three CL child go hospital

"Tomorrow Suda will take three children to a hospital."

* ปีหน้า ครูใหญ่ จะ ส่ง ห้า คน คุณครู ไป ประเทศจีน

piinâa khruuyày càʔ sòŋ hâa khon khunkhruu pay pràʔthêetciin

next-year principal will send five CL teacher go China

"Next year the principal will send five teachers to China."

* ปีหน้า สมชาย จะ ส่ง สาม คน ลูก ๆ ไป ต่างประเทศ

piinâa sǒmchaay càʔ sòŋ sǎam khon lûuklûuk pay tàaŋpràʔthêet

next-year Somchai will send three CL child go foreign-country

"Next year Somchai will send three children to a foreign country."

* ปีหน้า เจ้านาย จะ ส่ง แปด คน พนักงาน ไป ต่างจังหวัด

piinâa câwnaay càʔ sòŋ pὲɛt khon phánákŋaan pay tàaŋcaŋwàt

next-year boss will send eight CL employee go out-of-town

"Next year the boss will send eight employees out of town."

* พรุ่งนี้ เจ้านาย จะ พา เก้า คน พนักงาน ไป ต่างจังหวัด

phrûŋníi câwnaay càʔ phaa kâw khon phánákŋaan pay tàaŋcaŋwàt

tomorrow boss will bring nine CL employee go out-of-town

"Tomorrow the boss will take nine employees out of town."

* ปีหน้า มาลี จะ พา สอง คน ลูก ๆ ไป ต่างประเทศ

piinâa maalii càʔ phaa sɔ̌ɔŋ khon lûuklûuk pay tàaŋpràʔthêet

next-year Mali will bring two CL child go foreign-country

"Next year Mali will take two children to a foreign country."

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* ปีหน้า ครูใหญ่ จะ ชวน สอง คน คุณครู ไป ประเทศจีน

  piinâa khruuyày cà? chuan sɔ̌ɔŋ khon khunkhru pay prà?thêetciin

  next-year principal will ask two CL teacher go China

  "Next year the principal will ask two teachers to go to China together."

* พรุ่งนี้ มานะ จะ พา สอง คน ลูก ๆ ไป ต่างจังหวัด

  phrûŋníi maaná? cà? phaa sɔ̌ɔŋ khon lûuklûuk pay tàaŋcaŋwàt

  tomorrow Mana will bring two CL child go out-of-town

  "Tomorrow Mana will take two children out of town."

* พรุ่งนี้ สมชาย จะ เชิญ สิบ คน คุณครู ไป ร้านอาหาร

  phrûŋníi sǒmchaay cà? chəən sìp khon khunkhruu pay ráan?aahǎan

  tomorrow Somchai will invite ten CL teacher go restaurant

  "Tomorrow Somchai will invite ten teachers to a restaurant."

* พรุ่งนี้ สมชาย จะ ชวน สิบ คน เพื่อน ๆ ไป โรงภาพยนตร์

  phrûŋníi sǒmchaay cà? chuan sìp khon phɨ̂anphɨ̂an pay rooŋphâappháyon

  tomorrow Somchai will ask ten CL friend go cinema

  "Tomorrow Somchai will ask ten friends to go to a cinema together."

* ปีหน้า สุดา จะ ชวน ห้า คน เพื่อน ๆ ไป ประเทศจีน

  piinâa sù?daa cà? chuan hâa khon phɨ̂anphɨ̂an pay prà?thêetciin

  next-year Suda will ask five CL friend go China

  "Next year Suda will ask five friends to go to China together."

* พรุ่งนี้ คุณครู จะ พา สิบ คน นักเรียน ไป โรงพยาบาล

  phrûŋníi khunkhruu cà? phaa sìp khon nákrian pay rooŋpháyaabaan

  tomorrow teacher will bring ten CL student go hospital

  "Tomorrow the teacher will take ten students to a hospital."

Thai Condition 2a

• เมื่อกี้ ครูใหญ่ พูดว่า นักเรียน เหล่านี้ น่ารัก มาก

  mɨ̂akîi khruuyày phûutwâa nákrian làw-níi nâarák mâak

  just-now principal say student group-this cute very

  "The principal just said that these students were very cute."

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- เมื่อกี้   สมชาย   พูดว่า   ขอทาน   เหล่านั้น   ขี้เกียจ   มาก

  mûakîi   sŏmchaay   phûutwâa   khɔ̌ɔthaan   làw-nán   khîikìat   mâak

  just-now   Somchai   say   beggar   group-that   lazy   very

  "Somchai just said that those beggars were very lazy."

- เมื่อกี้   คุณครู   พูดว่า   เด็ก ๆ   เหล่านั้น   ขยันเรียน   มาก

  mûakîi   khunkhruu   phûutwâa   dèkdèk   làw-nán   khàyǎnrian   mâak

  just-now   teacher   say   child   group-that   diligent   very

  "The teacher just said that those children were very diligent."

- เมื่อกี้   มานะ   บอกว่า   นักเรียน   เหล่านี้   แข็งแรง   มาก

  mûakîi   maanáʔ   bɔ̀ɔkwâa   nákrian   làw-níi   khěŋrɛɛŋ   mâak

  just-now   Mana   say   student   group-this   healthy   very

  "Mana just said that these students were very healthy."

- เมื่อกี้   คุณครู   บอกว่า   นักเรียน   เหล่านี้   ขยันเรียน   มาก

  mûakîi   khunkhruu   bɔ̀ɔkwâa   nákrian   làw-níi   khàyǎnrian   mâak

  just-now   teacher   say   student   group-this   diligent   very

  "The teacher just said that these students were very diligent."

- เมื่อกี้   คุณแม่   พูดว่า   เด็ก ๆ   เหล่านั้น   น่ารัก   มาก

  mûakîi   khunmɛ̂ɛ   phûutwâa   dèkdèk   làw-nán   nâarák   mâak

  just-now   mother   say   child   group-that   cute   very

  "My mother just said that those children were very cute."

- เมื่อกี้   มาลี   พูดว่า   ขอทาน   เหล่านั้น   สกปรก   มาก

  mûakîi   maalii   phûutwâa   khɔ̌ɔthaan   làw-nán   sòkkapròk   mâak

  just-now   Mali   say   beggar   group-that   dirty   very

  "Mali just said that those beggars were very dirty."

- เมื่อกี้   คุณพ่อ   บอกว่า   ขอทาน   เหล่านั้น   ลำบาก   มาก

  mûakîi   khunphɔ̂ɔ   bɔ̀ɔkwâa   khɔ̌ɔthaan   làw-nán   lambàak   mâak

  just-now   father   say   beggar   group-that   struggling   very

  "My father just said that those beggars were very struggling."

- เมื่อกี้   คุณหมอ   บอกว่า   เด็ก ๆ   เหล่านี้   แข็งแรง   มาก

  mûakîi   khunmɔ̌ɔ   bɔ̀ɔkwâa   dèkdèk   làw-níi   khɛ̌ŋrɛɛŋ   mâak

  just-now   doctor   say   child   group-this   healthy   very

  "The doctor just said that these children were very healthy."

- เมื่อกี้   คุณแม่   บอกว่า   ขอทาน   เหล่านี้   ยากจน   มาก

  mûakîi   khunmɛ̂ɛ   bɔ̀ɔkwâa   khɔ̌ɔthaan   làw-níi   yâakcon   mâak

  just-now   mother   say   beggar   group-this   poor   very

  "My mother just said that these beggars were very poor."

- เมื่อกี้   คุณครู   บอกว่า   นักเรียน   เหล่านี้   ขี้เกียจ   มาก

  mûakîi   khunkhruu   bɔ̀ɔkwâa   nákrian   làw-níi   khîikìat   mâak

  just-now   teacher   say   student   group-this   lazy   very

  "The teacher just said that these students were very lazy."

- เมื่อกี้   ครูใหญ่   บอกว่า   เด็ก ๆ   เหล่านี้   เรียนเก่ง   มาก

  mûakîi   khruuyày   bɔ̀ɔkwâa   dèkdèk   làw-níi   riankèŋ   mâak

  just-now   principal   say   child   group-this   good-at-studying   very

  "The principal just said that these students were very good at studying."

Thai Condition 2b

- เมื่อกี้   ครูใหญ่   พูดว่า   พวกนักเรียน   เหล่านี้   น่ารัก   มาก

  mûakîi   khruuyày   phûutwâa   phûak-nákrian   làw-níi   nâarák   mâak

  just-now   principal   say   *phûak*-student   group-this   cute   very

  "The principal just said that these students were very cute."

- เมื่อกี้   สมชาย   พูดว่า   พวกขอทาน   เหล่านั้น   ขี้เกียจ   มาก

  mûakîi   sǒmchaay   phûutwâa   phûak-khɔ̌ɔthaan   làw-nán   khîikìat   mâak

  just-now   Somchai   say   *phûak*-beggar   group-that   lazy   very

  "Somchai just said that those beggars were very lazy."

- เมื่อกี้   คุณครู   พูดว่า   พวกเด็ก ๆ   เหล่านั้น   ขยันเรียน   มาก

  mûakîi   khunkhruu   phûutwâa   phûak-dèkdèk   làw-nán   khàyǎnrian   mâak

  just-now   teacher   say   *phûak*-child   group-that   diligent   very

  "The teacher just said that those children were very diligent."

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- เมื่อกี้ มานะ บอกว่า พวกนักเรียน เหล่านี้ แข็งแรง มาก

  mûakîi maaná? bɔ̀ɔkwâa phûak-nákrian làw-níi khɛ̌ŋrɛɛŋ mâak

  just-now Mana say *phûak*-student group-this healthy very

  "Mana just said that these students were very healthy."

- เมื่อกี้ คุณครู บอกว่า พวกนักเรียน เหล่านี้ ขยันเรียน มาก

  mûakîi khunkhruu bɔ̀ɔkwâa phûak-nákrian làw-níi khàyǎnrian mâak

  just-now teacher say *phûak*-student group-this diligent very

  "The teacher just said that these students were very diligent."

- เมื่อกี้ คุณแม่ พูดว่า พวกเด็ก ๆ เหล่านั้น น่ารัก มาก

  mûakîi khunmɛ̂ɛ phûutwâa phûak-dèkdèk làw-nán nâarák mâak

  just-now mother say *phûak*-child group-that cute very

  "My mother just said that those children were very cute."

- เมื่อกี้ มาลี พูดว่า พวกขอทาน เหล่านั้น สกปรก มาก

  mûakîi maalii phûutwâa phûak-khɔ̌ɔthaan làw-nán sòkkapròk mâak

  just-now Mali say *phûak*-beggar group-that dirty very

  "Mali just said that those beggars were very dirty."

- เมื่อกี้ คุณพ่อ บอกว่า พวกขอทาน เหล่านั้น ลำบาก มาก

  mûakîi khunphɔ̂ɔ bɔ̀ɔkwâa phûak-khɔ̌ɔthaan làw-nán lambàak mâak

  just-now father say *phûak*-beggar group-that struggling very

  "My father just said that those beggars were very struggling."

- เมื่อกี้ คุณหมอ บอกว่า พวกเด็ก ๆ เหล่านี้ แข็งแรง มาก

  mûakîi khunmɔ̌ɔ bɔ̀ɔkwâa phûak-dèkdèk làw-níi khɛ̌ŋrɛɛŋ mâak

  just-now doctor say *phûak*-child group-this healthy very

  "The doctor just said that these children were very healthy."

- เมื่อกี้ คุณแม่ บอกว่า พวกขอทาน เหล่านี้ ยากจน มาก

  mûakîi khunmɛ̂ɛ bɔ̀ɔkwâa phûak-khɔ̌ɔthaan làw-níi yâakcon mâak

  just-now mother say *phûak*-beggar group-this poor very

  "My mother just said that these beggars were very poor."

- เมื่อกี้   คุณครู   บอกว่า   พวกนักเรียน   เหล่านี้   ขี้เกียจ   มาก

  mûakîi   khunkhruu   bɔ̀ɔkwâa   phûak-nákrian   làw-níi   khîikìat   mâak

  just-now   teacher   say   *phûak*-student   group-this   lazy   very

  "The teacher just said that these students were very lazy."

- เมื่อกี้   ครูใหญ่   บอกว่า   พวกเด็ก ๆ   เหล่านี้   เรียนเก่ง   มาก

  mûakîi   khruuyày   bɔ̀ɔkwâa   phûak-dèkdèk   làw-níi   riankèŋ   mâak

  just-now   principal   say   *phûak*-child   group-this   good-at-studying   very

  "The principal just said that these students were very good at studying."

Thai Condition 2c

- เมื่อกี้   มาลี   บอกว่า   สุนัข   เหล่านี้   น่ารัก   มาก

  mûakîi   maalii   bɔ̀ɔkwâa   sùʔnák   làw-níi   nâarák   mâak

  just-now   Mali   say   dog   group-this   cute   very

  "Mali just said that these dogs were very cute."

- เมื่อวาน   คุณป้า   พูดว่า   กระต่าย   เหล่านี้   น่ารัก   มาก

  mûawaan   khunpâa   phûutwâa   kràʔtàay   làw-níi   nâarák   mâak

  yesterday   aunt   say   rabbit   group-this   cute   very

  "Yesterday my aunt said that these rabbits were very cute."

- เมื่อวาน   คุณพ่อ   พูดว่า   ปลาฉลาม   เหล่านี้   ดุร้าย   มาก

  mûawaan   khunphɔ̂ɔ   phûutwâa   plaachàlǎam   làw-níi   dùʔráay   mâak

  yesterday   father   say   shark   group-this   fierce   very

  "Yesterday my father said that these sharks were very fierce."

- เมื่อวาน   น้องชาย   พูดว่า   จระเข้   เหล่านั้น   น่ากลัว   มาก

  mûakîi   nɔ́ɔŋchaay   phûutwâa   cɔɔráʔkhêe   làw-nán   nâaklua   mâak

  just-now   younger-brother   say   crocodile   group-that   frightening   very

  "My younger brother just said that those crocodiles were very frightening."

- เมื่อวาน   พี่ชาย   พูดว่า   จระเข้   เหล่านั้น   ดุร้าย   มาก

  mûawaan   phîichaay   phûutwâa   cɔɔráʔkhêe   làw-nán   dùʔráay   mâak

  yesterday   older-brother   say   crocodile   group-that   fierce   very

  "Yesterday my older brother said that those crocodiles were very fierce."

- เมื่อกี้ มาลี พูดว่า สิงโต เหล่านั้น สกปรก มาก

  mûakîi maalii phûutwâa sĭŋtoo làw-nán sòkkapròk mâak

  just-now Mali say lion group-that dirty very

  "Mali just said that those lions were very dirty."

- เมื่อกี้ น้องชาย บอกว่า ลูกแมว เหล่านี้ น่ารัก มาก

  mûakîi nɔ́ɔŋchaay bɔ̀ɔkwâa lûukmɛɛw làw-níi nâarák mâak

  just-now younger-brother say kitten group-this cute very

  "My younger brother just said that these kittens were very cute."

- เมื่อกี้ มานะ พูดว่า สิงโต เหล่านั้น ดุร้าย มาก

  mûakîi maaná? phûutwâa sĭŋtoo làw-nán dù?ráay mâak

  just-now Mana say lion group-that fierce very

  "Mana just said that those lions were very fierce."

- เมื่อกี้ คุณแม่ พูดว่า สิงโต เหล่านั้น น่ากลัว มาก

  mûakîi khunmɛ̂ɛ phûutwâa sĭŋtoo làw-nán nâaklua mâak

  just-now mother say lion group-that frightening very

  "My mother just said that those lions were very frightening."

- เมื่อวาน คุณป้า พูดว่า สุนัข เหล่านั้น สกปรก มาก

  mûawaan khunpâa phûutwâa sù?nák làw-nán sòkkapròk mâak

  yesterday aunt say dog group-that dirty very

  "Yesterday my aunt said that those dogs were very dirty."

- เมื่อกี้ พี่ชาย พูดว่า กระต่าย เหล่านั้น สกปรก มาก

  mûakîi phîichaay phûutwâa krà?tàay làw-nán sòkkapròk mâak

  just-now older-brother say rabbit group-that dirty very

  "My older brother just said that those rabbits were very dirty."

- เมื่อวาน สุดา พูดว่า สุนัข เหล่านั้น ดุร้าย มาก

  mûawaan sù?da phûutwâa sù?nák làw-nán dù?ráay mâak

  yesterday Suda say dog group-that fierce very

  "Yesterday Suda said that those dogs were very fierce."

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Thai Condition 2d

- เมื่อกี้ มาลี บอกว่า พวกสุนัข เหล่านี้ น่ารัก มาก

  mûakîi maalii bɔ̀ɔkwâa phûak-sù?nák làw-níi nâarák mâak

  just-now Mali say *phûak*-dog group-this cute very

  "Mali just said that these dogs were very cute."

- เมื่อวาน คุณป้า พูดว่า พวกกระต่าย เหล่านี้ น่ารัก มาก

  mûawaan khunpâa phûutwâa phûak-krà?tàay làw-níi nâarák mâak

  yesterday aunt say *phûak*-rabbit group-this cute very

  "Yesterday my aunt said that these rabbits were very cute."

- เมื่อวาน คุณพ่อ พูดว่า พวกปลาฉลาม เหล่านี้ ดุร้าย มาก

  mûawaan khunphɔ̂ɔ phûutwâa phûak-plaachàlăam làw-níi dù?ráay mâak

  yesterday father say *phûak*-shark group-this fierce very

  "Yesterday my father said that these sharks were very fierce."

- เมื่อวาน น้องชาย พูดว่า พวกจระเข้ เหล่านั้น น่ากลัว มาก

  mûakîi nɔ́ɔŋchaay phûutwâa phûak-cɔɔrá?khêe làw-nán nâaklua mâak

  just-now younger-brother say *phûak*-crocodile group-that frightening very

  "My younger brother just said that those crocodiles were very frightening."

- เมื่อวาน พี่ชาย พูดว่า พวกจระเข้ เหล่านั้น ดุร้าย มาก

  mûawaan phîichaay phûutwâa phûak-cɔɔrá?khêe làw-nán dù?ráay mâak

  yesterday older-brother say *phûak*-crocodile group-that fierce very

  "Yesterday my older brother said that those crocodiles were very fierce."

- เมื่อกี้ มาลี พูดว่า พวกสิงโต เหล่านั้น สกปรก มาก

  mûakîi maalii phûutwâa phûak-sĭŋtoo làw-nán sòkkapròk mâak

  just-now Mali say *phûak*-lion group-that dirty very

  "Mali just said that those lions were very dirty."

- เมื่อกี้ น้องชาย บอกว่า พวกลูกแมว เหล่านี้ น่ารัก มาก

  mûakîi nɔ́ɔŋchaay bɔ̀ɔkwâa phûak-lûukmɛɛw làw-níi nâarák mâak

  just-now younger-brother say *phûak*-kitten group-this cute very

  "My younger brother just said that these kittens were very cute."

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- เมื่อกี้   มานะ   พูดว่า   พวกสิงโต   เหล่านั้น   ดุร้าย   มาก

  mûakîi   maaná?   phûutwâa   phûak-sǐŋtoo   làw-nán   dù?ráay   mâak

  just-now   Mana   say   *phûak*-lion   group-that   fierce   very

  "Mana just said that those lions were very fierce."

- เมื่อกี้   คุณแม่   พูดว่า   พวกสิงโต   เหล่านั้น   น่ากลัว   มาก

  mûakîi   khunmêɛ   phûutwâa   phûak-sǐŋtoo   làw-nán   nâaklua   mâak

  just-now   mother   say   *phûak*-lion   group-that   frightening   very

  "My mother just said that those lions were very frightening."

- เมื่อวาน   คุณป้า   พูดว่า   พวกสุนัข   เหล่านั้น   สกปรก   มาก

  mûawaan   khunpâa   phûutwâa   phûak-sù?nák   làw-nán   sòkkapròk   mâak

  yesterday   aunt   say   *phûak*-dog   group-that   dirty   very

  "Yesterday my aunt said that those dogs were very dirty."

- เมื่อกี้   พี่ชาย   พูดว่า   พวกกระต่าย   เหล่านั้น   สกปรก   มาก

  mûakîi   phîichaay   phûutwâa   phûak-krà?tàay   làw-nán   sòkkapròk   mâak

  just-now   older-brother   say   *phûak*-rabbit   group-that   dirty   very

  "My older brother just said that those rabbits were very dirty."

- เมื่อวาน   สุดา   พูดว่า   พวกสุนัข   เหล่านั้น   ดุร้าย   มาก

  mûawaan   sù?da   phûutwâa   phûak-sù?nák   làw-nán   dù?ráay   mâak

  yesterday   Suda   say   *phûak*-dog   group-that   fierce   very

  "Yesterday Suda said that those dogs were very fierce."

Thai Condition 3a

- เมื่อกี้   มาลี   พูดว่า   มี   นักเรียน   กำลัง   กินข้าว   อยู่ใน   โรงอาหาร

  mûakîi   maalii   phûutwâa   mii   nákrian   kamlaŋ   kinkhâaw   yùu-nay   rooŋ?aahǎan

  just-now   Mali   say   have   student   PROG   eat-rice   PROG-in   cafeteria

  "Mali just said that there was/were (a) student(s) eating in the cafeteria."

- เมื่อกี้   สุดา   พูดว่า   มี   เด็ก ๆ   กำลัง   คุยกัน   อยู่ใน   โรงภาพยนตร์

  mûakîi   sù?daa   phûutwâa   mii   dèkdèk   kamlaŋ   khuykan   yùu-nay   rooŋphâappháyon

  just-now   Suda   say   have   child   PROG   talk   PROG-in   cinema

  "Suda just said that there were children talking in the cinema."

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- เมื่อกี้   มานะ   บอกว่า   มี   นักเรียน   กำลัง   เล่นกัน   อยู่ใน   ห้องพักครู

  mûakîi   maaná?   bɔ̀ɔkwâa   mii   nákrian   kamlaŋ   lênkan   yùu-nay   hôoŋphákkhruu

  just-now   Mana   say   have   student   PROG   play   PROG-in   teachers' room

  "Mana just said that there was/were (a) student(s) playing in the teachers' room."

- เมื่อกี้   สุดา   บอกว่า   มี   ขอทาน   กำลัง   ขอเงิน   อยู่ใน   โรงอาหาร

  mûakîi   sù?daa   bɔ̀ɔkwâa   mii   khɔ̌ɔthaan   kamlaŋ   khɔ̌ɔ-ŋəən   yùu-nay   rooŋ?aahǎan

  just-now   Suda   say   have   beggar   PROG   ask-for-money   PROG-in   cafeteria

  "Suda just said that there was/were (a) beggar(s) asking for money in the cafeteria."

- เมื่อกี้   คุณป้า   บอกว่า   มี   เด็ก ๆ   กำลัง   กินข้าว   อยู่ที่   ร้านอาหาร

  mûakîi   khunpâa   bɔ̀ɔkwâa   mii   dèkdèk   kamlaŋ   kinkhâaw   yùu-thîi   ráan?aahǎan

  just-now   aunt   say   have   child   PROG   eat-rice   PROG-at   restaurant

  "My aunt just said that there were children eating in the restaurant."

- เมื่อกี้   สมชาย   พูดว่า   มี   ขอทาน   กำลัง   นั่งเล่น   อยู่ใน   โรงพยาบาล

  mûakîi   sǒmchaay   phûutwâa   mii   khɔ̌ɔthaan   kamlaŋ   nâŋlên   yùu-nay   rooŋpháyaabaan

  just-now   Somchai   say   have   beggar   PROG   sit   PROG-in   hospital

  "Somchai just said that there was/were (a) beggar(s) sitting in the hospital."

- เมื่อกี้   คุณป้า   บอกว่า   มี   เด็ก ๆ   กำลัง   เล่นกัน   อยู่ใน   สนามกีฬา

  mûakîi   khunpâa   bɔ̀ɔkwâa   mii   dèkdèk   kamlaŋ   lênkan   yùu-nay   sànǎamkiilaa

  just-now   aunt   say   have   child   PROG   play   PROG-in   stadium

  "My aunt just said that there were children playing in the stadium."

- เมื่อกี้   คุณครู   บอกว่า   มี   นักเรียน   กำลัง   นั่งเล่น   อยู่ใน   โรงอาหาร

  mûakîi   khunkhru   bɔ̀ɔkwâa   mii   nákrian   kamlaŋ   nâŋlên   yùu-nay   rooŋ?aahǎan

  just-now   teacher   say   have   student   PROG   sit   PROG-in   cafeteria

  "The teacher just said that there was/were (a) student(s) sitting in the cafeteria."

- เมื่อกี้   มาลี   บอกว่า   มี   ขอทาน   กำลัง   ขอเงิน   อยู่ใน   ร้านอาหาร

  mûakîi   maalii   bɔ̀ɔkwâa   mii   khɔ̌ɔthaan   kamlaŋ   khɔ̌ɔ-ŋəən   yùu-nay   ráan?aahǎan

  just-now   Mali   say   have   beggar   PROG   ask-for-money   PROG-in   restaurant

  "Mali just said that there was/were (a) beggar(s) asking for money in the restaurant."

- เมื่อกี้   สมชาย   บอกว่า   มี   นักเรียน   กำลัง   เดินเล่น   อยู่ใน   สนามกีฬา

  mûakîi   sǒmchaay   bɔ̀ɔkwâa   mii   nákrian   kamlaŋ   dəənlên   yùu-nay   sànǎamkiilaa

  just-now   Somchai   say   have   student   PROG   walk   PROG-in   stadium

  "Somchai just said that there was/were (a) student(s) walking in the stadium."

- เมื่อกี้ มานะ พูดว่า มี ขอทาน กำลัง กินข้าว อยู่ ที่ โรงอาหาร

  mûakîi maaná? phûutwâa mii khɔ̌ɔthaan kamlaŋ kinkhâaw yùu-thîi rooŋʔaahǎan

  just-now Mana say have beggar PROG eat-rice PROG-at cafeteria

  "Mana just said that there was/were (a) beggar(s) eating in the cafeteria."

- เมื่อกี้ ครูใหญ่ บอกว่า มี เด็ก ๆ กำลัง เล่นกัน อยู่ ใน ห้องพักครู

  mûakîi khruuyày phûutwâa mii dèkdèk kamlaŋ lênkan yùu-nay hɔ̂ɔŋphákkhruu

  just-now principal say have child PROG play PROG-in teachers' room

  "The principal just said that there were children playing in the teachers' room."

Thai Condition 3b

- เมื่อกี้ มาลี พูดว่า มี พวกนักเรียน กำลัง กินข้าว อยู่ใน โรงอาหาร

  mûakîi maalii phûutwâa mii phûak-nákrian kamlaŋ kinkhâaw yùu-nay rooŋʔaahǎan

  just-now Mali say have *phûak*-student PROG eat-rice PROG-in cafeteria

  "Mali just said that there were students eating in the cafeteria."

- เมื่อกี้ สุดา พูดว่า มี พวกเด็ก ๆ กำลัง คุยกัน อยู่ใน โรงภาพยนตร์

  mûakîi sùʔdaa phûutwâa mii phûak-dèkdèk kamlaŋ khuykan yùu-nay rooŋphâappháyon

  just-now Suda say have *phûak*-child PROG talk PROG-in cinema

  "Suda just said that there were children talking in the cinema."

- เมื่อกี้ มานะ บอกว่า มี พวกนักเรียน กำลัง เล่นกัน อยู่ ใน ห้องพักครู

  mûakîi maaná? bɔ̀ɔkwâa mii phûak-nákrian kamlaŋ lênkan yùu-nay hɔ̂ɔŋphákkhruu

  just-now Mana say have *phûak*-student PROG play PROG-in teachers' room

  "Mana just said that there were students playing in the teachers' room."

- เมื่อกี้ สุดา บอกว่า มี พวกขอทาน กำลัง ขอเงิน อยู่ ใน โรงอาหาร

  mûakîi sùʔdaa bɔ̀ɔkwâa mii phûak-khɔ̌ɔthaan kamlaŋ khɔ̌ɔ-ŋəən yùu-nay rooŋʔaahǎan

  just-now Suda say have *phûak*-beggar PROG ask-for-money PROG-in cafeteria

  "Suda just said that there were beggar asking for money in the cafeteria."

- เมื่อกี้ คุณป้า บอกว่า มี พวกเด็ก ๆ กำลัง กินข้าว อยู่ ที่ ร้านอาหาร

  mûakîi khunpâa bɔ̀ɔkwâa mii phûak-dèkdèk kamlaŋ kinkhâaw yùu-thîi ráanʔaahǎan

  just-now aunt say have *phûak*-child PROG eat-rice PROG-at restaurant

  "My aunt just said that there were children eating in the restaurant."

- เมื่อกี้ สมชาย พูดว่า มี พวกขอทาน กำลัง นั่งเล่น อยู่ ใน โรงพยาบาล

  mûakîi sǒmchaay phûutwâa mii phûak-khɔ̌ɔthaan kamlaŋ nâŋlên yùu-nay rooŋpháyaabaan

  just-now Somchai say have *phûak*-beggar PROG sit PROG-in hospital

  "Somchai just said that there were beggars sitting in the hospital."

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- เมื่อกี้ คุณป้า บอกว่า มี พวกเด็ก ๆ กำลัง เล่นกัน อยู่ ใน สนามกีฬา

  mûakîi khunpâa bɔ̀ɔkwâa mii phûak-dèkdèk kamlaŋ lênkan yùu-nay sànǎamkiilaa

  just-now aunt say have *phûak*-child PROG play PROG-in stadium

  "My aunt just said that there were children playing in the stadium."

- เมื่อกี้ คุณครู บอกว่า มี พวกนักเรียน กำลัง นั่งเล่น อยู่ ใน โรงอาหาร

  mûakîi khunkhru bɔ̀ɔkwâa mii phûak-nákrian kamlaŋ nâŋlên yùu-nay rooŋʔaahǎan

  just-now teacher say have *phûak*-student PROG sit PROG-in cafeteria

  "The teacher just said that there were students sitting in the cafeteria."

- เมื่อกี้ มาลี บอกว่า มี พวกขอทาน กำลัง ขอเงิน อยู่ ใน ร้านอาหาร

  mûakîi maalii bɔ̀ɔkwâa mii phûak-khɔ̌ɔthaan kamlaŋ khɔ̌ɔ-ŋəən yùu-nay ráanʔaahǎan

  just-now Mali say have *phûak*-beggar PROG ask-for-money PROG-in restaurant

  "Mali just said that there were beggars asking for money in the restaurant."

- เมื่อกี้ สมชาย บอกว่า มี พวกนักเรียน กำลัง เดินเล่น อยู่ ใน สนามกีฬา

  mûakîi sǒmchaay bɔ̀ɔkwâa mii phûak-nákrian kamlaŋ dəənlên yùu-nay sànǎamkiilaa

  just-now Somchai say have *phûak*-student PROG walk PROG-in stadium

  "Somchai just said that there were students walking in the stadium."

- เมื่อกี้ มานะ พูดว่า มี พวกขอทาน กำลัง กินข้าว อยู่ ที่ โรงอาหาร

  mûakîi maanáʔ phûutwâa mii phûak-khɔ̌ɔthaan kamlaŋ kinkhâaw yùu-thîi rooŋʔaahǎan

  just-now Mana say have *phûak*-beggar PROG eat-rice PROG-at cafeteria

  "Mana just said that there were beggars eating in the cafeteria."

- เมื่อกี้ ครูใหญ่ บอกว่า มี พวกเด็ก ๆ กำลัง เล่นกัน อยู่ ใน ห้องพักครู

  mûakîi khruuyày phûutwâa mii phûak-dèkdèk kamlaŋ lênkan yùu-nay hɔ̂ɔŋphákkhruu

  just-now principal say have *phûak*-child PROG play PROG-in teachers' room

  "The principal just said that there were children playing in the teachers' room."

Thai Prerequisite A for test sentences in Set 3

- มี นักเรียน กำลัง กินข้าว อยู่ใน โรงอาหาร

  mii nákrian kamlaŋ kinkhâaw yùu-nay rooŋʔaahǎan

  have student PROG eat-rice PROG-in cafeteria

  "There is/are (a) students(s) eating in a cafeteria."

- มี เด็ก ๆ กำลัง คุยกัน อยู่ใน โรงพยาบาล

  mii dèkdèk kamlaŋ khuykan yùu-nay rooŋphâappháyon

  have child PROG talk PROG-in cinema

  "There are children talking in the cinema."

- มี   ขอทาน   กำลัง   ขอเงิน   อยู่ใน   โรงพยาบาล

  mi   khɔ̌ɔthaan   kamlaŋ   khɔ̌ɔ-ŋəən   yùu-nay   rooŋpháyaabaan

  have   beggar   PROG   ask-for-money   PROG-in   hospital

  "There is/are (a) beggar(s) asking for money in the hospital."

Thai Prerequisite B for test sentences in Set 3 *

* มี   นักเรียน   เหล่านั้น   กำลัง   กินข้าว   อยู่ใน   โรงอาหาร

  mii   nákrian   làw-nán   kamlaŋ   kinkhâaw   yùu-nay   rooŋʔaahǎan

  have   student   group-that   PROG   eat-rice   PROG-in   cafeteria

  "Those students are eating in the cafeteria."

* มี   เด็ก ๆ   เหล่านี้   กำลัง   คุยกัน   อยู่ใน   โรงพยาบาล

  mii   dèkdèk   làw-níi   kamlaŋ   khuykan   yùu-nay   rooŋphâappháyon

  have   child   group-this   PROG   talk   PROG-in   cinema

  "These children are talking in the cinema."

* มี   ขอทาน   เหล่านี้   กำลัง   ขอเงิน   อยู่ใน   โรงพยาบาล

  mi   khɔ̌ɔthaan   làw-níi   kamlaŋ   khɔ̌ɔ-ŋəən   yùu-nay   rooŋpháyaabaan

  have   beggar   group-this   PROG   ask-for-money   PROG-in   hospital

  "These beggars are asking for money in the hospital."