

ANAPHOR RECONSTRUCTION IN L1 AND L2 JAPANESE RELATIVE CLAUSES

YUNCHUAN CHEN AND SHIN FUKUDA

Part I Introduction

When an anaphor that must be locally bound occurs within the head NP of relative clauses (RCs), its interpretation has been considered to help diagnose whether the head NP is raised or base-generated (e.g. Schachter 1973; Bhatt 2002; Aoun and Li 2003). For Chinese relative clauses (CRCs), it has been argued that the head NP is raised from within the RC because the anaphor within the head NP can be co-referential with the RC subject (Aoun and Li 2003), as in (1). However, for Japanese relative clauses (JRCs) such as (2), whether the anaphor *jibun* within the head NP can refer to the RC subject has been controversial. While many studies claim that the co-reference between the anaphor and the RC subject is impossible (e.g. Hoji 1985; Murasugi 2000), several other studies argue that the co-reference is actually acceptable (e.g. Hoshi 2004; Ishizuka 2010).

- (1) [Zhangsan_k kanjian-le [[Xiaoming_i kai t_j lai de]
Zhangsan see-PST Xiaoming drive over DE
[zij_i/_k de chezi]_j]] (Chinese)
self GEN car
“Zhangsan_k saw self_i/_k’s car that Xiaoming_i drove over.”
(Aoun and Li 2003, 132)

- (2) Hanako_j-ga [[Taroo_k-ga e_i arat-ta] [jibun_j/_{?k}-no booshi]_i]-o
Hanako-NOM Taroo-NOM wash-PST self-GEN hat-ACC
yogoshi-ta. (Japanese)
stain-PST
“Hanako_j stained self_j/_{?k}’s hat that Taroo_k washed.”

The above controversies raise the following questions in the context of second language (L2) acquisition. If Japanese and Chinese RCs are

different in terms of the possible interpretation of an anaphor inside the head NP, can native speakers of Chinese who study Japanese as an L2 acquire the difference? The target knowledge is underdetermined because it cannot be directly derived from input, classroom instruction or learners' L1. Thus, L1 Chinese learners of L2 Japanese are faced with a challenging task: to unlearn some knowledge that is licensed in their L1 without any direct evidence from input. If they manage to do so, the operation of UG in L2 acquisition would be motivated.

Part II Design of Experiment 1

First of all, we conducted a TVJT with L1 Japanese speakers to address the following research question:

(3) Can the anaphor *jibun* within the head NP of JRCs can be co-referential with the RC subject?

The core implications of the results of Experiment 1 for the derivation of the head NP in JRCs are the following: if the anaphor can refer to the RC subject, it must be the case that the head NP reconstructs within the RC at LF, which implicates that the head NP is raised from within the head NP; however, if the anaphor cannot refer to the RC subject, we can infer that the head NP does not reconstruct within the RC so it is base-generated externally to the RC.

A total of 28 L1 Japanese speakers participated in Experiment 1. They were undergraduate students from one university in Japan. The experiment was done with a computer in a computer lab and each participant received an extra course credit after finishing the experiment. All participants finished the experiment within 20 minutes.

The task was a picture-matching TVJT. Four Disney characters, *Mickey*, *Minnie*, *Donald* and *Daisy*, were used in the materials. For each experimental stimulus, participants saw a picture and a sentence on a computer screen. One item with its two conditions is shown below as an example:



The Japanese sentence under the pictures is below:

- (5) Daisy_j-ga Mickey_k-ga arat-ta jibun_{j/??k}-no booshi-o
 Daisy-NOM Mickey-NOM wash-PST self-GEN hat-ACC
 yogoshita
 stain-PST
 “Daisy_j stained self^s_{j/??k} hat that Mickey_k washed.”

Participants were informed that all Disney characters like to put their face photos on their belongings. In (4a), the picture features a hat with a face photo of *Mickey*, which indicates that the hat is owned by *Mickey*. Participants then judged whether the sentence and the picture matched by selecting one of two choices: ‘match’ or ‘mismatch’. Importantly, in order for (5) to match (4a), *jibun-no booshi* “self’s hat” in (5) must be interpreted as *Mickey*’s hat. In other words, the antecedent of the anaphor must be the RC subject. In contrast, (4b) indicates that the hat is owned by *Daisy*. Thus, in order for (5) to match it, *jibun-no booshi* must be interpreted as *Daisy*’s hat. Therefore, within each item, the intended antecedent for the anaphor is either the matrix subject or the RC subject, depending on the picture. This factor of *Antecedent Position* results in two critical conditions: (i) a picture is such that the anaphor *jibun* must refer to the matrix subject (*Jibun-Matrix*) and (ii) a picture is such that the anaphor *jibun* must refer to the RC subject (*Jibun-RC*).

There were 24 sentences of different lexicalizations. Each of the 24 sentences was then combined with a picture that requires the matrix subject as the antecedent of the anaphor and another picture that requires the RC subject as the antecedent of the anaphor, resulting in 48 sentence-picture pairs. These 48 pairs were distributed into two lists so that each list contained only one condition from the same lexicalization. Thus, there were 24 critical stimuli in total in each list and each condition had 12 stimuli. Moreover, 36 fillers were included. The order of the all items in each list was pseudo-randomized.

Part III Findings of Experiment 1

A total of 28 L1 Japanese participants’ data were examined and analyzed. First, the mean frequency of ‘match’ answers with its standard deviation (SD) and standard error (SE) out of 12 items in each critical condition was calculated, which is summarized in Table 1.

Table 1. L1 Japanese speakers' means, SDs and SEs of the two critical conditions in Experiment 1

Conditions	Mean(SD)	SE
<i>Jibun</i> -Matrix	11.25 (1.11)	0.21
<i>Jibun</i> -RC	1.25 (1.55)	0.29

The mean difference between *Jibun*-Matrix and *Jibun*-RC clearly shows that the matrix subject is preferred to the RC subject as the antecedent of *jibun*. Pairwise comparison confirmed this observation: the mean difference between *Jibun*-Matrix and *Jibun*-RC is significant: $t(27) = 22.76$, $p < .01$. In addition, each individual's judgments were also examined. Based on binominal distribution, if a participants allowed/rejected 9 items or more in each condition, we will be sure that she did not make random choices. It shows that 27 out of 28 participants accepted 9 items or more in *Jibun*-Matrix and 1 participant accepted 8 items. Meanwhile, 24 out of 28 participants rejected 9 items or more in *Jibun*-RC¹. Thus, the co-reference between *jibun* and the RC subject seems impossible for L1 Japanese speakers. Thus, our findings suggest that the anaphor *jibun* within the head NP of JRCs cannot refer to the RC subject, which supports the proposal that the head NP of JRCs is base-generated externally to the RC and does not reconstruct within the RC at LF (e.g. Murasugi 2000). With this conclusion, we will continue to investigate whether L1 Chinese speakers of L2 Japanese can acquire the knowledge that the anaphor *jibun* within the head NP of JRCs cannot refer to the RC subject. If they can, the POS issue in L2 acquisition would be implicated.

Part IV Poverty of stimulus in L2 acquisition

One central concern in second language (L2) acquisition is: (i) whether UG is still accessible to L2 acquisition and if so, (ii) whether L2 grammars are constrained by UG. In late 1960s and early 1970s, researchers such as Corder (1967) and Selinker (1972) found that L2 learners make systematic rather than random errors, which indicates that learners' grammar is rule-governed. Since then, there have been different hypotheses concerning whether UG is accessible to L2ers. First, several researchers propose that UG is not accessible in adult L2 acquisition (e.g. Clahsen and Muysken 1986; Bley-Vroman 1990). They argue that L2 acquisition is not

¹ All participants rejected 7 items or more in *Jibun*-RC.

constrained by UG at all or only constrained by the properties of learners' L1. For example, by examining the naturalistic L2 acquisition of German by adult native speakers of various languages such as Italian, Portuguese, and Spanish, Clahsen and Muysken (1986) showed that learners move nonfinite verbs rightward in their L2 German, which is prohibited by UG. Based on this finding, Clahsen and Muysken argue that L2 learners' grammar is unconstrained and L2 acquisition is not constrained by UG. Nevertheless, Schwartz and Sprouse (2000) state that Clahsen and Muysken's "wild" L2 data is actually constrained by UG, if the data is analyzed under the revised syntactic structure proposed in du Plessis et al. (1987) and Schwartz and Tomaselli (1990). Another study arguing that UG does not constrain L2 acquisition is from Klein (1993, 1995). She observed that many languages allow omission of prepositions in RCs, which is called *null prep*. However, the null prep is prohibited in English because the ECP would be violated. Klein investigated whether native speakers of the languages that permit the null prep are able to acquire the knowledge that the null prep is prohibited in English. With a series of experiments, Klein found that even highly advanced L2 learners of English whose L1 belong to the relevant type of languages accept null prep in English, based on which she argues that L2 grammar can be unconstrained.

Although the UG-incompatible data seem to suggest that UG does not constrain L2 acquisition, Schwartz and Sprouse (2000) argue that the UG-incompatible data itself cannot be an argument against the availability of UG in L2 acquisition. There are two arguments. First, many known languages also show UG-incompatible data (e.g. Tomaselli and Schwartz 1990). Second, to argue that UG is not accessible in L2 acquisition, UG-incompatible data itself is not sufficient and should be supplemented by the evidence that L2 acquisition is not underdetermined by input. Since the POS is one of the core arguments to argue for the operation of UG in L1 acquisition, if we could show that the POS argument also holds for L2 acquisition, we would motivate the operation of UG in L2 acquisition (Schwartz and Sprouse 2000). Thus, to argue that UG remains active in L2 acquisition, the POS should be the focus. In addition, White (2003) states that the POS exists even if L2 learners do not acquire the same knowledge as native speakers. She claims that it is sufficient to demonstrate the POS as long as L2 learners could show complex grammatical knowledge that cannot be derived from their L1, input or any explicit instruction.

Indeed, many previous studies have shown that the POS does occur in L2 acquisition, which means there has been evidence that complex grammar can be learned by L2 learners in the absence of positive evidence

in the input and L1. In the following sections, we will investigate whether L1 Chinese learners of L2 Japanese can acquire the underdetermined knowledge that the anaphor *jibun* within the head NP cannot refer to the RC subject, with the aim to see whether the operation of UG in L2 acquisition can be further supported.

Part V Research Questions

In Chinese relative clauses (CRCs), it has been argued that the anaphor *ziji* “self” within the head NP of CRCs can take either the RC subject or the matrix subject as its antecedent (Aoun and Li 2003), as in (1a). In contrast, in Japanese relative clauses (JRCs), the results of Experiment 1 have confirmed the claim the anaphor *jibun* “self” within the head NP of JRCs cannot refer to the RC subject (e.g. Hoji 1985), as in (1b). This difference can be accounted for by analyzing that these two different languages use two different strategies to derive the head NP of RCs in the two languages: in Chinese, the head NP is raised from within the RC (Aoun and Li 2003) while in Japanese, the head NP is base-generated externally to the RC (e.g. Murasugi 2000).

As the co-reference between the anaphor and the RC subject is prohibited in Japanese but is allowed in Chinese, L1 Chinese learners of L2 Japanese are faced with a challenging task of unlearning the knowledge that is licensed in their L1. The constraint that the anaphor *jibun* cannot refer to the RC subject is underdetermined for L1 Chinese learners due to the following three reasons: (i) there is no input directly exhibiting that the anaphor *jibun* within the head NP cannot refer to the RC subject; (ii) this constraint is not taught in Japanese classes, based on our consultation with instructors of Japanese in China, (iii) this constraint cannot be derived from Chinese. Thus, we aim to address the following research questions:

(6a) Can L1 Chinese learners of L2 Japanese acquire the underdetermined constraint that the anaphor *jibun* within the head NP cannot refer to the RC subject?

(6b) Are there L1 transfer effects when L1 Chinese learners of L2 Japanese interpret the anaphor *jibun* within the head NP of JRCs?

Part VI Design of Experiment 2

All L2 participants completed two tasks in Experiment 2: (i) a Japanese TVJT, which is the same as Experiment 1 that the L1 Japanese speakers participated in and (ii) a Chinese TVJT equivalent to the Japanese TVJT, where each item was closely translated from Japanese to Chinese. Participants did the Chinese TVJT 3 weeks after the Japanese TVJT. Both TVJTs were done with a computer in a computer lab. Each participant spent about 1 hour in total to finish the two tasks and was given extra course credits after the experiment.

A total of 81 L1 Chinese learners of L2 Japanese were recruited to participate in this experiment. They were undergraduate students majoring in Japanese language at 3 universities in southwest China. According to a short background information survey, none of them started learning Japanese before the age of 17 and they do not have any extended stay outside China before entering college at the age of 17 or 18. Some participants studied in Japan as exchange students for one year in their third year in college.

The items in the Japanese TVJT and the Chinese TVJT were equivalent. There were 2 critical conditions: (i) a picture is such that the anaphor must refer to the matrix subject (*Jibun/Ziji*-Matrix) and (ii) a picture is such that the anaphor must refer to the RC subject (*Jibun/Ziji*-RC), as in (4) and (5). The Chinese sentence equivalent to the Japanese sentence (5) is below:

- (7) Daisy_j nongzang-le Mickey_k xi de ziji_{j/k}-de maozi.
 Daisy stain-PST Mickey wash DE self-DE hat
 ‘‘Daisy_j stained self_{j/k}’s hat that Mickey_k washed.’’

Since the Chinese anaphor *ziji* can refer to either the matrix subject or the RC subject under Aoun and Li’s (2003) proposal, participants were expected to accept items in both *Ziji*-Matrix and *Ziji*-RC in the Chinese TVJT. Further, 34 fillers were used to as a screening test to monitor whether the participants were careful enough in reading sentences and a total of 12 participants were excluded. The procedure in Experiment 2 is the same as that in Experiment 1. Moreover, each participant was given the same type of list in Chinese and Japanese. That is to say, the participants who had seen List 1 of the Japanese TVJT were given List 1 of the Chinese TVJT and those who had seen List 2 of the Japanese TVJT were given List 2 of the Chinese TVJT. Two-way repeated measures

ANOVA were used and pairwise comparisons were also conducted. We also examined the individual participants' judgments.

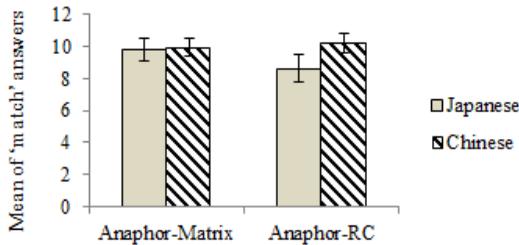
Part VII Findings of Experiment 2

The data of a total of 69 L2 participants were analyzed. First, the mean frequency of 'match' answers with its standard deviation (SD) and standard error (SE) for each condition in the Japanese and Chinese TVJTs was calculated, which is summarized in Table 4 and Figure 1.

Table 2. L2 participants' means, SDs and SEs of the critical conditions in the Japanese and Chinese TVJTs

Conditions	Mean(SD)	SE
<i>Jibun</i> -Matrix	9.83 (2.94)	0.35
<i>Ziji</i> -Matrix	9.97 (2.29)	0.28
<i>Jibun</i> -RC	8.62 (3.63)	0.44
<i>Ziji</i> -RC	10.20 (2.57)	0.31

Figure 1. L2ers' judgments on the critical conditions of the Japanese TVJT and the Chinese TVJT



Since each participant saw the same list in both Japanese and Chinese, the type of language can also be considered as a factor. There were two factors: (i) *Language Type* (Japanese or Chinese) and (ii) *Antecedent Position* (whether the intended antecedent is the matrix subject or the RC subject). Two-way repeated measures ANOVA revealed an interaction between the two factors: $F(1, 68)=5.44, p=.02$. Pairwise comparison shows that the difference in the mean frequency of the "match" answers between *Jibun*-Matrix and *Ziji*-Matrix is not significant: $t(68)=0.433, p=.666$. However, the mean frequency of the "match" answers of *Jibun*-RC is

significantly lower than that of *Ziji*-RC: $t(68)=3.348$, $p<.01$, which suggests that the L2 participants did make a distinction between the Chinese anaphor *ziji* and the Japanese anaphor *jibun* regarding their co-reference with the RC subject: *jibun* is less likely to take the RC subject as its antecedent than *ziji*.

In addition, the individual participants' judgments were examined. Based on binominal distribution, if a participant accepted/rejected 9 items or more in one condition, we would be confident that she did not make random judgments. By checking their judgments in *Jibun*-RC, we found that 42 out of 69 participants accepted 9 items or more, which suggests that they allow the co-reference between *jibun* and the RC subject. However, 7 participants rejected 9 items or more, which indicates that they have the native-like knowledge to reject the co-reference between *jibun* and the RC subject.

Part VIII Discussion and implications

Our findings suggest that the L2 participants know there is a difference between Chinese and Japanese concerning the available interpretations of the anaphor within the head NP of RCs. That is, *jibun* is less likely to take the RC subject as its antecedent than *ziji*. Acquisition of this knowledge implicates the operation of UG because this particular knowledge about JRCs cannot be directly derived from input or learners' L1. But how can such knowledge be acquired even if it is underdetermined?

Although there is no direct evidence showing the information that the co-reference between the RC subject and the anaphor *jibun* is prohibited, there must be some clues in the input that trigger acquisition of the syntactic knowledge that the head NP is base-generated in JRCs. One potential piece of evidence is from the scope interaction between the head NP and the universal quantifier *subete* "all" within the RC. (8a) and (8b) are two equivalent examples from Japanese and Chinese:

(8a)_{[CP} subete-no-sensei-ga yon-da] [_{NP} hon] (Japanese)
 all-GEN-teacher-NOM read-PST book
 'the books that all teachers read.'

(indefinite reading: books>all; *all> books) (definite reading: books>all)

(8b)_{[CP} suoyou de laoshi kan de] [_{NP} shu] (Chinese)
 all-GEN-teacher read DE book
 'the books that all teachers read.'

(indefinite reading: all>books; *books>all) (definite reading: books>all)

In (8a), the bare noun *hon* “book” could have either an indefinite reading or a definite reading (Tawa 1993; Nemoto 2005). When it is definite, the NP *hon* “book” always takes a wider scope than the universal quantifier *subete* “all” while when it is indefinite, *hon* “book” also takes a wider scope than *subete* “all.” Thus, *subete* “all” can never take a wider scope than *hon* “book.” Whenever this sentence is used, the *book* must refer to the same set of books that each teacher read. The wider scope of the indefinite *hon* “book” can be accounted for by the head external analysis of JRCs. When the head NP is base-generated externally to the RC, we predict it takes a wider scope than a universal quantifier *subete* “all” within the RC.

On the other hand, in the Chinese sentence (8b), the bare noun *shu* “book” could also have either an indefinite reading or a definite reading (e.g. Li 2011; Jiang 2012). When it is definite, the NP *shu* “book” always takes a wider scope than the universal quantifier *suoyou* “all.” But when it is indefinite, *suoyou* “all” takes a wider scope than *shu* “NP” and *shu* cannot take a wider scope than *suoyou*. Hence, when (8b) is used in a context where *shu* is indefinite, *shu* must refer to a whole set of books consisting of all that each teacher read. The derivation of this interpretation can be accounted for by the head raising analysis of CRCs: at LF, the head NP *shu* reconstructs at its base position within the RC so the universal quantifier *suoyou* “all” takes a wider scope over it².

Thus, by comparing (8a) and (8b), we can see a difference between Japanese and Chinese concerning the scope interaction between the indefinite head NP and the universal quantifier *subete* “all” within the RC: in Japanese, the head NP always takes a wider scope than the universal quantifier *subete* “all” whereas in Chinese, the universal quantifier *suoyou* “all” always takes a wider scope than the head NP. For L1 Chinese learners of L2 Japanese, the scope interaction difference between Chinese and Japanese can be positive evidence suggesting that the head NP of JRCs is base-generated. Recall that 7 learners seemed to have successfully acquired the target knowledge. At their beginning phase of acquiring JRCs, they were very likely to project a raised head NP on the basis of their Chinese knowledge. Later, JRCs like (8a) from the input, which involve a scope interaction between the universal quantifier *subete* “all” and the head NP, may alert the learners that their initial hypothesis about

² A similar phenomenon involving a universal quantifier has also been discussed in Aoun and Li (2003).

the projection of the head NP is incorrect because their interlanguage knowledge predicts (8b) is impossible for the reading of “books>all.” Restructuring JRCs then occurs and the learners must create a new projection for the head NP of JRCs. That is, the head NP should be base-generated rather than raised.

Part IX Conclusion

In this study, we first conducted a picture-matching TVJT experiment with L1 Japanese speakers to investigate whether the anaphor *jibun* within the head NP of JRCs can be co-referential with the RC subject (Experiment 1). The results show that such co-reference is prohibited, which indicates that the head NP of JRC is base-generated externally to the RC and does not reconstruct within the RC at LF. With this finding, we continued to approach an L2 issue: can L1 Chinese learners of L2 Japanese acquire the knowledge that the co-reference between *jibun* and the RC subject is impossible? This knowledge is underdetermined for L1 Chinese learners since it cannot be directly derived from input, classroom instruction, or learners’ L1. If such knowledge can be acquired, the poverty of stimulus in L2 acquisition would be motivated. To address the question, we ran the same experiment that had been conducted with L1 Japanese speakers (Experiment 2), with an equivalent experiment in Chinese as a control. The results suggest that the L1 Chinese learners of L2 Japanese are able to make a distinction between Japanese and Chinese concerning the interpretation of the anaphor within the head NP of RCs. Although their judgments in the Japanese experiment are still far from being native-like, their knowledge of the difference between Japanese and Chinese implicates acquisition of the underdetermined knowledge. It provides new evidence to support the operation of UG in L2 acquisition. Further, how such knowledge may be acquired was discussed.

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