

L2 Acquisition of the Interpretation of Embedded Null Arguments in Chinese

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1. Introduction

Syntactic possibilities of covert elements in L2 grammars have been examined in a number of studies, but there is no study that specifically tackles the acquisition of the interpretation of null arguments in L2 Chinese. The empirical study presented in this article aims to fill this gap by investigating the interpretation of embedded null arguments in L2 Chinese grammars of English-speaking learners. According to the analysis proposed in the article, there are two types of null elements in Chinese: the syntactic deletion type (a purely syntactic category) and the discourse deletion type (a syntax-discourse interface category). An embedded null subject can be either a syntactic deletion type of null element or a discourse deletion type, whereas an embedded null object is a discourse deletion type of null element. A syntactic deletion type of null element is related with the reading in which an embedded null subject refers to the matrix subject, whereas a discourse deletion type contributes to the reading in which an embedded null argument refers to an entity in the discourse. The recent Interface Hypothesis (Sorace 2005; Sorace and Filiace 2006) proposes that L2 learners do not have problems acquiring purely syntactic categories, whereas they face difficulties acquiring categories relating to the syntax-discourse interface and may never succeed in this task. It is thus interesting to see if L2 learners can acquire both the syntactic deletion type of null element that is purely syntactic and the discourse deletion type of null element that is related to the syntax-discourse interface. The paper is organized as follows. Section 2 makes a proposal to account for Chinese null elements within the Phase Theory. Section 3 briefly reviews findings about the acquisition of Chinese null elements in L2 literature. Section 3 presents the methodology and results of the present study, whereas Section 4 contains a discussion.

2. Null elements in Chinese

2.1. Description

Unlike English, Chinese allows a null element to appear in the subject position of a finite clause and in the object position of a transitive verb, as illustrated in (1a) and (1b) respectively.

- (1) a. Zhangsan shuo *e* renshi Lisi.
Zhangsan say know Lisi
*‘Zhangsan says that *e* knows Lisi.’
- b. Zhangsan shuo Lisi renshi *e*.
Zhangsan say Lisi know
*‘Zhangsan says that Lisi knows *e*.’

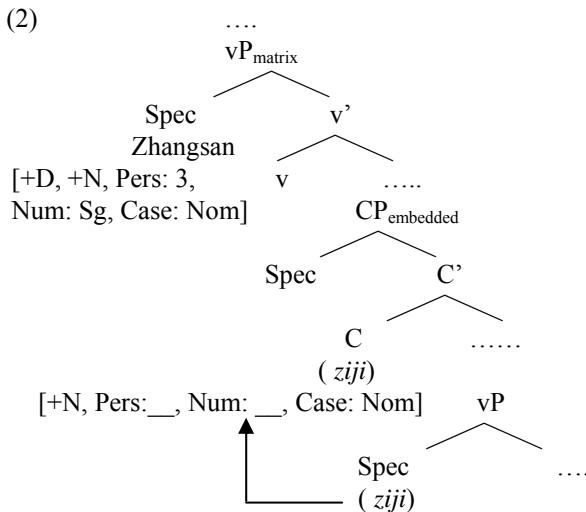
The matrix verb *shuo* ‘to say’ in (1a) subcategorises for a finite embedded clause. This finite

embedded clause contains no phonologically realised subject, and the sentence is acceptable. Likewise, the sentence in (1b) is grammatical despite the absence of an overt object after the transitive verb *renshi* ‘to know’ in the embedded clause. In contrast, the English equivalents of (1a) and (1b) are grammatically ruled out. Although null elements are allowed in both the embedded subject position and in the embedded object position in Chinese, an embedded null subject does not allow the same interpretations as an embedded null object. The embedded null subject in (1a) can refer to either the matrix subject *Zhangsan* or someone in the discourse, whereas the embedded null object in (1b) can only refer to someone in the discourse. It cannot refer to the matrix subject *Zhangsan*.

2.2. Analysis

Roberts (2007) proposes that null subjects in languages with rich agreement morphology result from deletion of pronouns at PF—they are *pros*. A pronoun in this type of language can be deleted, as its features are properly included in those of its probe, T. The pronoun is a defective goal of T (Roberts 2007). What differentiates these languages and languages with impoverished agreement paradigms, like English, is that T in the former type of language has a [+D] feature which is related to rich agreement morphology. The existence of a [+D] feature on T makes it possible that features of T properly include those of a pronoun, which intrinsically has a [+D] feature.

Chinese has neither rich subject agreement morphology nor rich object agreement morphology: Neither the Chinese T nor *v* has a [+D] feature. Therefore, pronouns with an intrinsic [+D] feature cannot be deleted from the subject or object position in Chinese, as their features can never be properly included in those of T or *v--pro* is not allowed in Chinese. Chinese null elements have to be analysed differently from those in languages with rich subject or object agreement morphology. I propose that one type of Chinese embedded null subject results from the deletion of the bare reflexive *ziji* ‘self’ as a defective goal of the matrix subject. Let us consider this possibility in sentence (1a), which is schematised in (2) below.



In line with the assumptions about phases in Chomsky (2005), I assume that C rather than T probes the subject in its base generation position in Chinese. The embedded C in (2) probes *ziji* at the Spec vP position and values its unvalued case feature as nominative. I assume that *ziji* ‘self’ is an N-head with unvalued phi-features, which can move from head to head and attach to heads such as C by adjunction during the computation (cf. Cole and Sung 1994; Reinhart and Reuland 1993). The unvalued ϕ -features of *ziji* ‘self’ trigger it to move upwards and head-adjoin to the embedded C. According to the Phase-Impenetrability Condition (PIC) (Chomsky 2001), the embedded head C is still accessible to the matrix vP. The matrix subject at the Spec vP position is active, as it still has an unvalued case feature. The matrix subject probes *ziji* and values the unvalued ϕ -features of *ziji*. At PF, *ziji* has the same phi-features as the matrix subject. Both of them have a nominative case feature. As an N^0 category, *ziji*

has a nominal feature – the [N] feature. In addition to the [N] feature, the matrix subject has a [D] feature, which is the definiteness feature (Longobardi 1994; Roberts 2007). The features of *ziji* are properly included in those of the matrix subject as shown in (2). *Ziji* can delete in line with Roberts’ (2007) proposal of PF deletion mentioned above. An embedded null subject is derived when the deletion takes place. I refer to it as the syntactic deletion type of embedded null subject, as it involves only syntactic computation.¹

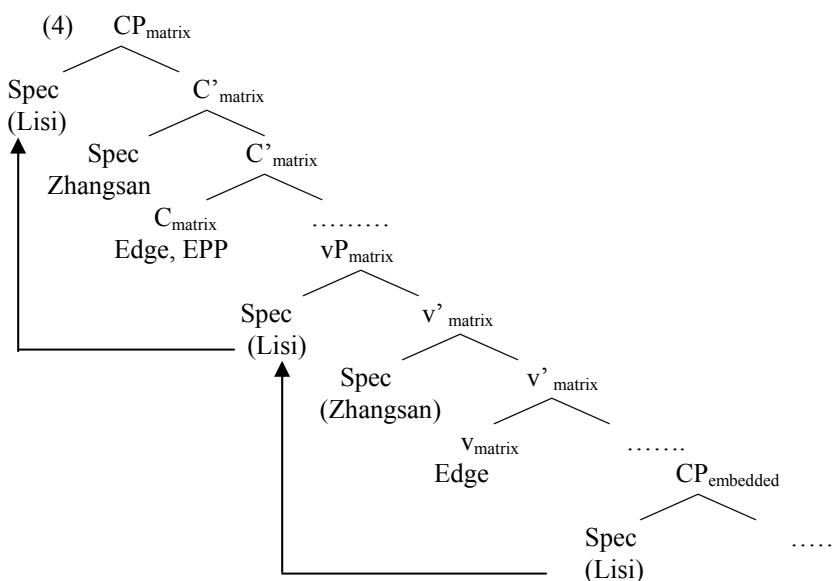
An embedded null subject in Chinese can also refer to a discourse entity given proper discourse conditions, as exemplified in (3) below.

(3) Q: (Lisi qu guo Lundun ma?)
Lisi go EXP London Q
‘Has Lisi been to London?’

A: a. Zhangsan shuo *e* qu guo Lundun.
Zhangsan say go EXP London
‘Zhangsan says that *e* (*e* = *Lisi*) has been to London.’

b. Zhangsan shuo *ziji* qu guo Lundun.
Zhangsan say self go EXP London
‘Zhangsan says that *self* (*self* ≠ *Lisi*) has been to London.’

Given a discourse in the form of a question, the embedded null subject in (3Aa) refers to the discourse prominent *Lisi*. On the other hand, if the null element is replaced by *ziji* ‘self’, as in (3Ab), this reading is not possible. This indicates that there is yet another type of embedded null subject in Chinese other than the type derived from the deletion of *ziji*. The sentence in (3Aa) above can be represented in (4).



The embedded subject *Lisi* moves from the Spec CP position of the embedded clause phase by

¹ I do not consider it as a syntax-phonology interface category, as PF has an effect on every element of the sentence. An element is either pronounced or silent at PF according to its syntactic function. On the other hand, even if we consider it as a syntax-phonology interface category, our predictions about it remain the same in comparison with the syntax-discourse interface category proposed below in terms of L2 acquisition. It has been proposed that phenomena relating to internal interfaces, which connect syntax and other domains within the language faculty (e.g. phonology), can be completely acquired like purely syntactic categories in L2 acquisition (Belletti *et al.* 2007, Sorace & Filiaci 2006, Tsimpli & Sorace 2006).

phase until it reaches the uttermost Spec CP position of the matrix clause due to the Edge feature of each phase head. Note that the uttermost specifier position is a left edge position, which is different from the specifier position, where an external argument originates or moves into (i.e. the subject *Zhangsan* in (4)) (Chomsky 1995). This is a position for fronted elements, such as topicalised elements. All the lower copies are suppressed in terms of chain-reduction (Chomsky 2001; Nunes 2004). Chinese allows a Topic NP Deletion Rule, which operates across discourse to delete the topic of a sentence under identity with a topic in a preceding sentence (Huang 1982, 1984; Tsao 1977). The result of such a deletion process is formally a ‘Topic Chain’. In line with the Topic NP Deletion Rule, *Lisi* in (4) can be deleted and an embedded null subject is formed. I term this type of embedded null subject the discourse deletion type of embedded null subject. It relates to the syntax-discourse interface, as it involves discourse information as well as syntactic computation.

We showed above that the embedded subject position allows two types of null element. Below we will look at the embedded object position. The embedded null object in (5A) below finds its referent in the discourse.

(5) Q: *Lisi renshi Lao Wang ma?*
 Lisi know Lao Wang Q
 ‘Does Lisi know Lao Wang?’

A: *Zhangsan shuo Lisi bu renshi e.*
 Zhangsan say Lisi not know
 *‘Zhangsan says Lisi does not know *e* (*e* = Lao Wang).’

I argue that the embedded null object in (5A) is a discourse deletion type of null element.² The sentence in (5A) can be represented in (6) below.

(6) [_{CP_{matrix}} (Lao Wang) C’ [... [_{VP} (Lao Wang) v’ ... [_{CP_{embedded}} (Lao Wang) C ... [_V (Lao Wang)]]]]]]

Lao Wang in (6) is base-generated as the complement of VP. It moves leftwards phase by phase until it reaches the topic position of the matrix clause (Spec CP_{matrix}) due to the Edge feature of each phase. All the lower copies are suppressed except for the highest one at Spec CP_{matrix}. The topicalised *Lao Wang* can delete, when it can be identified with the chain topic of the topic chain.

3. L2 acquisition of Chinese null arguments

To the best of my knowledge, Yuan (1993) is the only study that specifically looks at the L2 acquisition of Chinese null arguments. In this empirical study, Yuan tested English-speaking learners of Chinese through an acceptability judgment task. He finds that learners accept both null subjects and null objects from a very early stage onwards. Yuan’s study only focuses on the issue of whether null arguments are allowed in Chinese L2 grammars. No study in L2 acquisition literature investigates if L2 learners interpret and represent Chinese null arguments properly at different stages of acquisition. The current study intends to go some way towards addressing this lacuna. Specifically, the current study aims to answer the following questions:

- Will English-speaking learners whose native language prohibits null subjects and null objects allow them in their L2 Chinese? In line with Yuan’s (1993) findings, L2 learners are predicted to have no problem allowing null elements in subject positions of finite clauses and object positions after transitive verbs.
- Will they be able to acquire both the syntactic deletion type of null element and the discourse deletion type? In line with the Interface Hypothesis, the discourse deletion type of null element will pose more difficulties to L2 learners than the syntactic deletion type and may never be acquirable.

² See Zhao (2008) for reasons why the bare reflexive *ziji* cannot be deleted from the embedded object position.

4. The present study

4.1. Participants

The study included 75 English-speaking learners of Chinese, and 16 native speakers (NS) of Chinese who served as controls. L2 learners were divided into four proficiency groups based on their performance in a Chinese proficiency test that took form of a cloze test (total score = 40): post-beginner (PBE), low-intermediate (LI), high-intermediate (HI) and advanced (AD). More detailed information on each group is given in Table 1 below:

Table 1: Information about the subjects

Group	No. of subjects	Average age	Average no. of months learning Chinese	Average no. of months in Mainland China/Taiwan	Mean scores on proficiency test (range; SD)
PBE	14	25	10.2	4	5.8 (2-9; 2.5)
LI	22	20	20.1	7.1	14.5(10-19; 3.3)
HI	26	22	30.7	10.9	24.3(20-29; 3.2)
AD	13	21	43.3	21.0	33.4(30-36; 2.1)
NS	16	25	n/a	n/a	38.4(35-40; 1.5)

A one-way ANOVA test reveals a significant difference between the four learner groups and the NS group ($F(4, 86) = 355.486, p < 0.001$). The *post-hoc* Games-Howell tests indicate that the four learner groups differ significantly from each other ($p < 0.001$) and from the native Chinese group ($p < 0.001$).

4.2. Materials

The main test material was a Picture Judgement Task (PJT). The PJT consisted of 36 context-providing pictures, each accompanied by 4 sentences to be marked on a scale ranging from -2 to 2 (from ‘completely untrue to the picture’ to ‘completely true to the picture’). An option ‘incorrect sentence’ was included in addition to the scale mentioned above. This option was useful in detecting if a subject accepted the use of null elements in the embedded argument position. If a subject did not even accept sentences with null elements, the interpretations of null elements were out of the question.

One of the 4 sentences was the test sentence for the current study. Among the 36 pictures, 12 were concerned with the current study. Two types of pictures were designed: one type illustrated a situation in which the null element in the embedded subject or object position referred to the matrix subject (termed ‘coreferential pictures’); the other type illustrated a situation in which the null element in the embedded subject or object position referred to a person other than the matrix subject (termed ‘disjoint pictures’). Test sentences accompanying a coreferential picture were either the same with or minimally different from those accompanying the corresponding disjoint picture. At the most, the differences between them were the names of the cartoon figures which were given in the picture in both English and Chinese. There were a balanced number of coreferential pictures and disjoint pictures in the task. Both the pictures and the sentences were randomised.

Four sentence types will be analysed in the current study, each having three tokens.

- (7) Coref+Subj: The picture depicts a situation where an embedded null subject needs to be coreferential with the matrix subject.
- Disj+Subj: The picture depicts a situation where an embedded null subject needs to refer to an entity disjoint with the matrix subject.
- Coref+Obj: The picture depicts a situation where an embedded null object needs to be coreferential with the matrix subject.
- Disj+Obj: The picture depicts a situation where an embedded null object needs to refer to an entity disjoint with the matrix subject.

4.3. Results

The mean scores of each group with regard to sentences with embedded null subjects with both type of pictures are given in Table 2 below.

Table 2: Mean scores for null elements in embedded subject positions

Subject groups	Coref+Subj	Disj+Subj
PBE	1.43	-0.13†
LI	1.17	0.09†
HI	1.49	0.07†
AD	1.19	0.95
NS	1.75	1.38

It is worth noting that the ‘incorrect sentence’ option was very rarely chosen by L2 learners at any proficiency level. This indicates that L2 learners included in the study allow null elements to appear in the embedded subject position in Chinese.

As shown in Table 2, the matrix subject is considered by the NS group to be a possible antecedent of the embedded null subject. The L2 learners accept the coreferential reading of the embedded null subject at every proficiency level, with the mean scores all above the acceptance level ‘+1’. A one-way ANOVA test indicates that L2 groups and the NS group do not differ significantly from each other. As discussed in Section 2, the coreferential reading of the embedded null subject is related with the syntactic deletion type of null element. The above results may indicate that L2 learners have acquired the syntactic deletion type of embedded null subject from the post-beginners’ stage onwards.

As shown in Table 2, native speakers allow an embedded null subject to refer to an entity in the discourse rather than the matrix subject. L2 learners from the post-beginning to the high-intermediate stage do not allow this type of reading. They show a strong tendency to accept a discourse entity as the referent of an embedded null subject at the advanced stage. A one-way ANOVA test yields a significant main effect of subject group ($F(4, 86) = 7.410, p < .001$). The *post-hoc* Tukey tests indicate that native speakers are significantly different from learners at the post-beginners’, low-intermediate and high-intermediate stages (PBE vs. NS: $p = .001$; LI vs. NS: $p = .001$; HI vs. NS: $p = .001$). There is no significant difference between the NS group and the AD group. The above results indicate that learners can ultimately achieve native-like competence in considering an entity in the discourse as a possible referent of an embedded null subject. However, this competence is not achieved until the advanced stage. As argued in Section 2, the embedded null subject that refers to an entity in the discourse is a discourse deletion type of null element. The above results indicate that the discourse deletion type of embedded null subject is not acquired until the advanced stage.

The mean scores of each group with regard to sentences with embedded null objects are given in Table 3 below.

Table 3: Mean scores for null elements in embedded object positions

Subject groups	Coref+Obj	Disj+Obj
PBE	0.75†	0.35†
LI	0.19†	0.87†
HI	0.17†	1.37†
AD	-0.92	1.23
NS	-1.85	1.71

As shown in Table 3, the native speakers reject the coreferential reading of an embedded null object (Type Coref+Obj), but accept the disjoint reading (Type Disj+Obj). It is worth mentioning that the option ‘incorrect sentence’ is very rarely chosen by L2 speakers at all stages. This indicates that L2 learners included in the study allow a null element to appear in the embedded object position.

L2 learners at the post-beginning stage show an incorrect tendency to accept the coreferential reading of an embedded null object. Learners at the advanced stage, however, show a strong tendency to reject this reading correctly. A one-way ANOVA test reveals a significant main effect of subject group ($F(4, 86) = 15.350, p < .001$). L2 learners are significantly different from the native speakers in judging Type Coref+Obj at the post-beginners', low-intermediate and high-intermediate stages ($p < .001$). There is no significant difference between the AD group and the NS group. The results indicate that L2 learners do not achieve native-like competence in rejecting the coreferential reading of the embedded null object until the advanced stage.

L2 learners show a strong tendency to allow an embedded null object to refer to a discourse entity as early as the low-intermediate stage. A one-way ANOVA test reveals a significant main effect of subject group ($F(4, 86) = 4.742, p = .002$). The *post-hoc* Games-Howell tests indicate that the NS group is significantly different from the PBE group and the LI group respectively (PBE vs. NS: $p = .002$; LI vs. NS: $p = .031$). There is no significant difference between the NS group and the L2 groups at the high-intermediate stage and the advanced stage. Despite the significant difference between the LI group and the NS group, the LI group shows a strong tendency to accept the discourse deletion type of embedded null object, with the mean score being '+0.87'. This means that the low-intermediate learners have obtained native-like competence in accepting the discourse type of embedded null object, although they are not yet as confident as the native speakers.

5. Discussion

The present study intended to find out if English-speaking learners allowed null elements to appear in the embedded argument positions, and if they could acquire both the syntactic deletion type of null element that belongs to pure syntax and the discourse deletion type that relates to the syntax-discourse interface. It was predicted that L2 learners would allow null elements to appear in the embedded argument positions from an early stage onwards. It was also predicted that L2 learners would have no problem with the syntactic deletion type of embedded null subject, whereas they might have problems with the discourse deletion type and might never be able to acquire it.

As reported above, the option 'incorrect sentence' is chosen very sparsely by L2 learners even at the post-beginners' stage. This indicates that L2 learners allow null elements to appear in embedded argument positions from the post-beginning stage onwards. This is in conformity with Yuan (1993), whose L2 learners also allowed embedded null arguments at an early stage.

L2 learners allow an embedded null subject to refer to the matrix subject as early as the post-beginning stage. This might suggest that they have acquired the syntactic deletion type of embedded null subject at this stage. However, we cannot rule out the possibility that they may in fact perceive the embedded null subject as a phonetically unrealised counterpart of an English pronoun and thus allow coreference between the embedded null subject and the matrix subject. If this is the case, we have no clear evidence here to show at which stage of acquisition the coreferential embedded null subject is represented as the syntactic deletion type of null element at L2 grammars.

L2 learners do not allow an embedded null subject to refer to a discourse entity until the advanced stage, which suggests that they have not acquired the discourse deletion type of embedded null subject until this stage. As discussed above, there is a possibility that L2 learners have acquired the syntactic deletion type of embedded null subject as early as the post-beginning stage. If this possibility holds, an interesting observation can be made: L2 Chinese grammars do not converge with the target grammar in terms of the discourse deletion type of embedded null subject until the advanced stage, whereas they do with respect to the syntactic deletion type as early as the post-beginning stage.

The above observation is in line with the Interface Hypothesis proposed by Sorace (2005) and Sorace and Filiace (2006). This hypothesis maintains that categories that belong to pure syntax are acquirable, whereas categories that relate to the syntax-discourse interface are inherently difficult and may never be acquired. Sorace and Filiace (2006) suggest that the acquisition of interface categories requires not only the relevant syntactic and discourse knowledge but also the ability to coordinate the two. The difficulties L2 learners have with this type of category may derive from the learners' adequate processing resources to coordinate and integrate the two types of knowledge. As argued previously, the syntactic deletion type of null element is derived from the deletion of the bare reflexive *ziji* 'self' as a

defective goal of the matrix subject, and is a purely syntactic category. The discourse deletion type is derived from the topicalisation and deletion of the embedded subject under identity with the chain topic of the topic chain in the discourse. As the discourse deletion type of embedded null subject involves the discourse notion of the topic chain (Tsao 1977), as well as syntactic computations, it relates to the syntax-discourse interface. Following the Interface Hypothesis, it may be argued that it is too demanding in terms of processing for L2 learners from the post-beginners' stage to the high-intermediate stage to integrate the syntactic computation with the discourse knowledge. This may explain why they fail to derive the discourse deletion type of embedded null subject at these stages. Future research is needed to find suitable methods to test the processing effect involved in this regard. It is important to mention that, despite developmental problems, the current study establishes that the discourse deletion type of embedded null subject that belongs to the syntax-discourse interface is ultimately acquirable in the L2.

Alternatively, the late acquisition of the discourse deletion type of embedded null subject may have resulted from the difficulties L2 learners have in its derivation process. The successful acquisition of the discourse deletion type of embedded null subject is based on the following two prerequisites: (a) learners need to be aware that the Chinese embedded subject can be topicalised; (b) learners need to be aware that the topic of a Chinese sentence can be deleted if this topic is identified with the chain topic of the topic chain. L2 learners may have problems with either or both of these two preconditions, which leads to their inability to correctly represent the discourse deletion type of embedded null subject. We will have more discussions about the two prerequisites later.

Turning now to the embedded object position, we have seen that post-beginners show a tendency to accept coreference between the embedded null object and the matrix subject, which is not allowed in Chinese. It is possible that post-beginners consider the embedded null object as a phonetically unrealised counterpart of an English pronoun. As argued in Section 2, *pro* is syntactically impossible in Chinese, although they are possible in languages with rich agreement such as Italian. L2 learners do not correctly reject this possibility until the advanced stage. They allow an embedded null object to refer to a discourse entity as early as the low-intermediate stage, which means that L2 learners allow the discourse deletion type of embedded null object as early as the low-intermediate stage. The discourse deletion type of embedded null object is a syntax-discourse interface category. Its correct representation requires the integration of the syntactic computation of the sentence and the discourse information. The acquisition of this interface category is achieved earlier than the correct rejection of the syntactic possibility of a *pro* at the embedded object position. This contrast is not in line with the Interface Hypothesis.

The discourse deletion type of embedded null object is derived from the topicalisation of the embedded object and its deletion under identity with the chain topic of the topic chain. The fact that learners have acquired it as early as the low-intermediate stage indicates that they are aware that the embedded object in Chinese can be topicalised and that Chinese allows a Topic NP Deletion Rule from the low-intermediate stage onwards.

I have proposed several possible reasons for the late acquisition of the discourse deletion type of embedded null subject. I will now revisit these reasons, taking the acquisition of the same type of null element in the embedded object position into consideration. I have argued that L2 learners may have problems integrating the syntactic computation with the discourse information in line with the Interface Hypothesis. This explanation does not hold if we take the embedded object position into consideration. As the discourse deletion type of embedded null object is also a syntax-discourse category, its correct representation also requires the integration of the syntactic computation and the discourse information. L2 learners acquire the discourse deletion type of embedded null object as early as the low-intermediate stage. The processing load of integrating the syntactic computation and the discourse information cannot account for high-intermediate and advanced learners' failure to acquire the discourse deletion type of embedded null subject.

I have also proposed that the delay in the acquisition of the embedded null subject may come from either or both of the following two preconditions: (a) the topicalisation of the embedded subject; (b) the Topic NP Deletion Rule. I argued above that L2 learners have acquired the Topic NP Deletion Rule as early as the low-intermediate stage. It should not pose any problem to L2 learners from the low-intermediate stage onwards. The difficulty these learners have in acquiring the discourse deletion

type of embedded null subject can only derive from the problems they have with the topicalisation of the embedded subject in Chinese.³

In sum, the paper presented a study of L2 acquisition of the interpretation of embedded null arguments in Chinese. It was proposed that there were two types of null elements in Chinese: the syntactic deletion type and the discourse deletion type. The interpretation of an embedded null argument is related with the types of null elements that the embedded argument position allows. L2 learners in the current study allowed null elements to appear in the embedded argument positions from an early stage onwards, which is consistent with the findings of Yuan (1993). They acquired both the syntactic deletion type of embedded null subject that belongs to pure syntax and the discourse deletion type that relates to the syntax-discourse interface. Although the discourse deletion type of null element was acquired late in the embedded subject position, it was acquired relatively early in the embedded object position. These findings are not in line with the Interface Hypothesis (Sorace 2005). We concluded that the difficulty facing intermediate learners in terms of the discourse deletion type of embedded null subject derived from the topicalisation of the embedded subject.

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³ See Zhao (2008) for a possible account as to why the topicalisation of the embedded subject in Chinese poses problems to L2 learners.

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