A referential/quantified asymmetry in the second language acquisition of English reflexives by Chinese-speaking learners

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Received April 2007; revised February 2008; accepted June 2008

There has been considerable research that investigates whether reflexives in interlanguage grammars (ILGs) are constrained by Principle A of the Binding Theory. These earlier studies focused on the role of sentence type, including both finite and non-finite test sentences; they did not examine the role of antecedent type, namely distinguishing between quantified antecedents and referential antecedents in the test sentences. This study explores Chinese learners’ acquisition of the locality constraints on the binding of English reflexives from a developmental perspective, focusing both on the role of sentence type and the role of antecedent type. A story-based truth-value judgment task was administered to three proficiency levels of Chinese-speaking learners of English. It was found that the finite/non-finite asymmetry in the learners’ long-distance (LD) judgments was strongest for the intermediate participants but much weaker for the beginners and advanced participants; the referential/quantified asymmetry in the learners’ LD judgments was strongest for the advanced participants but much weaker for the beginners and intermediate participants. Implications of these findings are discussed.

Keywords: reflexives, binding, quantified and referential antecedents, Move-to-INFL approach, parameters

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http://www.sagepub.co.uk/journalspermissions.nav 10.1177/0267658309349435
I Introduction

One of the differences between English and Chinese is that English reflexives require their antecedents to be within the domain of a local subject, as shown in (1), whereas the Chinese reflexive *ziji* (‘self’) permits the antecedent to be in a different clause (i.e. long-distance) as well as in the same clause (i.e. local), as shown in (2).1

1) John, thinks [Bill, trusts himself].
2) Zhangsan, renwei [Wangwu xiangxin ziji].
   ‘Zhangsan thinks that Wangwu trusts himself.’

Studies investigating the acquisition of English reflexives by speakers of Chinese-type languages address the question of whether or not second language (L2) learners whose native language exhibits long-distance (LD) binding are able to acquire the local binding characteristics of English reflexives; that is, will the L2 learners disallow LD binding in their interlanguage grammars (ILGs)? English input may provide ample evidence showing that local binding is possible, but this by no means suggests that LD binding is impossible in English. For example, a Chinese speaker may encounter English sentences like:

3) Mary talked about herself.
4) Tom wants Mary to paint herself.
5) Tom believed that Mary was painting herself.

where Mary can be an antecedent for herself, but there is nothing to tell that Chinese speaker that in sentences like the following Mary cannot be an antecedent for herself:

6) * Mary liked John’s pictures of herself.
7) * Mary wanted Tom to like herself.

Cases like (6) and (7) could only be determined as impossible if a learner already knows that English reflexives can only be locally bound. Furthermore, it is quite rare that learners are explicitly told or taught about the locality constraints on the binding of English reflexives. Therefore, the acquisition of English reflexives by speakers of languages that instantiate LD binding (e.g. Chinese) would be a possible

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1 The term ‘Chinese’ here refers to Mandarin Chinese. Mandarin also has another reflexive anaphor *taziji* (‘himself/herself’). For discussion of the properties of *taziji* see Section IV.
case for investigating to what extent UG, the first language (L1) and the ability to reset parameters are involved in its acquisition.

Ever since the early study of Finer and Broselow (1986), a large number of studies have been conducted to investigate this issue under Principle A of the Binding Theory (e.g. Thomas, 1989; 1991; Cook, 1990; Hirakawa, 1990; Finer, 1991; Eckman, 1994; White, 1995; Wakabayashi, 1996; White and Genesee, 1996; White et al., 1997; MacLaughlin, 1998; Wells, 1998; Yip and Tang, 1998; Akiyama, 2002; Ying, 2003; Sequeiros, 2004). Several distinct findings have emerged from these studies:

- Some learners show local binding in their L2 English.
- Some learners show LD binding in their L2 English.
- A significantly higher percentage of LD binding occurs in non-finite clauses than in finite clauses.

As for these findings, most researchers have claimed that UG is available and resetting of parameters is possible in L2 acquisition (e.g. Hirakawa, 1990), while some have argued that the L2 binding results can be accounted for solely in terms of transfer from the native language and thus do not provide any evidence for parameter resetting or access to UG (e.g. Yuan, 1994). Some have further argued that experimental data testing knowledge of English reflexives suggest that UG does not operate in adult L2 acquisition and the nature of the L2 learner’s behavior is no more than general problem-solving (e.g. Schachter, 1996).

As a matter of fact, it is difficult to draw firm conclusions about how performance data in the case of reflexive binding might relate to underlying knowledge of binding and to what extent the ability to reset parameters is involved. This is because of:

- methods of collection of experimental data: in early studies which used a multiple-choice task or a picture-identification task to test L2 learners’ knowledge of reflexive binding, researchers found it extremely difficult to establish whether participants’ responses reflect the full

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2 Much of the earlier L2 research on reflexives was conducted within the framework of Manzini and Wexler (1987) and Wexler and Manzini (1987). They proposed two parameters associated with Principle A to handle cross-linguistic differences: the Governing Category Parameter, which dealt with domain, and the Proper Antecedent Parameter, dealing with orientation. Hence, much of the earlier L2 research on reflexives was directed at the issue of whether or not L2 learners can reset the two parameters in question.
range of their competence rather than preferred interpretations of an
anaphor in a given context (e.g. Wakabayashi, 1996; White et al.,
1997; Akiyama, 2002);

• methods of analysis of experimental data: the percentage of the
responses for each sentence type aggregated by groups of partici-
pants has been examined in most of the previous studies. However,
these kinds of data may not provide a precise description of ILGs,
although they may reveal some general tendencies of L2 acquisition
(e.g. Wakabayashi, 1996; Akiyama, 2002);

• the participant pool: previous studies of reflexive binding have typic-
ally involved L2 speakers with transitional grammars, hence it is dif-
ficult to determine their ability to reset parameters. These problems
were kept in mind when the test for the present study was devised.

This study explores Chinese learners’ acquisition of the locality
constraints on the binding of English reflexives from a developmental
perspective. The earlier studies on L2 binding focused on the role of sen-
tence type, including both finite and non-finite test sentences; they did
not examine the role of antecedent type, namely distinguishing between
quantified antecedents (such as everyone, someone, no one) and refer-
ential antecedents (such as James, Mary) in the test sentences. A reflex-
ive may take referential or quantified antecedents. In both situations, the
distribution of the reflexive is the same. For example, English reflexives
take referential or quantified NPs within the same clause as antecedents,
whereas the Chinese reflexive ziji takes referential or quantified NPs in
a different clause as well as in the same clause as antecedents, as shown
in (8). However, the interpretations of the reflexive in the two situations
are totally different. In the former situation, the reflexive refers to a par-
ticular individual. In the latter situation, however, the reflexive receives
a variable interpretation, because quantified expressions do not pick out
a specific entity from the universe of discourse.

8) a. Meigeren dou renwei [Zhangsan xiangxin ziji].
   Everyone all think Zhangsan trust self
   ‘Everyone thinks that Zhangsan trusts him/himself.’

b. Zhangsan renwei [meigeren dou xiangxin ziji].
   Zhangsan think everyone all trust self
   ‘Zhangsan thinks that everyone trusts him/himself.’

For such reasons, the focus of the present study will be not only
the role of sentence type, but also the role of antecedent type. Two
research questions were addressed: First, do the learners show distinct performance in finite vs. non-finite clauses? Second, do they show distinct performance on referential vs. quantified antecedents?

II Theoretical accounts

According to Chomsky (1981), anaphors, which include reflexives and reciprocals, are subject to Principle A of the Binding Theory, which states that an anaphor must be bound in its binding domain. Principle A is an invariant property of human language. However, there is considerable cross-linguistic variation in the domains in which anaphors must be bound. In English, the reflexives like *himself* and *herself* can be bound up to, but not beyond a local subject; binding to subjects or non-subjects is allowed.

9) Julie hoped that [June would talk to Mary about herself].

In Russian, the reflexive *sebja* (*self*) can be bound across the PRO subject of a non-finite clause, but not across the nominative subject of a finite clause (examples from Bailyn, 1992); it requires the antecedent to be a subject.

10) Saša poprosila Marinu [PRO narisovat’ sebja].
Sasha requested Marina-ACC draw self
‘Sasha asked Marina to draw her/herself.’

b. Saša preset, [čtoby Marinu narisovala sebja].
Sasha requests that Marina draw-Past self
‘Sasha requests that Marina draw herself.’

In Chinese, the reflexive *ziji* can even be bound across the nominative subject of a finite clause, and shows strict subject orientation, as shown in (11).

11) Zhangsan gaosu Lisi [Wangwu xiangxin ziji].
Zhangsan tell Lisi Wangwu trust self
‘Zhangsan tells Lisi that Wangwu trusts him/himself.’

3 Although tense and agreement are not systematically marked in Chinese, there are still ways to make a distinction between finite and non-finite clauses in the language. Huang (1984) argues that Chinese uses AUX to encode finiteness. The occurrence of a lexical subject in the language is systematically licensed by an AUX even though AUX may not always have its overt realization. According to Huang, there are mainly two types of verb in Chinese: one including verbs like *shuo* (*say*) and *xiangxin* (*believe*), which can be followed by finite clauses, and the other including the so-called ‘control verbs’ like *zhunbei* (*prepare*), *shefà* (*try*), *quan* (*persuade*), and *bi* (*force*), which can only be followed by non-finite clauses.
It should be noted at this point that in addition to the LD reflexive *ziji*, Chinese also has a local reflexive *taziji* (‘himself/herself’), which shares the same morphological structure and behaviour as English reflexives, as shown in (12).4

\[
\text{12) } 
\text{Zhangsan} \text{i gei Lisi yi zhang taziji de zhaopian.}
\]

\[
\text{Zhangsan give Lisi one CL himself DE photograph}
\]

‘Zhangsan gives Lisi a photograph of himself.’

This, however, appears not to play a role in the way that Chinese speakers establish knowledge of English reflexive binding (for discussion, see Section IV).

There are many proposals in the literature that are concerned with capturing the facts of the syntactic binding of reflexives; for example, the parameterized approach (Manzini and Wexler, 1987; Wexler and Manzini, 1987), the Move-to-INFL approach (e.g. Pica, 1987; Battistella, 1989), and the Relativized SUBJECT approach (Progovac, 1992; 1993). The discussion here focuses on the Move-to-INFL approach, which is adopted as the framework for the present study.

According to the Move-to-INFL approach (e.g. Pica, 1987; Battistella, 1989), anaphors are defective and thus must move at Logical Form (LF) in order to get licensed. Monomorphemic reflexives like *ziji* in Chinese and *sebja* in Russian are heads and do not have features of person, number and gender. Hence, they can raise out of VP into the INFL of the same clause. After the monomorphemic reflexive raises into INFL, it will be c-commanded by the subject NP only, but not the object, explaining why monomorphemic reflexives cannot be bound by any non-subject antecedent. We also assume, following Reinhart and Reuland (1991), that head movement of reflexives involves incorporation. When the reflexive head X adjoins to another head Y, excorporation is blocked. As a result, subsequent movement of X requires the pied-piping of Y. Movement of Y is possible only when the position of Y is not crucial for the interpretation of the sentence. The movement of tensed INFL from its own clause would be prohibited because it would result in a structure in which tense would have scope over a higher clause. Thus, the interclausal movement of reflexives would be possible only in (1) languages lacking tensed INFL and (2) non-finite

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4 The abbreviations used in example (12) are: CL = classifier, DE = modifying marker that occurs at the end of a pronominal modifier.
structures. In Chinese, the total absence of tense morphemes enables the interclausal movement of *ziji*, which decides the property of LD binding of *ziji*. In Russian, tense is realized morphologically in finite clauses and therefore prohibits the interclausal movement of *sebja*. Consequently, *sebja* must be bound locally in a finite clause. In a non-finite clause, tense is morphologically null, thus, enabling the interclausal movement of *sebja*. In consequence, *sebja* can have LD binding out of non-finite clauses.

Polymorphemic reflexives like *himself* in English and *taziji* in Chinese, on the other hand, are maximal projections, which can adjoin only to the nearest maximal projection, namely the VP in which they originate. There they remain in the binding domain of either a local subject or a local object. Thus, the polymorphemic reflexives will always require local antecedents, which are not necessarily subjects.

To summarize thus far, the cross-linguistic variation in the grammars of reflexives can be explained in terms of two parameters: a reflexive parameter (following MacLaughlin, 1998) and a tense parameter:

- Reflexive parameter: a reflexive is monomorphemic or polymorphemic.
- Tense parameter: Tense is null or morphological.

The reflexive parameter distinguishes between different types of reflexive. The tense parameter, on the other hand, distinguishes between null or overt tense morphology. These two parameters yield the three possible binding patterns, as shown in Table 1.

- Type I is the binding pattern in which only local binding is allowed, as in English (*himself*) and Chinese *taziji*.
- Type II is the binding pattern in which LD binding is permitted out of non-finite clauses only, as in Russian (*sebja*).
- Type III is the binding pattern in which LD binding is permitted out of finite clauses, as in Chinese (*ziji*).

<table>
<thead>
<tr>
<th>Type</th>
<th>Reflexive</th>
<th>Tense</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>poly</td>
<td>overt</td>
<td>English <em>himself</em></td>
</tr>
<tr>
<td></td>
<td>poly</td>
<td>null</td>
<td>Chinese <em>taziji</em></td>
</tr>
<tr>
<td>Type II</td>
<td>mono</td>
<td>overt</td>
<td>Russian <em>sebja</em></td>
</tr>
<tr>
<td>Type III</td>
<td>mono</td>
<td>null</td>
<td>Chinese <em>ziji</em></td>
</tr>
</tbody>
</table>
III The experiment

1 Participants

Sixty-six Chinese speakers served as participants for the experiment, and 12 native speakers of English as controls. The 66 Chinese speakers included 21 students studying English as one of the courses in a middle school in China and 45 university students enrolled in various English language courses at a large university in China. An English proficiency test, namely the Quick Placement Test (QPT) (UCLES, 2001) was administered to them. Based on their scores in the test, the Chinese speakers were divided into three groups: beginning \((n = 21)\), intermediate \((n = 19)\) and advanced \((n = 26)\). A one-way ANOVA showed that there were significant differences among the three learner groups \((F = 419.925, p < 0.0001)\), with post hoc Scheffé procedures showing significant differences between the advanced group and the other learner groups, as well as between the beginner and intermediate groups. As for the native controls, they were all students at the University of Essex, UK. Detailed information on the participants is given in Table 2.

2 Materials

To avoid the preference problem pointed out earlier, a story-based truth-value judgement task based on that in White et al. (1997) was developed for this study to test Chinese speakers’ knowledge of reflexive binding in L2 English. The individual test items consisted of a context in the form of a story in Chinese and two comments about the story in English. The controls were tested on the same stories and comments in English. Of the 30 stories, 24 were test items and 6 were distractors. Of the two comments for each story, one was a test sentence containing a reflexive, the other was a distractor. The following examples show the general structure of the test items, with (13) showing how a referential

<table>
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<th>Table 2</th>
<th>Participants’ background information</th>
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<tr>
<td></td>
<td>Number of participants</td>
</tr>
<tr>
<td>Chinese beginner</td>
<td>21</td>
</tr>
<tr>
<td>Chinese intermediate</td>
<td>19</td>
</tr>
<tr>
<td>Chinese advanced</td>
<td>26</td>
</tr>
<tr>
<td>Native English</td>
<td>12</td>
</tr>
</tbody>
</table>
antecedent was embedded in the story and the comment, and with (14) showing how a quantified antecedent was embedded in the story and the comment.

13) Lisa just broke up with her boyfriend. She was down in the dumps, so she had a crew cut. Now she looks like her brother. Lisa thinks that her mother will mistake her for her brother. [The story was in Chinese for the Chinese participants.]

Comments:
   a. Lisa thinks that her mother will not recognize herself. (True – False)
   b. Lisa changed a lot as the result of her haircut, so it will be difficult for her mother to recognize her. (True – False)

14) Mr. Cook is the director of a drama club. He was asked to recommend one of the club members to play the main character in a new play. With acting experience, every member thinks, ‘I will be perfect for the role.’

Comments:
   a. Mr. Cook is an important person in the drama club. (True – False)
   b. Everyone thinks that Mr. Cook will recommend himself. (True – False)

The participants read the stories and had to decide for each subsequent comment whether it was a natural sentence that followed appropriately from the story by circling either ‘True’ or ‘False’ printed at the end of the comment. They were told that sometimes in the test both comments would follow naturally, but sometimes only one or even none of the comments would follow from the story. In the case of example (13), the story makes it clear that it will be difficult for Lisa’s mother to recognize Lisa, so if a participant’s grammar allows coreference between herself and the LD NP Lisa in ‘Lisa thinks that her mother will not recognize herself’, the participant should indicate that comment A does indeed match the story, by circling ‘True’. On the other hand, if a participant allows only local binding of herself, then the comment can only mean that Lisa’s mother will not recognize herself. Since this meaning is manifestly inconsistent with the text, such an interpretation of herself should lead that participant to claim comment A does not match the story, by circling ‘False’. Comment B implies that it will be difficult for Lisa’s mother to recognize Lisa, hence matching the story. Example (14) followed the same design rationale.

We presented the context in Chinese and the test comments in English for the following reasons. First, presenting the context in Chinese ensures that all of the participants in the experimental group clearly and unambiguously understand the context, hence reducing the possibility that choices of answers result from misunderstandings of stories. Second, presenting only the test comment in the target language (English)
eliminates any possible attempts by the participants to somehow use the surface grammatical form of the stories as a source of aid in judging the comments. Therefore, Chinese contexts seem preferable.

The 24 sentences for testing the Chinese speakers’ interpretation of English reflexives fall into four types, as illustrated in Table 3. Types 1 and 2 investigate whether participants allow coreference between himself/herself and a local subject; Types 3 and 4 between himself/herself and an LD subject.

3 Group results

Table 4 presents the mean accuracy scores, by sentence type, for L2 learners and controls. A score of 1 was given to each item where a participant

Table 3  Sentence types used to test Chinese speakers’ interpretation of English reflexives

<table>
<thead>
<tr>
<th>Type 1: Biclausal sentences with finite embedded clauses; context suggests binding to the local subject (6 tokens). Expected response: true</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1a: Referential antecedents (3 tokens)</td>
</tr>
<tr>
<td>*Bob thought that James was painting himself,</td>
</tr>
<tr>
<td>Type 1b: Quantificational antecedents (3 tokens)</td>
</tr>
<tr>
<td>*Bob thought that everyone was painting himself,</td>
</tr>
<tr>
<td>Type 2: Biclausal sentences with non-finite embedded clauses; context suggests binding to the local subject (6 tokens). Expected response: true</td>
</tr>
<tr>
<td>Type 2a: Referential antecedents (3 tokens)</td>
</tr>
<tr>
<td>*Bob wanted James to paint himself,</td>
</tr>
<tr>
<td>Type 2b: Quantified antecedents (3 tokens)</td>
</tr>
<tr>
<td>*Bob wanted everyone to paint himself,</td>
</tr>
<tr>
<td>Type 3: Biclausal sentences with finite embedded clauses; context suggests binding to the LD subject (6 tokens). Expected response: false</td>
</tr>
<tr>
<td>Type 3a: Referential antecedents (3 tokens)</td>
</tr>
<tr>
<td>*Bob thought that James was painting himself,</td>
</tr>
<tr>
<td>Type 3b: Quantificational antecedents (3 tokens)</td>
</tr>
<tr>
<td>*Everyone thought that Bob was painting himself,</td>
</tr>
<tr>
<td>Type 4: Biclausal sentences with non-finite embedded clauses; context suggests binding to the LD subject (6 tokens). Expected response: false</td>
</tr>
<tr>
<td>Type 4a: Referential antecedents (3 tokens)</td>
</tr>
<tr>
<td>*Bob wanted James to paint himself,</td>
</tr>
<tr>
<td>Type 4b: Quantified antecedents (3 tokens)</td>
</tr>
<tr>
<td>*Everyone wanted James to paint himself,</td>
</tr>
</tbody>
</table>
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answered ‘True’ to a sentence where the context set up the local subject as the appropriate antecedent or ‘False’ to a sentence where the context set up the LD subject as the appropriate antecedent (impossible in English).

**a Type 1 and Type 2:** For Type 1 sentences, a one-way ANOVA showed that the learner groups did not differ significantly from each other or from the controls; performance on Type 1a vs. Type 1b sentences showed no significant differences. For Type 2 sentences, a one-way ANOVA again showed no significant differences between the mean accuracy scores of the four groups; performance on Type 2a vs. Type 2b sentences showed no significant differences. Performance on Type 1 vs. Type 2 sentences showed no significant differences either. These results suggest that the Chinese speakers, like the native controls, readily accepted local antecedents.

**b Type 3 and Type 4:** For Type 3 sentences, a one-way ANOVA displayed significant group effects ($F = 51.727, p < 0.0001$), with *post hoc* Scheffé procedures showing group differences between the three learner groups and the control group; significant differences are also found between the advanced group and the other learner groups, as well as between the beginner and intermediate groups. Comparing performance on Type 3a vs. Type 3b sentences showed significant differences for the advanced group ($t = 20.207, p < 0.0001$) but not for the beginner or intermediate group;

<table>
<thead>
<tr>
<th>Type</th>
<th>Referential antecedents</th>
<th>Quantified antecedents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beginner group</td>
<td>Intermediate group</td>
</tr>
<tr>
<td>Ref.</td>
<td>2.86</td>
<td>2.89</td>
</tr>
<tr>
<td>Qty</td>
<td>2.81</td>
<td>2.89</td>
</tr>
<tr>
<td>2</td>
<td>Beginner group</td>
<td>Intermediate group</td>
</tr>
<tr>
<td>Ref.</td>
<td>2.90</td>
<td>2.95</td>
</tr>
<tr>
<td>Qty</td>
<td>2.76</td>
<td>2.84</td>
</tr>
<tr>
<td>3</td>
<td>Beginner group</td>
<td>Intermediate group</td>
</tr>
<tr>
<td>Ref.</td>
<td>1.24*</td>
<td>2.00*</td>
</tr>
<tr>
<td>Qty</td>
<td>1.14*</td>
<td>2.05*</td>
</tr>
<tr>
<td>4</td>
<td>Beginner group</td>
<td>Intermediate group</td>
</tr>
<tr>
<td>Ref.</td>
<td>1.1*</td>
<td>1.58*</td>
</tr>
<tr>
<td>Qty</td>
<td>1.1*</td>
<td>1.63*</td>
</tr>
</tbody>
</table>

*Note:* *significantly different from the control group.
that is, the advanced group was more sensitive to the referential/quantified asymmetry, showing significantly lower accuracy on LD quantified antecedents as compared to LD referential antecedents in finite clauses.

For Type 4 sentences, a one-way ANOVA again showed highly significant group differences ($F = 49.495, p < 0.0001$), with post hoc Scheffé procedures showing group differences between the three learner groups and the control group; significant differences are also found between the advanced group and the other learner groups, as well as between the beginner and intermediate groups. Comparing performance on Type 4a vs. Type 4b sentences showed significant differences for the advanced group ($t = 6.985, df = 25, p < 0.0001$) but not for the beginner or intermediate group; that is, the advanced group was more sensitive to the referential/quantified asymmetry, showing significantly lower accuracy on LD quantified antecedents as compared to LD referential antecedents in non-finite clauses.

Comparing performance on Type 3 vs. Type 4 sentences showed significant differences for the intermediate group ($t = 2.446, df = 25, P = 0.025$) but not for the beginner or advanced group; that is, the intermediate group was more sensitive to the finite/non-finite asymmetry, showing significantly greater accuracy at rejecting LD antecedents in finite over non-finite clauses.

c Summary: To summarize, the group results illustrate three trends. First, Chinese learners accepted LD antecedents significantly more than the controls, but their performance improved significantly with proficiency. Second, only the advanced group showed significantly lower accuracy on LD quantified antecedents as compared to LD referential antecedents in both finite and non-finite clauses. Third, only the intermediate group showed significantly greater accuracy at rejecting LD antecedents in finite over non-finite clauses.

4 Individual results
The analysis of individual data was based on the consistency of responses each participant exhibited. Following Akiyama (2002), we defined consistency as two or three acceptances or rejections out of three. We first evaluated the participants’ response patterns to each sentence type separately, then combined the results in order to classify the individual participant as exhibiting either a particular type of binding (Type I, Type II, or Type III) or being inconsistent in their judgments.
Figure 1 shows how the three types of binding developed from beginner through native controls. It appears that the Type I and Type III binding developed in certain determined directions: Type I was progressing to 100% whereas Type III was regressing to zero; this suggests that the learners became more target-like with proficiency in interpreting English reflexives. The development for Type II binding, on the other hand, was more complex: this binding pattern was strongest for the intermediate participants, but much weaker for the beginners and advanced participants, which is consistent with the group result that the intermediate participants were more sensitive to the finite/non-finite asymmetry, showing significantly higher incidence of LD binding out of non-finite than out of finite clauses.

Recall that group data indicated that the advanced participants were more sensitive to the referential/quantified asymmetry, showing significantly lower accuracy on LD quantified antecedents as compared to LD referential antecedents in both finite and non-finite clauses. The responses of individual participants are analysed to see whether the group results in fact reflect properties of individual grammars. Following Thomas (1989), I established criterial levels for the LD referential antecedents and LD quantified antecedents that indicate whether a given participant has rejected the LD antecedents in question. A participant

![Figure 1](image.png)  
**Figure 1** Development of each type of binding using the two out of three criterion
was classified as exhibiting ‘full rejection’ of LD referential antecedents or LD quantified antecedents on a sentence type if he or she rejected LD binding on all three test sentences, or ‘partial rejection’ if he or she rejected LD binding on two out of the three test sentences. Otherwise, the participant was classified as ‘no rejection’.

Table 5 sorts the Chinese participants according to whether they have rejected one or both of these antecedent types in finite (Type 3) sentences. All the 26 advanced participants (24 + 2) have ‘full rejection’ of the LD referential antecedents without equivalent rejection of the LD quantified antecedents. Thus, the number of individual advanced participants who show more rejection of the LD referential antecedents than of the LD quantified antecedents is much greater than the number who show the opposite rejection pattern (more rejection of LD quantified antecedents than of the LD referential antecedents) (26:0). For the beginners (0:1) and intermediate participants (0:1), however, the number of individual participants who show more rejection of the LD referential antecedents than of the LD quantified antecedents is similar to the number who show the opposite rejection pattern.

Table 6 sorts the Chinese participants according to whether they have rejected one or both of these antecedent types in non-finite (Type 4) sentences. No advanced participants have partial or full rejection of the LD quantified antecedents without equivalent rejection of the LD referential antecedents, while 18 advanced participants (1 + 16 + 1) have partial or full rejection of the LD referential antecedents without equivalent rejection of the LD quantified antecedents. Thus, the number

<table>
<thead>
<tr>
<th>Table 5</th>
<th>Numbers of the Chinese participants with full, partial, or no rejection of LD referential antecedents (RAs) and LD quantified antecedents (QAs) in finite sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No rejection of LD RAs</td>
</tr>
<tr>
<td>Full rejection of LD QAs</td>
<td>1</td>
</tr>
<tr>
<td>Partial rejection of LD QAs</td>
<td>2</td>
</tr>
<tr>
<td>No rejection of LD QAs</td>
<td>13</td>
</tr>
</tbody>
</table>
of individual advanced participants who show more rejection of the LD referential antecedents than of the LD quantified antecedents is much greater than the number who show the opposite rejection pattern (18:0). For the beginners (1:1) and intermediate participants (1:2), however, the number of individual participants who show more rejection of the LD referential antecedents than of the LD quantified antecedents is similar to the number who show the opposite rejection pattern.

To summarize, analysis of the responses of individual participants is in support of the group result that only the advanced group showed significantly greater accuracy on LD referential antecedents as compared to LD quantified antecedents in both finite and non-finite clauses.

### IV Discussion

1. The finite/non-finite asymmetry

Previous studies that have included both finite and non-finite test sentences reported higher incidence of LD binding out of non-finite than out of finite clauses (e.g. Finer and Broselow, 1986; Hirakawa, 1990; Finer, 1991; MacLaughlin, 1998). Whereas other studies (e.g. Eckman, 1994; Yip and Tang, 1998) reported conflicting results indicating that there was no such finite/non-finite asymmetry. In the present study, the finite/non-finite asymmetry was strongest for the intermediate participants, but much weaker for the beginners and advanced participants. This finding can be accounted for on the basis of the Move-to-INFL approach (e.g. Pica, 1987; Battistella, 1989). Chinese speakers appear initially
to misanalyse English polymorphemic reflexives as monomorphemes, due to transfer of L1 knowledge of the monomorphemic reflexive *ziji*. Consequently, English reflexives have to raise into INFL at LF in their ILGs. At the same time, they may also transfer the properties of tense in their L1 Chinese into their L2 English, unaware of the fact that, unlike Chinese, tense is realized morphologically in English finite clauses. As a result, the interclausal movement of English reflexives will be possible in both finite and non-finite sentences in their ILGs, thereby predicting no asymmetry in the beginners’ treatment of LD binding in finite and non-finite clauses.

Given the presence in Chinese of the polymorphemic form *taziji* (‘himself/herself’), one possibility could have been that Chinese speakers would associate English *himself/herself* with this form. However, if they had done this, their responses should have been native-like. Given the difficulty that these Chinese learners have in acquiring local binding of English reflexives, they must have set English and Chinese polymorphemic reflexives apart and cannot simply have treated them as equivalents. *Taziji* does not help in the L2 acquisition of English local binding, possibly due to its weaker influence on Chinese speakers. The antecedent for *taziji* is limited to NPs that are [3rd person, singular, masculine/feminine, human], but the antecedent of *ziji* can be any person, number, and gender as long as it is human, so *ziji* can often replace *taziji* in sentences with a masculine/feminine, third-person singular antecedent. The empirical findings here for Chinese are consistent with the analysis of Ying (1999) for Japanese, who argued that the high frequency usage of *zibun* would lead Japanese-speaking learners of English to initially assume that English has a monomorphemic reflexive even though Japanese also has polymorphemic reflexives like *kare-zisin* (‘himself’).

As the level of proficiency increased, the Chinese speakers found that tense is realized morphologically in English finite clauses, but meanwhile failed to reanalyse English reflexives as morphologically complex. Consequently, English reflexives still have to raise into INFL in their ILGs. In a non-finite clause, the absence of tense morphemes enables English reflexives to raise into the INFL of a higher clause, making it possible for English reflexives to have LD binding out of

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5 In the Current Mandarin Chinese Corpus, which consists of about 264 444 436 words drawn from both written and spoken current Mandarin Chinese, *ziji* is much more frequent than *taziji* of both types: *ziji* occurs 223,298 times, which accounted for 86.1% of all reflexives used; *taziji* (‘himself’) occurs 12,286 times, constituting 4.7%; *taziji* (‘herself’) 4,153 times, constituting 1.6%.
non-finite clauses. However, in a finite clause, if the tense is treated as morphologically overt, the interclausal movement of reflexives will be prohibited and LD binding will be impossible for English reflexives in finite clauses. In consequence, the asymmetry in the intermediate participants’ treatment of LD binding in finite and non-finite clauses is predicted by our analysis.

By advanced proficiency, the Chinese speakers realize that English reflexives are polymorphemic and must be adjoined to the immediate VP. As a result, they rejected LD binding in both finite and non-finite sentences, and therefore showed no asymmetry in treatment of LD binding in finite and non-finite clauses.

To summarize, in the L2 acquisition of English reflexives, the Chinese speakers are both transferring from the L1 and resetting parameters, specifically the reflexive parameter and the tense parameter. The finite/non-finite asymmetry observed is possibly due to the fact the reflexive parameter has not been reset whereas the tense parameter has been. What causes the Chinese speakers to make this kind of misanalysis? Acquisition involves an interaction of UG, the learner’s current grammar and the L2 input. For the Chinese speakers, resetting of the tense parameter could be triggered by the recognition of overt tense morphology found on verbs in English. However, it might seem odd that the L2 English input providing transparent evidence showing that reflexives are morphologically complex fails to trigger the relevant reflexive type. Nevertheless, it is noteworthy that this is not a problem unique to L2 acquisition. Young children acquiring English as an L1 do not seem to recognize the morphological complexity of English reflexives, thus exhibiting a situation that is completely parallel to the Chinese ziji case (e.g. McDaniel et al., 1990; Thomas, 1994).

2 The referential/quantified asymmetry

In this study the advanced participants were more sensitive to the referential/quantified asymmetry, showing significantly greater accuracy on LD referential antecedents in sentences like (15) as compared to LD quantified antecedents in sentences like (16).

15) * John thinks that Mark dislikes himself.
16) * Everyone thinks that Mr. Cook will choose himself.

With respect to this referential/quantified asymmetry, it is clear that the learners’ ILGs have not inherited this analysis from Chinese, the L1,
nor does English, the L2 exhibit this difference. One might argue that the asymmetry may somehow arise from frequency effects in the input, since English input contains more instances of local binding to referential antecedents than local binding to quantified antecedents. Note, however, that the beginners and intermediate participants in this study did not show such a referential/quantified asymmetry; hence, an account of the distinction between the ILGs of the beginners and intermediate participants and those of the advanced participants is still required. In other words, this observation about frequency effects in the input in no way undermines or detracts from the necessity of having a grammatical account of the referential/quantified asymmetry.

The referential/quantified asymmetry can also be accounted for on the basis of the Move-to-INFL approach (e.g. Pica, 1987; Battistella, 1989). The advanced participants, as already indicated in the discussion above, have analysed the English reflexives as morphologically complex. As a result, the reflexives must adjoin to the maximal phrase containing them (namely, VP) for an interpretation in these ILGs. In addition, following May (1977), quantificational sentences like (16) are subject to the rule Quantifier Raising, according to which a quantified NP adjoins to IP, leaving a trace A'-bound by the adjoined NP. As a result, the two operations – reflexive raising and quantifier raising – give (16) the LF-structure (17):

\[
\text{(17) } [IP \text{ Everyone} IP t \text{ thinks } [CP \text{ that Mr. Cook will himself choose } t]].
\]

In this construction, \textit{himself} is in the domain of the subject of that embedded clause, which is therefore its only possible antecedent. Given that the trace left behind by reflexive-raising has the same status for the Binding Theory as an R-expression, the trace of \textit{himself} in (17) is then required to be free with respect to any c-commanding argument, but allowed to be A'-bound. Since the quantifier \textit{everyone} moves from an A to an A' position by way of adjunction to IP, it can A'-bind both its trace and the trace left behind by the fronted reflexive \textit{himself}. This line of analysis accords well with Safir (1984), who argues that an A' category can bind more than one variable, as long as the variables are of the same type (all overt pronouns or all empty categories). Once the advanced participants recognize that \textit{himself} is bound by \textit{Mr. Cook}, and its trace is bound by \textit{everyone}, they might think that both \textit{Mr. Cook} and \textit{everyone} are possible antecedents of the reflexive in ‘Everyone thinks that Mr. Cook will choose himself.’ As a result, for quantificational sentences
like (16) where the context set up coreference between the reflexive and the LD quantifier, the learners would accept such LD interpretation. On the other hand, only the rule of reflexive raising can apply to the non-quantificational sentence (15), giving it the LF-structure (18).

18) John thinks that Mark himself [VP dislikes t].

In this construction, the matrix subject John must stay in its base position and cannot move to an A’ position binding the trace left behind by reflexive-raising. Hence, the embedded subject Mark is the only possible antecedent of the reflexive in these ILGs. As a result, for non-quantificational sentences like (15) where the context set up coreference between the reflexive and the LD referential expression, the advanced participants would reject such a LD interpretation. On such an account, it is hardly surprising to find that in the present study the advanced learners displayed an asymmetry in rejecting LD referential antecedents compared to their very low rejection of LD quantified antecedents. In such cases, the grammar of the advanced participants is different from the grammar of native speakers of English but nevertheless subject to UG constraints.

For the beginners and intermediate participants, there was no such referential/quantified asymmetry in their LD judgments. This is because they misanalysed the English reflexives as morphologically simple, as indicated already in the discussion above. As a result, the reflexives can raise out of VP into INFL, where they are interpreted, thus permitting LD binding regardless of antecedent type in these ILGs. Consequently,

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6 We argue that the quantifier everyone moves from an A to an A’ position by way of adjunction to IP in learners’ L2 English, which leads to the possibility of the LD quantified antecedent in Chinese speakers’ L2 English grammars. However, no independent evidence was provided for this claim. Further studies should design a test to check whether the quantifier raises in these ILGs.

7 An anonymous Second Language Research reviewer pointed out that John may raise to the topic position in learners’ L2 English as a result of L1 Chinese transfer, thus A-binding both its trace and the trace left behind by the fronted reflexive himself. We assume, following Yuan (1997), that in Chinese objects rather than subjects raise to the topic position and, therefore, the status of null subjects and null objects is different in Chinese: subjects are pro, objects are traces. In line with this claim, John, as a matrix subject, may not raise to the topic position in the learners’ L2 English, which further decides the impossibility of the LD referential antecedent in the Chinese advanced learners’ L2 English grammars.

8 We assume that, unlike the advanced participants who made no distinction between the binder of the reflexive and the binder of the trace of the reflexive, accepting both to be possible antecedents of himself in sentences like (17), the native speakers distinguished sharply between the two types of binder, rejecting the latter to be a possible antecedent of himself. In consequence, the native speakers would not show the same referential/quantified asymmetry.
there would be no asymmetry in their treatment of LD referential antecedents and LD quantified antecedents.

It is worth observing that in the L1 acquisition literature on Principle B, the difficulty goes in the opposite direction to what is reported here. In L1 acquisition of English, the experimental finding is that children allow (19) to have an interpretation in which Mama Bear is washing herself, in apparent violation of Principle B. When a quantificational NP like every bear is in subject position as in (20), however, children do not allow the interpretation that every bear is washing herself (e.g. Chien and Wexler, 1990; McDaniel and Maxfield, 1992).

19) Mama Bear is washing her.
20) Every bear is washing her.

It is not clear why the direction of the effect is different in the context of the two different Binding Principles, and further work is required to examine whether the two phenomena are related (compare also Lee’s (2003) observation on the case of quantificational antecedents in Thai reflexive binding).

V Conclusions

This study has identified two important aspects of the acquisition of reflexive binding in English by native speakers of Chinese. Firstly, that the finite/non-finite asymmetry reported in previous studies was strongest for the intermediate participants but much weaker for the beginners and advanced participants, suggesting that the Chinese speakers are both transferring from the L1 and resetting parameters, specifically, the reflexive parameter and the tense parameter. The finite/non-finite asymmetry would be potentially consistent with learners having a grammar for L2 English where the parameter relating to reflexive type has not been reset whereas the tense parameter has been. Second, that there is an unexpected asymmetry in the grammars of advanced proficiency learners of English, who allow LD quantified antecedents to bind reflexives in tensed embedded clauses. This finding can be accounted for by assuming that at LF a quantifier raises by way of IP-adjunction, and a polymorphemic reflexive raises by way of VP-adjunction. This referential/quantified asymmetry is realized neither in Chinese nor English, but is a possibility that falls within the range sanctioned by UG. In acquiring the locality constraints on the binding of English reflexives, the learners’ performance progressed as a function of their proficiency, but a gap remained between the advanced participants’ judgments and
those of the native speakers, indicating that the Chinese speakers in this study have not yet acquired the locality constraints on the binding of English reflexives. However, on the whole, their grammars of English reflexives do not diverge from the possibilities allowed by UG.

The present study has not been able to address all aspects of reflexive binding. As in a number of previous studies (e.g. Wells, 1998; Akiyama, 2002) it has not considered whether Chinese speakers’ ILGs allow binding by non-subject antecedents (i.e. the orientation of reflexive binding). In English, such binding is possible in local domains. No language, however, should allow an LD object to bind reflexives, given the nature of the binding principles. Thus, if L2 grammars are UG-sanctioned, they should not allow sentences like the following:

21) * Tom told James, that Bob blamed himself.
22) * Tom told everyone, that Bob blamed himself.

Such cases will be the subject of future work.

Acknowledgements
This study was supported by an MOE Project (No. 07JJD740067) of the Center for Linguistics and Applied Linguistics of Guangdong University of Foreign Studies and the Guangdong 211 Project (No. GDUFS211-1-056). I would like to express my thanks to Roger Hawkins and three anonymous Second Language Research reviewers for their valuable comments on an earlier version of the article. Thanks also to Wang Chuming for his warm encouragement. Any errors, of course, are my own.

VI References
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