THE ACQUISITION OF JAPANESE RELATIVE CLAUSES BY L1 CHINESE
LEARNERS

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Yunchuan Chen

Dissertation Committee:

Shinichiro Fukuda, Chairperson
Li Jiang
Kazue Kanno
Min Liu
Bonnie D. Schwartz

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ABSTRACT

This dissertation focuses on L1 Chinese learners' acquisition of Japanese relative clauses (RCs),
as it provides an ideal testing ground for two important questions of L2 acquisition in syntax: (i)
when two languages have a superficially similar syntactic structure that arguably involves
different syntactic operations, can L2 learners acquire the difference? (ii) if successful
acquisition of such a difference does occur, in what ways does that inform us about the nature of
L2 acquisition of syntax? Despite such superficial similarities between Chinese and Japanese
RCs, previous theoretical work puts forward different analyses for their syntactic structures.
Thus, the first two parts of this dissertation provide novel experimental evidence indicating that
the head noun phrase (NP) of RCs is only base-generated in Japanese but is either raised or base-
generated in Chinese. Nevetheless, the experimental evidence also suggests that the raising
strategy is preferred to the base-generation strategy to derive the head NP from the singly
embedded object position of Chinese RCs. In the third part, I reported the findings from another
experiment I created to explore whether L1 Chinese learners of L2 Japanese are able to acquire
the syntactic knowledge that the head NP of Japanese RCs can only be base-generated. Since
such knowledge is implicit, I used a diagnostic to test how L1 Chinese learners interpret the
anaphor *jibun* 'self' within the head NP of Japanese RCs. The experimental results show that at
least some advanced L1 Chinese learners of Japanese have acquired the difference between
Chinese and Japanese RCs in terms of the interpretation of the anaphor inside the head NP,
despite its underdetermined nature. This in turn argues for the Full Transfer/Full Access
Hypothesis (Schwartz & Sprouse, 1994, 1996) and argues against 'partial access to UG'
approaches such as the Interpretability Hypothesis (Tsimpli & Dimitrakopoulou, 2007).

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2	2nd person
3	3rd person
ACC	accusative
ASP	aspect marker
CL	classifier
COMP	complementizer
COP	copula
DAT	dative
DE	Chinese pre-nominal modification marker *de*
GEN	genitive
GER	gerund
LE	Chinese perfective marker or sentence-final particle
MASC	masculine
NEG	negative marker
NO	Japanese nominalizer *no*
NOM	nominative
PL	plural
PST	past
SG	singular
TOP	topic marker

CHAPTER 1. INTRODUCTION

Within generative approaches to second language (L2) acquisition, much ink has been spilt over two core issues: (i) whether L2 learners are able to acquire linguistic knowledge that is underdetermined by input (a learnability issue) and (ii) how L2 learners develop their interlanguage grammar, or the L2 grammar, over time (a developmental issue[1]). In particular, whether L2 learners can acquire a syntactic structure that is not instantiated in their L1 has widely been researched, in order to understand whether Universal Grammar (UG) is accessible in L2 acquisition (e.g., Hawkins & Chan, 1997; White, 1985; Yuan, 2001). With this background, this dissertation is devoted to approaching the following two questions with regard to the L2 acquisition of syntax:

(1a) When two languages have a superficially similar syntactic structure that arguably involves different syntactic operations, can L2 learners acquire the difference?

(1b) If successful acquisition of such a difference does occur, in what ways does that inform us about the nature of L2 acquisition of syntax?

The empirical focus of this dissertation is L1 Chinese learners' acquisition of Japanese relative clauses (RCs), as I believe that the acquisition of this particular construction involving speakers of these two particular languages provides an ideal testing ground for (1a). First, Chinese[2] and Japanese RCs are superficially similar.

(2a) [$_{NP}$ [$_{RC}$ wo kan ec$_i$ de] **shu$_i$**] shi zhe-ben.   (Chinese)
        I   read   DE book is this-CL
  'The book that I am reading is this.'

(2b) [$_{NP}$ [$_{RC}$ boku-ga ec$_i$ yon-de-ru] **hon$_i$**]-ga kore-da (Japanese)
        I-NOM   read-GER-ASP book-NOM this-COP
  'The book that I am reading is this.'

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[1] In this dissertation, only adult L2 acquisition is considered.
[2] *Chinese* means *Mandarin Chinese* in this dissertation.

(2a) and (2b) are equivalent sentences in Chinese and Japanese, as the same English translation indicates. Both sentences contain an RC, whose head noun phrase (NP) is located after it. There is a dependency between the head NP and an element *ec* (empty category) inside the RC that is not pronounced, namely the direct object of the verb *read*. In this dissertation, unless stated otherwise, I define the RC[3] as a sentential modifier with a missing constituent or a resumptive pronoun (RP) which shares its referential identity with the head NP.

Despite such superficial similarities, previous studies on Chinese and Japanese RCs put forward different analyses for their syntactic structures (e.g., Aoun & Li, 2003; Fukui & Takano, 2000; Huang, Li, & Li, 2009; Murasugi, 2000). First, it has been argued that Chinese RCs may have two different derivations: one that involves raising of the head NP out of the RC, i.e., *the head-raising derivation*, as in (3a), and the other that involves concatenation of the RC and the head NP where the head NP is base-generated outside of the RC with an RP inside the RC, i.e., *the head-base-generation derivation*, as in (3b) (Aoun & Li, 2003; Huang et al., 2009).

(3a)   [$_{RC}$ t_i] NP$_i$

(3b)   [$_{RC}$ RP$_i$] NP$_i$
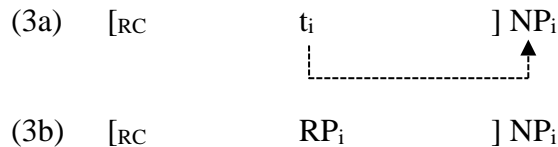
Japanese RCs, on the other hand, have been analyzed as having only one possible derivation, either the head-base-generation derivation (Fukui & Tanano, 2000; Kuno, 1973; Murasugi, 2000) or the head-raising derivation (e.g., Hoshi, 2004; Kitao, 2011; Morita, 2013).

Now, if Chinese RCs have two possible derivations for the head NP, raising and base-generation, while Japanese RCs only have one, raising or base-generation, in order for L1 Chinese learners of L2 Japanese to have native-like knowledge of the syntax of Japanese RCs, they must 'unlearn' one of the options that their L1 Chinese offers. This represents a specific case of the question (1a) that I raised at the beginning of this chapter, as repeated in (4).

(4)   When two languages have a superficially similar syntactic structure that arguably involves different syntactic operations, can L2 learners acquire this difference?

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[3] Chinese and Japanese also have adjunct and gapless RCs (see Aoun & Li, 2003; Murasugi, 2000), which are set aside for this dissertation.

In the context of L1 Chinese learners acquiring Japanese RCs, (4) can be specified in (5):

(5)   If the syntactic derivations of Chinese RCs and Japanese RCs are in fact different, can L1 Chinese learners acquire the syntactic knowledge about Japanese RCs, even though RCs in both Chinese and Japanese are superficially similar?

In this dissertation, based on novel experimental evidence, I argue that (i) there are in fact two different possible derivations for Chinese RCs while Japanese has only one and (ii) at least some L1 Chinese learners of Japanese manage to acquire the difference despite its underdetermined nature. This brings me to the second research question (1b), repeated as (6) below:

(6)   If successful acquisition of such a difference does occur, in what ways does that inform us about the nature of L2 acquisition of syntax?

Under the current assumptions in the Minimalist Program, according to which syntactic movements are triggered by uninterpretable features (e.g., Chomsky, 2000), I argue that the successful acquisition of Japanese RCs by L1 Chinese learners involves changing uninterpretable feature values. This conclusion in turn argues for the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996), according to which L2 learners have full access to UG, and argues against 'partial access to UG' approaches such as the Interpretability Hypothesis (Tsimpli & Dimitrakopoulou, 2007), according to which changing the value of an uninterpretable feature in the L2 that is instantiated in the L1 should not be possible.

The rest of the dissertation is structured as follows. In Chapter 2, the hypotheses concerning 'partial access to UG' are first reviewed, including the 'No Parameter Resetting Hypothesis' (e.g., Smith & Tsimpli, 1995), the 'Failed Functional Features Hypothesis' (Hawkins & Chan, 1997) and the 'Interpretability Hypothesis' (Tsimpli & Dimitrakopoulou, 2007). Then I review the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996), which is different from the 'partial access to UG' accounts with respect to whether UG is fully available in L2 acquisition.

Chapter 3 surveys previous studies on Japanese and Chinese RCs. First, I review the arguments for the proposal that the head NP of Chinese RCs can be either raised out of the RC or base-generated external to the RC, highlighting how these two possible derivations are related to

the possibility of having an RP inside the RC. Then I review three main approaches to the syntactic structure of Japanese RCs and point out that there is a controversy regarding the interpretation of subject-oriented anaphors within the head NP of Japanese RCs.

Chapter 4 is devoted to investigating the structure of Chinese RCs. As mentioned above, Chinese RCs have been claimed to involve both the head-raising and the head-base-generation derivations. One of the arguments for this claim comes from the observation that the intended gap position inside Chinese RCs can be occupied by the RP *ta* under certain circumstances (e.g., Hawkins & Chan, 1997; Li & Thompson, 1981). However, a critical examination of previous research identifies an important gap in existing empirical data: it is unclear whether the RP *ta* can occur in the subject and object positions inside Chinese RCs (e.g., Gu, 2001; Hitz, 2012; Yuan & Zhao, 2005). To address this issue, I conducted an acceptability judgment study to investigate the grammaticality of the RP in the subject and object positions inside Chinese RCs (Experiment 1). The results suggest that the RP is grammatical in the object position of the RC, as supported by evidence that the mean ratings of the gap and the RP do not significantly differ in the doubly embedded object position. However, the mean rating of the RP is significantly lower than that of the gap in the singly embedded object position, which suggests that it is less preferable than the gap. The experimental results further imply that although the head NP of Chinese RCs can be derived in two different ways, the raising strategy is generally preferred to the base-generation strategy. Such preference might be accounted for by Hawkins' (2004) proposal that the gap requires less morphological processing than the RP.

Chapter 5 investigates the internal structure of Japanese RCs by experimentally examining whether the subject-oriented anaphors *jibun* 'self' and *jibun-jishin* 'self-self' within the head NP can be bound by the RC subject, as in (7).

(7a) ? [$_{NP}$ [$_{RC}$ John$_j$-ga   e$_i$ tot-ta]   [jibun$_j$-no shashin]$_i$]-ga   soko-ni   aru
              John-NOM   take-PST   self-GEN picture-NOM   there-at   is
        'The picture of himself$_j$ that John$_j$ took is there.'

(7b) ? [$_{NP}$ [$_{RC}$ John$_j$-ga   e$_i$ tot-ta]   [jibun-jishin$_j$-no   shashin]$_i$]-ga   soko-ni   aru
              John-NOM   take-PST   self-self-GEN   picture-NOM   there-at is
        'The picture of himself$_j$ that John$_j$ took is there.'

Under the assumption that an anaphor must be bound by a c-commanding antecedent (Chomsky, 1981a, 1986b), if the anaphors *jibun* 'self' and *jibun-jishin* 'self-self' can be bound by the RC subject *John* in (7a) and (7b), the head NP must be analyzed as having been reconstructed into the RC to be interpreted at its base position at Logical Form (LF). This implies that the head NP in Japanese RCs must undergo syntactic movement. However, previous studies presented conflicting intuitive judgments on whether those anaphors inside the head NP can be co-referential with the RC subject (e.g., Fukui & Takano, 2000; Hoshi, 2004; Kitao, 2009, 2011; Murasugi, 2000). It has also been claimed that the morphological make-up of the anaphor may affect its ability to be co-indexed with the RC subject (Hoshi, 2004; Ishizuka, 2010). To address these issues, a truth value judgment study (Crain & Thornton, 1998) was conducted (Experiment 2). The results suggest that the morphological complexity of the subject-oriented anaphor has no effects on its possible interpretation, as the participants never accepted the interpretation in which the anaphor is intended to refer to the RC subject, regardless of its morphological make-up. Importantly, this conclusion supports the base-generation analysis for the derivation of the head NP in Japanese RCs.

Given the findings from Experiments 1 and 2 discussed in Chapters 4 and 5, in Chapter 6, a Japanese truth value judgment task and an equivalent Chinese task (Experiment 3) were conducted to investigate whether L1 Chinese learners can acquire knowledge that the anaphor *jibun* 'self' within the head NP of Japanese RCs cannot refer to the RC subject. If L1 Chinese learners exhibit evidence of this knowledge, such a finding would suggest that they have acquired the syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC. The results revealed that the intermediate learners consistently allowed the co-reference between the anaphor and the RC subject, suggesting that they analyzed Japanese RCs to involve the head-raising derivation. In contrast, the advanced learners were less likely to allow such co-reference, indicating that they made a distinction between Chinese and Japanese with respect to the interpretation of the anaphor inside the head NP of RCs. Moreover, the individual participants' results suggest that six learners consistently rejected the co-reference between the anaphor and the RC subject, behaving like native Japanese speakers. This finding suggests that they have successfully acquired the target syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC.

Under the analysis according to which the raising of the head NP is triggered by the feature-checking requirements of the external D (Bianchi, 1999), I argue that the main findings of Experiment 3 have the following important implications. First, L1 Chinese learners initially project a raised head NP for Japanese RCs due to L1 transfer. However, L1 Chinese learners are able to restructure their interlanguage grammar and project a base-generated head NP for Japanese RCs. I argue that this restructuring process of the interlanguage grammar requires changing the uninterpretable feature value of D that triggers the raising of the head NP. If this analysis is on the right track, it presents an argument against the 'partial access to UG' hypotheses (Smith & Tsimpli, 1995; Hawkins & Chan, 1997; Tsimpli & Dimitrakopoulou, 2007). The most recent representation of the hypotheses, the Interpretability Hypothesis (Tsimpli & Dimitrakopoulou, 2007), proposes that in L2 acquisition, uninterpretable features are confined to only L1 and they are not accessible after the critical period. Under this hypothesis, the uninterpretable feature of D that triggers the raising of the head NP is expected to persist in L1 Chinese learners' syntactic representation of Japanese RCs, contrary to my findings. In contrast, the findings are compatible with Schwartz and Sprouse's (1994, 1996) Full Transfer/Full Access Hypothesis, which proposes that the initial state of L2 acquisition is represented by full transfer of the entire L1 grammar but all aspects of UG, including the functional domain, can be used to restructure the interlanguage grammar.

CHAPTER 2. PREVIOUS L2 STUDIES ON THE ACQUISITION OF SYNTACTIC OPERATIONS THAT INVOLVE FORMAL FEATURES

As mentioned in Chapter 1, this dissertation focuses on the debate between the 'partial access' approach and the 'full access' approach to the availability of UG in L2 acquisition by adult learners.

In this chapter, I first review three hypotheses arguing for 'partial access to UG': (i) the No Parameter Resetting Hypothesis (e.g., Smith & Tsimpli, 1995), (ii) the Failed Functional Features Hypothesis (Hawkins & Chan, 1997), and (iii) the Interpretability Hypothesis (Tsimpli & Dimitrakopoulou, 2007). These hypotheses share a common core argument that some aspect of UG is not available for adults to construct an L2 grammar, but the unavailable aspect of UG is defined differently in these hypotheses. I then review the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996) as a representative of the 'full access to UG' approach, which claims that all aspects of UG, including the functional domain,[4] can be accessed by adult L2 learners to reconstruct their interlanguage grammar.

The reviews of the two approaches are followed by a review of recent studies that examined whether L2 learners can acquire differences between L1 and L2 that arguably involve uninterpretable features and their values, as the two competing approaches identify these features as key to differentiate them. Unfortunately, however, the findings from these previous studies are inconclusive, as they failed to rule out the role of the input that L2 learners receive in language classrooms.

At the end of this chapter, I argue that an important question concerning whether UG is fully accessible in adulthood that has not been asked by previous studies is as follows: When two languages have a superficially similar syntactic structure that arguably involves different syntactic operations, can L2 learners acquire this difference?

2.1 Partial Access to UG approach

According to the partial access to UG hypotheses, UG is only partially accessible to adult L2 learners. There are three representatives: the 'No Parameter Resetting Hypothesis' (e.g., Smith &

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[4] I assume that the functional domain of UG includes all functional categories with features and their values.

Tsimpli, 1995), the 'Failed Functional Features Hypothesis' (Hawkins & Chan, 1997), and the 'Interpretability Hypothesis' (Tsimpli & Dimitrakopoulou, 2007).

2.1.1 No Parameter Resetting Hypothesis

The No Parameter Resetting Hypothesis claims that in L2 acquisition, adult learners can only use the parameter settings realized in the L1, and those parameters can never be reset in the L2. The main argument for the hypothesis comes from Smith and Tsimpli (S&T) (1991, 1995), which conducted a case study with a well-known 'linguistic savant' *Christopher,* who suffered brain damage when he was six months old. Christopher was institutionalized because he was unable to look after himself. Yet, he showed an astounding talent in learning foreign languages. In S&T's study, Christopher was asked to do translation between his L1 English and L2s and to make acceptability judgments on L2 sentences. S&T found that Christopher was good at learning lexical items but was weak at syntax, showing transfer effects from his L1 English in all aspects except subject omission in null subject languages. To account for Christopher's failure in the acquisition of L2 syntax, S&T suggest that parameter resetting is not accessible to L2 learners after the critical period. This is because parameter settings, which are assumed to be realized by different values of functional categories, are contained in a functional sub-module of UG. S&T hypothesize that such a sub-module cannot be accessed in adulthood. Moreover, following Tsimpli and Roussou (1991), S&T argue that the sub-module of functional categories in UG is separate from the principles of UG, the latter of which can be accessed by L2 learners. According to the No Parameter Resetting Hypothesis, therefore, while the principles of UG are available to L2 learners, the parameters are not. Thus, this hypothesis predicts that adult L2 learners are unable to reset parameters, i.e., to reset the values of functional categories in the target language.

2.1.2 Failed Functional Features Hypothesis

According to the Failed Functional Features Hypothesis, functional features or their values that are not instantiated in the L1 cannot be acquired in the L2 after the critical period (Hawkins & Chan, 1997; Hawkins & Hattori, 2006). Hawkins and Chan (H&C) (1997) provided evidence for

the hypothesis from the acquisition of English RCs by L1 Chinese[5] and L1 French learners of L2 English. Adopting a feature-driven operator movement analysis for RCs, H&C assume that the value of the [±wh] feature of a C(omplementizer) determines the derivation of the RC. If the value of the [±wh] feature in C is [+wh], a *wh*-phrase, which is co-indexed with the head NP, must move to [Spec, CP] to check the feature, as in (8a). If the value of the [±wh] feature in C is [-wh], a null operator moves to [Spec, CP] to check the feature, as in (8b). They also assume that the overt generalization of the C with [-wh] is *that*, as in (8c).

(8)   a. [The girl]$_i$ [CP who$_i$ Ø$_{[+wh]}$ [I like t$_i$]] is here.
       b. [The girl]$_i$ [CP Op$_i$ Ø$_{[-wh]}$ [I like t$_i$]] is here.
       c. [The girl]$_i$ [CP Op$_i$ that$_{[-wh]}$ [I like t$_i$]] is here.

                                              (Hawkins & Chan, 1997, p. 190)

The standard evidence for the operator movement analysis of English RCs is that the movement of a *wh*-phrase/null operator is constrained by Subjacency (Chomsky, 1981a, b, 1986a). (9) is an example of an RC where Subjacency is violated.

(9)*   [The boy]$_i$ [CP who$_i$ [IP Mary described [DP the way [CP t$_i$ that [IP Bill attacked t$_i$]]]]]
       is here.   (Hawkins & Chan, 1997, p. 191)

A Subjacency violation occurs if the movement of a *wh*-phrase or null operator crosses more than one bounding node (Chomsky, 1986a). In (9), after the *wh*-phrase *who* lands in the specifier position of the embedded CP, it must cross two bounding nodes, one DP and one IP, to be in the specifier position of the higher CP, and this violates Subjacency. According to H&C, English and French are examples of languages that involve operator movement driven by the [±wh] feature in the derivation of RCs. But there are languages in which the C lacks the [±wh] feature, and in such languages, neither *wh*-movement nor null operator-movement takes place in RCs. H&C argue that Chinese is an example of such a language. They assume that in Chinese RCs,

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[5] The participants' L1 was Cantonese. However, since Hawkins and Chan (1997) assumed in their study that Cantonese and Mandarin Chinese RCs are identical in their syntactic structures, I use *Chinese* to stand for *Cantonese* when reviewing their study, although I acknowledge that there are many syntactic differences between Cantonese and Mandarin Chinese (See Matthews & Yip, 2011).

the complementizer *de* lacks the [±wh] feature and therefore no operator movement is involved. Instead, a null topic is generated in situ in [Spec, CP], which binds a null pronoun (*pro*) or an overt 'resumptive' pronominal, as in (10).

(10)   [CP Top$_i$ [IP   wo   xihuan pro$_i$/   ta$_i$]   de] [na-ge   nuhai]$_i$
                            I   like   her   DE   that-CL   girl
        'the girl who I like'   (Hawkins & Chan, 1997, p. 193)

This analysis correctly predicts that Subjacency can be violated in Chinese RCs, as in (11).

(11)   [CP Top$_i$ [IP[DP[IP e$_i$ chuan t$_j$] de [yifu]$_j$] hen piaoliang]] de [nage ren]$_i$
                            wear   DE   clothes very pretty   DE   that   person
        'the person$_i$ that the clothes she$_i$ wears is pretty'   (Li, 2002, p. 56)

If operator movement were involved in (11), Subjacency would be violated because the null operator must cross one DP and one IP. Thus, (11) is wrongly predicted to be unacceptable. The acceptable status of (11) supports H&C's analysis that Chinese RCs do not involve any syntactic movement.

    To investigate whether L1 Chinese learners can acquire the knowledge that the English RCs involve operator movement, H&C conducted a series of acceptability judgment tasks. The participants were L1 Chinese learners and L1 French learners, who were divided into three different proficiency level sub-groups, and native English speakers as a control group. The experimental items included grammatical RCs and ungrammatical RCs. The ungrammatical RCs were either (i) RCs with both a *wh*-phrase and the overt complementizer *that*, (ii) RCs with an overt pronoun in the gap position, and (iii) RCs that violate Subjacency. The results showed that L1 French learners had a significant improvement in accuracy in all three types of sentences as their English proficiency increased. L1 Chinese learners behaved like L1 French learners with respect to the ungrammatical sentences (i) and (ii), as their judgments become more accurate as their English proficiency increased. However, they found that the advanced learners were more likely than the intermediate and elementary learners to accept the ungrammatical sentences with a Subjacency violation in (iii). Based on this unexpected finding, H&C conclude that the advanced Chinese learners did not actually acquire the syntactic knowledge that English RCs

involve operator movement. Rather, they just used their L1-based knowledge and considered the *wh*-phrase as a topic that binds a null *pro* within the embedded clause, as in (12).

(12) [The girl]$_i$ [$_{CP}$ who$_i$ [$_{IP}$ I like pro$_i$]] is here.

As H&C showed, Subjacency can indeed be violated in Chinese topicalized sentences, as in (13).

(13) [zhe-ben shu]$_i$, [$_{DP}$[$_{CP}$ [$_{IP}$ pro$_j$ du-guo   pro$_i$ de] ren$_j$] bu   duo
       this-CL book   read-ASP   DE man   not   many
       'This book, the people who read (it) aren't many.'

Thus, H&C argue that L1 Chinese learners cannot acquire the syntactic knowledge that English RCs involve operator movement, which suggests they are unable to acquire the [±wh] feature encoded in the C of English RCs. Under the assumption that the [±wh] feature is not instantiated in Chinese, the finding motivates the Failed Functional Features Hypothesis, which claims that adult L2 learners cannot acquire any new functional features in the L2 that are not instantiated in their L1. In contrast, White and Juffs (1998) reported that in an acceptability judgment task, a group of adult L1 Chinese learners of L2 English from an English immersion program in China were able to make native-like judgments on English sentences that violate Subjacency. Such findings go against H&C's results. Perhaps the L1 Chinese learners' English proficiency in H&C's study was not high enough.

What is important to note about H&C's study is that knowledge of the Subjacency constraint in English RCs is underdetermined for L1 Chinese learners: it is not explicitly taught in English language classes and is unlikely to be derived from input or the L1 Chinese. Therefore, it rules out confounding factors such as meta-linguistic knowledge and frequency of occurrence in input.

While H&C's Failed Functional Features Hypothesis only concerns the acquisition of a functional feature that is not instantiated in the L1, White (2003) argues that the hypothesis should also apply to the acquisition of a new feature value/strength because there is no principled reason to make a distinction between feature and feature value. Thus, if Language A and Language B share a functional feature but the value of it differs in the two languages, L1 speakers of Language A should not be able to acquire the value of such feature in Language B and vice versa. That is, acquiring a new feature value in the L2 is predicted to be impossible.

This prediction is supported by the findings in Hawkins and Hattori (H&H) (2006). H&H assume that interrogatives in both Japanese and English involve a functional feature of [$u$wh:][6] in C. In English, this feature is strong and therefore triggers the *wh*-phrase to move to [Spec, CP]. In Japanese, however, this feature is weak and does not drive the *wh*-phrase to move to [Spec, CP]. Based on the results of a truth value judgment task, which showed a significant difference of judgments on sentences involving Subjacency violation between L1 Japanese learners of English and L1 English speakers, H&H argue that even advanced L1 Japanese learners of L2 English cannot acquire the strong value of the feature [$u$wh:] that is encoded in the C of English interrogatives, which supports the proposal that adult L2 learners cannot acquire a new feature value in the L2. Since a *wh*-phrase can be scrambled to the front in Japanese sentences, H&H claim that L1 Japanese L2 English learners can just rely on that strategy to account for English *wh*-interrogatives. Therefore, the Failed Functional Features Hypothesis can be extended to include both features and feature values: features or feature values that are not instantiated in the L1 cannot be acquired in the L2 after the critical period.

2.1.3 Interpretability Hypothesis

The Interpretability Hypothesis claims that whether a feature is interpretable or uninterpretable matters in L2 acquisition. Tsimpli (2003), Tsimpli and Mastropavlou (2007) and Tsimpli and Dimitrakopoulou (2007) assume a distinction between interpretable and uninterpretable features with respect to their availability in adult L2 acquisition. Interpretable features such as [Singular] and [Past] are those features that have semantic content, which can be used by the semantic component of the grammar in determining the interpretation of sentence. In contrast, uninterpretable features do not carry semantic content and are restricted to syntactic computations, such as the [±wh] feature in C of English RCs.

According to Tsimpli and Dimitrakopoulou's (T&D) (2007) Interpretability Hypothesis, uninterpretable features cannot be accessed by adult L2 learners while interpretable features can. T&D's main argument for the hypothesis comes from L1 Greek learners' acquisition of English *wh*-questions. In Modern Greek *wh*-interrogatives, according to T&D, the 3rd person subject-verb agreement affixes are the spell-out of uninterpretable phi features on T(ense), as in (14a) and (14b). Addtionally, if the *wh*-phrase is fronted from an object position, a resumptive clitic

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[6] The letter '*u*' means 'uninterpretable.'

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pronoun co-indexed with the *wh*-phrase can optionally occur. T&D claim that such an object clitic is the spell-out of *phi-* and case features on the functional head *v*, which agrees with its antecedent in person, number and gender. (15) is an example where a resumptive proclitic pronoun occurs.

(14a) Pji   ipe   oti   efighan?
       who$_{NOM}$-$_{PL}$ said$_{3SG}$ that   left$_{3PL}$
       'Who did he say (*that) left?'   (Tsimpli & Dimitrakopoulou, 2007, p. 220)

(14b) Pjion   ipes   oti   idhes?
       who$_{ACC-SG}$ said$_{2SG}$ that   saw$_{2SG}$
       'Who did you say (that) you saw?'   (Tsimpli & Dimitrakopoulou, 2007, p. 220)

(15)   Pjon   ipes   oti   ton   prosevalan   oxris   logho?
       who   said$_{2SG}$ that   him   insulted$_{3PL}$ without   reason
       'Who did you say that they insulted (*him) without a reason?'
                                                        (Tsimpli & Dimitrakopoulou, 2007, p. 220)

T&D argue that English *wh*-interrogatives lack the uninterpretable features on T that spell out the subject-verb agreement affixes and those on *v* that spell out the object clitic. Therefore, under the Interpretability Hypothesis, according to which uninterpretable features cannot be accessed in the adulthood, T&D predicted that even advanced L1 Greek learners of L2 English would incorrectly accept the RP in the subject and object positions of English *wh*-interrogatives. T&D conducted an acceptability judgment experiment and had two important findings. First, most intermediate learners accepted the RP at both the subject and object positions. Second, while most advanced learners rejected the RP at the object position, a significantly lower number of them were able to reject the RP at the subject position. Based on these results, the authors argue that L1 Greek learners of L2 English fully transfer the uninterpretable agreement features into their L2 English grammar and are unable to unlearn them. Nevertheless, if the learners cannot unlearn the L1-based uninterpretable features, it is unclear why there were still some advanced learners who were able to reject the RP at both the subject and object positions. Thus, the fact that some advanced learners did not have native-like judgments does not necessarily mean the target uninterpretable features cannot be acquired.

2.1.4 Summary of the Partial Access to UG Approaches

This section has reviewed three main hypotheses under the 'partial access to UG' approach with their empirical motivations: the 'No Parameter Resetting Hypothesis' (e.g., Smith & Tsimpli, 1995) with the case study of Christopher, the 'Failed Functional Features Hypothesis' (Hawkins & Chan, 1997) with L1 Chinese learners' inability to learn the Subjacency constraint in English RCs, and the 'Interpretability Hypothesis' (Tsimpli & Dimitrakopoulou, 2007) with L1 Greek learners' non-target-like judgments about resumptive pronouns in English *wh*-questions. The 'No Parameter Resetting Hypothesis' and the 'Failed Functional Features Hypothesis' share a similar claim for the availability of UG in L2 acquisition: the functional domain of UG is inaccessible to adult L2 learners so the functional features or particular values/strengths of features that are not instantiated in the L1 cannot be acquired in the L2. In addition, the 'Interpretability Hypothesis' makes a distinction between interpretable and uninterpretable features: uninterpretable features cannot be accessed by L2 learners after the critical period while interpretable features can.

Despite their differences, these three hypotheses make the same predictions about whether or not L2 learners can acquire uninterpretable features such as the [±wh] feature on C in English. They are inaccessible to L2 learners either (i) because learners can only use the parameter settings realized in the L1 and those parameters can never be reset in the L2 (the 'No Parameter Resetting Hypothesis'), (ii) because functional features or their values that are not instantiated in the L1 cannot be acquired in the L2 after the critical period (the 'Failed Functional Features Hypothesis'), or (iii) because uninterpretable features cannot be accessed by L2 learners after the critical period (the 'Interpretability Hypothesis').

Thus, all three hypotheses under the 'partial access to UG' approach predict that, if two comparable syntactic structures in the L1 and L2 are derived by different underlying syntactic operations involving uninterpretable features, L2 learners would not be able to learn the difference. As a result, they would treat the relevant structure in the L2 like the comparable structure in the L1, which means the underlying syntactic operation that is responsible for the surface structure in the L1 would be applied to representing the structure in question in the L2.

2.2 Full Transfer/Full Access Hypothesis

There are two important elements in Schwartz and Sprouse's (1994, 1996) 'Full Transfer/Full Access Hypothesis':[7]

(16)   (i) all the principles and parameters that are instantiated in the L1 grammar are transferred into the interlanguage in the initial state of L2 acquisition;

        (ii) restructuring the L1-based interlanguage grammar is possible if it fails to accommodate the input of the target language.

Schwartz and Sprouse (S&S) also claim that restructuring of the interlanguage grammar is fully constrained by UG. In particular, it can take advantage of all options of UG, including the full range of functional features and their values within the functional domain of UG.

As such, this 'full access to UG' approach is crucially different from the 'partial access to UG' approach, which claims that functional features, in particular uninterpretable features and their values, are not accessible to post-critical-period L2 learners.

S&S (1994) propose the Full Transfer/Full Access Hypothesis on the basis of an examination of a L1 Turkish learner's longitudinal L2 German data from a European Science Foundation (ESF) project (Klein & Perdue, 1992). The learner's name is *Cevdet*, who was born and raised in Turkey but started living in Germany at the age of 15. With the ESF project, interviews were conducted to collect his spontaneous production data for 26 months starting a few months after he had arrived in Germany.

On the one hand, Turkish is a SOV language except that it also allows a certain type of clausal complement to follow a verb. On the other hand, German is also a SOV language except that verb-second (V2) rule is superimposed on that. That is, in German matrix clauses, a finite verb has to move to C, generating verb-second (V2) phenomenon. S&S divided Cevdet's L2 German development into four stages, Stage 0, 1, 2 and 3, based on the 26 months of data.

In Stage 0, Cevdet initially had OV matrix clauses due to L1 transfer.[8] In Stage 1, he exhibited both SVX[9] and XSV word orders. The target-like verb fronting in the SVX order is

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[7] Schwartz and Sprouse (1994, 1996) call it the 'Full Transfer/Full Access' model. I call it 'hypothesis,' in order to be in accordance with the 'partial access to UG' hypotheses that are reviewed in Section 2.1.

claimed to be driven by the salient mismatch of the surface syntax between Turkish and German. In the German input, there should be many utterances with the SVX order in matrix clauses, which Cevdet's interlanguage grammar in Stage 0 would fail to account for. For SVX sentences, S&S claim that Cevdet was able to make use of a CP, where the verb lands in C and the subject moves to [Spec, CP] to receive a nominative case. Moreover, the XSV order is argued to be derived by adding an optional adjunction to CP.

In Stage 2, Cevdet was observed to add the word order of XVS, where the verb precedes the subject. In particular, this pattern only occurs when the subject is a pronoun. S&S argue that the pronominal subjects can actually incorporate into the verb, following Baker's (1988) analysis that the Case Filter can be satisfied by a pronominal subject incorporating into a verb.

In Stage 3, Cevdet's XVS pattern is extended to include the non-pronominal subject. S&S attributed this occurrence to another mechanism available in UG: When a non-pronominal subject in [Spec, IP] is governed by a verb in an immediately higher C, nominative case can be assigned to it, and thus it does not have to move to [Spec, CP] for case reasons. Note that Cevdet's productions of SVX in Stage 1 and XVS in Stages 2 and 3 were very likely triggered by his response to V2 sentences in the German input.

Based on the analysis of Cevdet's spontaneous production data, S&S (1994, 1996) propose their Full Transfer/Full Access Hypothesis, which is comprised of the following two components: (i) *full transfer*: L2 learners fully transfer their L1 grammar in its entirety to the initial state of L2 acquisition, and (ii) *full access*: L2 learners can draw on all options in UG to restructure their L2 grammar if it fails to account for the input, which is evidenced by Cevdet's developmental path in his L2 German.

After the Full Transfer/Full Access Hypothesis was proposed, there have been many studies conducted that argue for either full transfer or full access or both in L2 acquisition (e.g., Haznedar, 1997; Marsden, 2009; Slabakova, 2000; Yuan, 1998). However, whether the functional categories, their features and feature values can be accessed by L2 learners, which is what divides the 'full access to UG' approach and the 'partial access to UG' approach, was approached by only a few studies, some of which have been reviewed in §2.1 (e.g., Hawkins &

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[8] Cevdet had already passed this stage when the data collection started. So there is no data directly showing that Cevdet had gone through Stage 0. However, S&S cited evidence from previous literature (e.g., Vainikka & Young-Scholten, 1994) showing that L1 Turkish learners initially exhibit OV matrix clauses in German.

[9] X is regarded as a 'nonsubject constituent' in S&S (1994, 1996).

Chan, 1997; Hawkins & Hattori, 2006). In the following section, previous studies supporting the successful acquisition of 'new' uninterpretable features and feature values are reviewed.

2.3 Studies supporting the acquisition of 'new' uninterpretable features and their values

So far we have seen the relevant studies that motivated the 'partial access to UG' approach and the 'full access to UG' approach. The core difference between the two approaches is that the former restricts L2 learners to access only a subset of functional features and their values that have been instantiated in the L1, while the latter places no such restriction on L2 acquisition. In what follows, I review recent studies that showed L2 learners are able to acquire 'new' uninterpretable features and their values that are not instantiated in L1. However, the review reveals that their findings are inconclusive because they failed to eliminate the possibility that L2 learners can learn explicitly taught knowledge that superficially looks like that the uninterpretable features and their values give rise to.

2.3.1 Previous studies about the L2 acquisition of new uninterpretable features

Many previous studies on the L2 acquisition of 'new' uninterpretable features investigated whether L1 English speakers can acquire the gender features in Romance languages (e.g., Bruhn de Garavito & White, 2000, 2002; Gess & Herschensohn, 2001; White, Valenzuela, Macgregor, Leung, & Ben-Ayed, 2001).

In Romance languages like French and Spanish, the grammatical gender feature is considered as an inherent feature of nouns (Corbett, 1991). Many Romance languages also show gender agreement among the determiner, noun and adjective, which is analyzed as realization of feature-checking requirements (e.g., Carstens, 2000). Importantly, the gender agreement realized on non-nominal elements such as adjectives involves uninterpretable features, since gender is not an inherent feature of non-nominal elements such as adjectives. By contrast, there is no gender agreement in languages like English. Therefore, one may argue that L1 English learners' acquisition of gender agreement in Romance languages requires acquisition of 'new' uninterpretable features.

The findings from previous studies on the acquisition of gender features as new uninterpretable features have been mixed, however. First, several studies examined L2 *production data* to understand whether L1 English learners can acquire the gender feature in

French (e.g., Gess & Herschensohn, 2001; Hawkins, 1998). On one hand, Hawkins (1998) found that L1 English learners of French seem to choose a default determiner (D), regardless of the inherent gender feature of the noun (N). Moreover, they are not accurate in selecting an appropriate indefinite D for an N. Based on this observation and others, Hawkins argues that the gender feature in French, which is lacking in English, may not be acquired by L1 English learners.

However, the apparent problem that the L1 English speakers have in choosing the correct D may not necessarily mean that gender features of Ns cannot be acquired and such a learning issue may not be solely attributed to the absence of the gender feature in the L1 English. First, the L1 English learners' problems identified in Hawkins also exist among L1 French speakers of L2 Spanish, as discussed by Bruhn de Garavito and White (2000, 2002). Since both French and Spanish manifest realization of N's gender feature on the D, Hawkins' argument that it is English which prevents L1 English learners from acquiring the gender feature in French is weakened. Moreover, Gess & Herschensohn (2001) observe that advanced L1 English learners are accurate in their production of Ds in French in a written sentence-completion task, suggesting that L1 English learners are able to acquire the gender feature of French.

Arguing that production data may not accurately reflect linguistic competence, White et al. (2001) conducted a picture-identification experiment to investigate whether L1 English learners can acquire the uninterpretable gender feature in L2 Spanish, by looking at their *interpretation* of the null nominals in Spanish. In Spanish, nominals may be covert, which is often referred to as 'N-drop' (Bernstein, 1993). It has been claimed that the content of the null nominal can be identified by the adjectives or determiners.

(17a) Un   libro   grande esta encima de la   mesa.
       a-MASC-SG   book-MASC-SG   big   is   on-top of the   table
       'There is a big book on the table.'

(17b) Un   Ø grande esta   encima   de   la   mesa.
       a-MASC-SG   big   is   on-top   of   the   table
       'There is a big one on the table.'

(White, 2003, p. 138)

(17b) shows that the N *libro* 'book' in (17a) can be dropped, which can be identified by the indefinite determiner *un* that carries masculine and singular features. As is well known, English is not a null subject-drop language and 'N-drop' is prohibited, as in (18).

(18)   There is a big *(one/book) on the table.

Thus, the nominal can be dropped in Spanish, but not English, presumably because it can be identified by the uninterpretable gender and number features in Spanish.

    In order to find out whether L1 English learners can acquire this particular aspect of the gender feature in Spanish, White et al. (2001) created a picture identification experiment, which investigated whether L1 English learners can correctly identify the null nominal in Spanish by detecting the gender agreement between the determiner and the adjective. (19) is a sentence from a sample item.

(19)   Me   compro   este   negro?
        CLI   buy   this-MASC-SG   black-MASC-SG
        'Shall I buy this black one?

In (19), there is a null nominal, which can be identified by *easte* 'this' and *negro* 'black,' both of which have masculine and singular features. In White et al.'s study, participants first heard sentences like (19), and then they were shown three pictures, which present a black shirt, a black tie and a black sweater. In Spanish, *camisa* 'shirt' and *corbata* 'tie' are feminine nouns while *suéter* 'sweater' is masculine. Participants were asked to pick one picture that is the most appropriate for (19). If L2 learners can infer the gender of the null nominal from the gender agreement between the determiner and the adjective, they would choose the black sweater.

    There were three groups of participants in White et al.'s study: (i) L1 English learners of L2 Spanish, (ii) L1 French learners of L2 Spanish,[10] and (iii) native Spanish speakers. The L2 learners were divided into low, intermediate and advanced groups. The results revealed that the intermediate L1 English learners were significantly less accurate than the advanced L1 English learners, as well as all groups of L1 French learners and the native Spanish speakers, in selecting the right pictures. The difference between the intermediate and advanced L1 English learners

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[10] The L1 French learners were included to examine whether they transferred their L1 knowledge of the gender feature from French to Spanish.

implies that L2 learners are able to acquire a new uninterpretable feature in the target language that is not instantiated in their L1. As such, this finding argues against the 'partial access to UG' approach, but is consistent with the Full Transfer/Full Access Hypothesis: (i) L2 learners initially transfer their L1 knowledge to the L2 grammar; (ii) L2 learners can draw on all aspects of UG, including the functional domain, to restructure the interlanguage grammar.

However, one important confound in White et al.'s experimental design is that it did not rule out the possibility that the advanced L1 English learners might have just used their knowledge from classroom instruction to make judgments. It is very likely that the 'N-drop' in sentences like (17b) is explicitly taught in Spanish language classrooms. Therefore, it is unclear whether White et al.'s study suggests that L1 English learners can indeed acquire linguistic knowledge about the gender feature in Spanish.

In sum, the findings from previous studies on L2 learners' ability to acquire 'new' uninterpretable features are inconclusive. In the following section, relevant studies about the L2 acquisition of new uninterpretable feature values are reviewed.

2.3.2 Previous studies about the L2 acquisition of new uninterpretable feature values

Previous studies on the L2 acquisition of different feature values took advantage of parametric differences among languages with respect to verb raising. Following Emonds (1978) and Pollock (1989), Chomsky (1993, 1995) proposes that INFL has different feature-checking requirements in different languages. In languages such as French, where INFL has strong features, the finite verb must raise to INFL to check these features. In contrast, in languages such as English, where INFL has weak features, the verb does not raise to INFL overtly. Instead, it raises covertly at LF. These features of INFL in both French and English are uninterpretable, based on Chomsky's (2000) claim that uninterpretable features are essential to movement and can allow a linguistic object to be targetd by syntactic operations. The alleged difference in verb raising between French and English has been motivated partly due to the clear distinction between the two languages with respect to the placement of adverbs (e.g., Emonds, 1978; Pollock, 1989).

(20a)   John   boit   souvent   du jus.
        John   drink   often   juice
        'John often drinks juice.'

(20b) *John   souvent   boit   du jus.
      John   often   drink   juice
      'John often drinks juice.'

(21a)   John often drinks juice.

(21b) *John drinks often juice.

With the assumption that the adverbial phrase is always adjoined to the VP, the verb *boit* 'drink'
in the French example (20a) must have raised to INFL so it precedes the adverb *souvent* 'often,'
which is further evidenced by the ungrammaticality of (20b). By contrast, in the English example
(21a), the verb *drink* does not raise to INFL so it must follow the adverb *often*, which is
supported by the ungrammatical status of (21b).

    Several L2 studies have focused on the strength of the uninterpretable features of INFL.
White (1992) conducted an elicited production task and an acceptability judgment task to
examine whether L1 French learners of L2 English can acquire the knowledge that INFL is weak
in English. Her experiments included three types of syntactic constructions, one of which
involves the position of an adverb with respect to the verb, as in (21a) and (21b). The
experimental results showed that the L1 French learners rejected almost 70% of the
ungrammatical English sentences involving an adverb following a transitive verb such as (21b).
Under the verb raising analysis outlined above, this indicates that they know INFL in English is
weak.

    The claim that L2 learners can acquire differences in the values of uninterpretable features is
further supported by Yuan (2001). Yuan argued that in Chinese, INFL is weak so the verb does
not raise, just like English. Below is a pair of examples that are equivalent to the English
examples in (21a) and (21b).

(22a)   John changchang he   guozhi.
        John often   drink juice
        'John often drinks juice.'

(22b) *John   he   changchang guozhi.
       John   drink   often   juice
       'John often drinks juice.'

Yuan conducted two experiments, an oral production task and a judgment task, to investigate whether L1 French, L1 English and L1 German learners of L2 Chinese can acquire the hypothesized knowledge that INFL is weak in Chinese. What is relevant to the discussion here is the data from the L1 French learners. Recall that since INFL in French is strong and the finite verb must raise to INFL to check its features, the verb always precedes the adverb in French, as in (20a). Then the question is, when L1 French speakers learn Chinese as an L2, can they acquire the knowledge that INFL is weak in Chinese?

The results from the L1 French participants showed that they never produced sentences like (22b) in the production task and consistently accepted sentences like (22a) and rejected sentences like (22b) in the judgment task, behaving like the L1 Chinese participants. This finding suggested that L1 French learners of L2 Chinese can acquire the knowledge that INFL in Chinese is weak. In other words, L1 French speakers have no problem in learning that the uninterpretable features on INFL in Chinese are weak, even though those are strong in French. This result supports the 'full access to UG' approach but argues against the 'partial access to UG' approach.

However, both White (1992) and Yuan (2001) failed to rule out the possibility that the relevant knowledge could have been explicitly taught to the learners in classrooms. In White's (1992) acceptability judgment task, it is likely that the L2 participants gave judgments just based on their meta-linguistic knowledge learned in the English classroom, which seems to be a simple rule: the adverb cannot occur between a verb and an object. In Yuan (2001), the L2 participants also might rely on similar taught knowledge.

2.4 Remaining issues in previous literature

As we have seen in 2.3, although White (1992) and Yuan (2001) showed that L2 learners can acquire uninterpretable feature values that do not exist in their L1, they did not rule out the factor that the learners' native-like performance was derived from explicit instruction in language classrooms. In order to avoid this issue, we should examine the acquisition of certain linguistic knowledge that is underdetermined in its nature, i.e., some knowledge that cannot be found in classroom instruction, input or learners' L1.

Moreover, as we reviewed, Hawkins and Chan (1997) and Hawkins and Hattori (2006) examined whether L2 learners can acquire the underdetermined knowledge of Subjacency in

English RCs and *wh*-interrogatives. Their experimental results suggest that even advanced learners lack such knowledge. When L1 Chinese learners interpret English RCs, Hawkins and Chan claim that the *wh*-phrase is considered as a topic, which binds a *pro* within the embedded clause, in parallel with Chinese topicalized sentences. Also, when L1 Japanese learners interpret English *wh*-interrogatives, Hawkins and Hattori (2006) argue that the fronted *wh*-phrase is generated through obligatory *wh*-scrambling, which is allowed in Japanese. However, as White and Juffs (1998) found that advanced L1 Chinese learners of L2 English were able to make native-like judgments on English sentences that violate Subjacency, perhaps the learners' English proficiency in Hawkins and Chan (1997) and Hawkins and Hattori (2006) were not advanced enough. Moreover, the authors state that L1 Chinese learners and L1 Japanese learners can use other L1-based strategies to accommodate the English input that involves a functional category/feature that is not instantiated in the L1: L1 Chinese learners consider English RCs as topicalized sentences while L1 Japanese learners interpret English *wh*-interrogatives as scrambled sentences. Nevertheless, it is unclear whether learners really use those L1-based strategies to account for the input. To get around this issue, I propose that sentences that are superficially similar but structurally different in two languages constitute an ideal testing ground for L2 acquisition of functional categories/features/feature values.

2.5 Summary

In the literature on L2 acquisition of syntax, there has been debate on whether UG is fully available to adult L2 learners. On the one hand, the 'partial access to UG' approach claims that not all aspects of UG are accessible. On the other hand, the 'full access to UG' approach proposes that all aspects of UG are available to adult L2 learners, including the functional domain.

Our review of the previous literature about whether UG is fully available to adult L2 learners led us to conclude that the issue can be narrowed down to the question of whether or not the domain of uninterpretable features can be accessed in L2 acquisition. L2 learners should be able to change the value of the uninterpretable feature in the L2 under the 'full access to UG' approach, whereas they should not be able to do so under the 'partial access to UG' approach.

As we have seen, the findings in previous studies provide arguments for both approaches. However, the findings from recent studies that focused on the L2 acquisition of uninterpretable

features and their values remain inconclusive because they fail to eliminate the possibility that their participants' performances are due to explicit knowledge they gain in language classrooms. To the best of my knowledge, there have been no studies that investigated the following question: When two languages have a superficially similar syntactic structure that arguably involves two different syntactic operations related to uninterpretable features, can L2 learners acquire this difference?

In the next chapter, I review the main approaches to the syntactic structures of RCs in Chinese and Japanese and identify issues in existing empirical data. In Chapter 4 and 5, I will address these issues with experiments. In Chapter 6, I show that Chinese and Japanese RCs provide an ideal testing ground for the L2 questions above, because they are superficially similar but involve two distinct syntactic operations to derive the head NP.

CHAPTER 3. JAPANESE AND CHINESE RELATIVE CLAUSES

As stated in Chapter 1, I define the RC as a sentential modifier with a missing constituent or a resumptive pronoun (RP) which shares its referential identity with the head NP. In this chapter, I will review existing approaches to the syntax of RCs and previous studies on Chinese and Japanese RCs. In 3.1, I review previous studies on the syntactic structure of RCs based on English data, focusing on two approaches: the head-raising approach and the operator movement approach. In 3.2, I review the arguments for the analysis that the head NP of Chinese RCs can be either raised out of the RC or base-generated external to the RC. In 3.3, I discuss previous studies on Japanese RCs and introduce three main approaches to their syntactic structure. Section 3.4 summarizes the findings from previous studies on Chinese and Japanese RCs and identifies key gaps in empirical data that this dissertation attempts to fill.

3.1 Two approaches to the derivation of RCs

There are two main approaches to the derivation of RCs across languages: the head-raising approach and the operator movement approach.

3.1.1 The head-raising approach

Brame (1968), Schachter (1973) and Vergnaud (1974) were the first to propose that the head NP of an RC is originally generated inside the RC and raised out of it later. This is known as the *head-raising analysis.* After these early publications, however, the head-raising approach did not gain traction until it was revived by Kayne (1994) and Bianchi (1999). For most of the 1980s and early 1990s, the operator movement (discussed in 3.1.2) was considered the 'standard' analysis of RCs.

The revival of the head-raising approach has both theoretical and empirical motivations. First, under Kayne's (1994) Antisymmetry approach to word order and phrase structures, right-adjunction is prohibited in the grammar of natural languages. With this approach, in languages such as English where the RC follows the head NP, the RC cannot be right-adjoined to the head NP. This is in contrast to the operator movement approach, under which the RC can either be left-adjoined or right-adjoined to the head

NP. Thus, the head-raising approach for post-nominal English RCs has been argued to involve two elements: a complementation structure and movement of the head NP. Under this analysis, a D takes a CP as its complement. In an English RC like (23a), the head NP *book* is raised to [Spec, CP] from within the RC, as in (23b). According to Bianchi (2000), *book* is actually generated as a DP introduced by a relative null D head, whose raising is triggered by the feature-checking requirements of the external D *the*, which has strong selectional phi features and categorical features that have to be checked locally with an [+N] phrase. Bianchi further claims that the external D *the* is interpreted with the NP selected by the null D through incorporating the two Ds to be one unified entity.

(23a)   [DP the [CP booki [C' that [IP I bought ti]]]]

(23b)
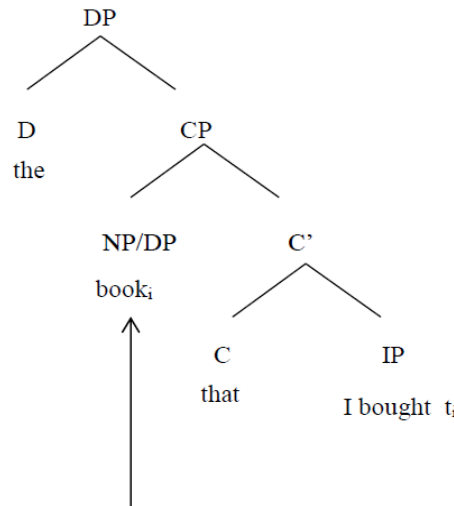
The core empirical arguments for the head-raising analysis of English RCs come from idioms and binding facts, which are reviewed below.

3.1.1.1 Idioms

Brame (1968) and Schachter (1973) provide evidence from idioms to argue that the head NP of English RCs should be analyzed as having raised from inside these RCs.

The expressions *keep track of* in (24a) and *make headway* in (24b) are idioms, meaning 'to monitor' and 'to move forward,' respectively. The ungrammaticality of (25a) and (25b) indicates that the *track* and the *headway* cannot stand alone and have to be interpreted together with other parts of the idioms.

(24a)   She's keeping careful track of her expenses.

(24b)   We made headway.

(25a)   *The careful track pleases me.

(25b)   *The headway was satisfactory.

Interestingly, in (26a) and (26b), *track* and *headway* can be relativized as head NPs while maintaining the idiomatic meanings.

(26a)   The careful track that she's keeping of her expenses pleases me.

(26b)   The headway that we made was satisfactory.

Schachter (1973) argues that those head NPs must be interpreted at their 'original positions' within the RC, i.e., reconstruct into the RC, in order to receive their idiomatic meanings at LF. Under the assumption that reconstruction can occur only when there is syntactic movement (Chomsky, 1993), one may argue that the head NPs must have been moved out of the RCs in (26a) and (26b).

3.1.1.2 Binding facts

The other type of evidence that has been used to argue for the head-raising approach involves binding facts (e.g., Aoun & Li, 2003; Bhatt, 2002; Schachter, 1973).

First, examples like (27a) and (27b) show that the anaphors *himself* and *each other* within the head NP can be bound by the RC subject[11] (Schachter, 1973):

(27a)   [[The portrait of himself$_i$]$_j$ that John$_i$ painted t$_j$]is extremely flattering.

---

[11] I assume that *himself* within the NP is an anaphor. However, Reinhart & Reuland (1993) argued that when the reflexive is embedded within an NP, it is a logophor rather than an anaphor and is exempt from Condition A of the binding theory.

(27b) [[The interest in each other$_i$]$_j$ that John and Mary$_i$ showed t$_j$] was fleeting.

Under the assumption that English reflexives and reciprocal pronouns are subject to Condition A (Chomsky, 1981a, 1986b), since the anaphors in (27a) and (27b) cannot be c-commanded by the RC subjects on the surface, the head NPs must move back into the RC, i.e., they reconstruct to their base positions inside the RC at LF. Since reconstruction implies syntactic movement, the head-raising approach is motivated.

The second binding argument for the head-raising analysis of RCs is from the binding of pronouns. In (28), the pronoun *him* within the head NP cannot be co-referential with the RC subject *John* (Bhatt, 2002):

(28)   *[The opinion of him$_i$]$_j$ that John$_i$ has t$_j$ is favorable.   (Bhatt, 2002, p. 49)

Under the head-raising analysis, since the head NP should reconstruct and be interpreted at its base position within the RC at LF, the ungrammaticality of (28) is predicted because Condition B of the binding theory is violated, i.e., a pronoun cannot be locally bound.

The third binding argument for the head-raising analysis comes from the R-expressions inside the head NP. As in (29a) and (29b), the proper NP *John* within the head NP cannot be co-referential with the subject *he*:

(29a) *[The opinion of John$_i$]$_j$ that he$_i$ thinks Mary has t$_j$ is favorable.
(29b) *[The portrait of John$_i$]$_j$ that he$_i$ painted t$_j$ is extremely flattering.

(Schachter, 1973)

If the head NP is base-generated outside of the RC, the ungrammatical status of these examples would be unexpected because *John* inside the head NP is not bound by the pronoun *he* inside the RC. In contrast, the ungrammaticality of these examples is predicted by the head-raising approach because when the head NP reconstructs within the RC at LF, the R-expression *John* would be bound by the subject *he*, violating Condition C of the binding theory, i.e., R-expressions must always be free.

3.1.2 The operator movement approach

Chomsky (1977) proposes that RCs are derived via *wh*-movement, which can be observed in many constructions such as *wh*-interrogatives in English. (30) is an example.

(30)   the girl$_i$ [who$_i$ John likes t$_i$].

The *wh*-movement analysis is motivated by the following two observations: (a) the dependency between the *wh*-phrase and the gap obeys the island constraints, as in (31a); (b) long-distance dependency is possible, as in (31b).

(31a)   *the girl$_i$ [who$_i$ I will be happy [if John likes t$_i$]].
(31b)   the girl$_i$ [who$_i$ I know [John likes t$_i$]].

The ungrammatical status of (31a) suggests that the *wh*-word *who*, as an operator, moves from within the adjunct *if*-clause, violating the island constraints (Huang, 1982). In contrast, the *wh*-word *who* in (31b) can be related to the gap across clause boundaries when there is no island involved, establishing a long-distance dependency. Moreover, in (30) and (31b), the fronted *wh*-word *who,* which is co-indexed with the gap, is claimed to be interpreted with the head NP *girl* via predication (Browning, 1987; Chomsky, 1977; Safir, 1986). Under this analysis, (30) can be represented as follows:

(32)   [$_{DP/NP}$ the girl]$_i$ [$_{CP}$ who$_i$ [$_{IP}$ John likes t$_i$]

The operator movement approach has one important implication regarding the derivation of the head NP which is different from the head-raising approach: the head NP is base-generated external to the RC rather than raised from within the RC. It is co-indexed with the gap via predication of the raised *wh*-phrase. Under the analysis that the head NP is base-generated, it is not predicted to reconstruct into the RC at LF.

29

3.1.2.1 Idioms

In 3.1.1.1, I discussed how idioms have been used to argue for the head-raising approach of English RCs. However, it turns out that some idiom data also argue for the operator movement approach. First, it is not always true that part of an idiom can be relativized as the head NP in English, as in (33a) and (33b).

(33a)   *The bucket she kicked was horrible.
       (Intended interpretation: her death was horrible.)

(33b)   *The spot that Mexican food hit yesterday was unforgettable.
       (Intended interpretation: the Mexican food that fulfilled our particular
       needs yesterday was unforgettable.)

<div align="right">(Kitao, 2011, p. 317)</div>

In English, the idioms *kick the bucket* and *hit the spot* mean 'to die' and 'be exactly what is required,' respectively. If the head NPs *bucket* and *spot* in (33a) and (33b) are raised out of the RC, they should reconstruct into the RCs at LF, and the corresponding idiomatic interpretations are predicted to be available in the two sentences. Nevertheless, such interpretations are not available, which suggests that the head NPs cannot reconstruct, supporting the operator movement approach.[12]

Second, as pointed out in McCawley (1981), the head NP can be linked to a matrix predicate to generate an idiomatic interpretation, as in (34):

(34)   John pulled the strings that got Bill his job.   (McCawley, 1981)

The idiom *pull the strings* means 'to exert influence over an organization.' In (34), the head NP *strings* can be idiomatically interpreted with the main predicate *pull,* which is compatible with the operator movement approach.

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[12] These particular idioms may simply resist displacement of their individual parts, which can be observed in other constructions such as passives:
(i) *The bucket was kicked by him yesterday. (Intended interpretation: he died yesterday.)
(ii) *The spot was hit by Mexican food yesterday. (Intended interpretation: the Mexican food was exactly what we needed yesterday.)

3.1.2.2. Binding facts

In 3.1.1.2, we have seen that there is binding evidence supporting the head-raising approach to RCs: (i) anaphors and reciprocal pronouns inside the head NP can be bound by the RC subject; (ii) pronouns and R-expressions inside the head NP cannot be co-referential with the RC subject. However, there are also arguments based on binding facts that support the operator movement analysis.

First, Aoun and Li (2003) note that there is a contrast between non-*wh*-RCs and *wh*-RCs with respect to the reconstruction of the head NP:

(35a)   We admired the picture of himself$_i$ (that) John$_i$ painted in art class.

(35b)   *We admired the picture of himself$_i$ which John$_i$ painted in art class.

(36a)   We admired the picture of himself$_i$ (that) John$_i$ likes best.

(36b)   *We admired the picture of himself$_i$ which John$_i$ likes best.

(Aoun & Li, 2003, p. 111)

In the non-*wh*-RCs (35a) and (36a), the anaphor *himself* inside the head NP *the picture of himself* can be bound by the RC subject *John*, which implies that the head NP reconstructs into the RC at the LF. By contrast, in the *wh*-RCs (35b) and (36b), the co-reference between *himself* and *John* is impossible,[13] which suggests that the head NP cannot reconstruct. Based on this contrast, Aoun and Li argue that the head NP in English RCs can be derived through either raising or base-generation and the latter strategy supports the operator movement approach.

Second, Sauerland (2000, 2003) claims that the R-expression within the head NP may be co-referential with the RC subject, which suggests that the head NP does not reconstruct into the RC:[14]

(37a)   [The relative of John$_i$]$_j$ that he$_i$ likes t$_j$ lives far away.   (Sauerland, 2003, p. 210)

(37b)   [The picture of Marsden$_i$]$_j$ which he$_i$ displays t$_j$ prominently are generally the attractive ones.   (Sauerland, 2003, p. 211)

---

[13] According to some native English speakers that I consulted, (35b) and (36b) are marginally acceptable, although they are worse than (35a) and (36a).

[14] Some native English speakers that I consulted with cannot get the co-references in (37a) and (37b).

In (37a) and (37b), the R-expressions *John* and *Marsden* within the head NPs can be co-referential with the RC subject *he*, based on which Sauerland argues that reconstruction effects can be absent with respect to Condition C, which is compatible with the operator movement approach.

3.1.3 Section Summary

In this section, I reviewed the head-raising approach and the operator movement approach to RCs, focusing on their implications on the derivation of the head NP. First, idioms and binding facts were provided to argue that the head NP of an RC must be raised out of the RC (e.g., Brame, 1968; Schachter, 1973), as reconstruction effects of the head NP are observed. However, counterexamples also exist, arguing that the head NP is base-generated out of the RC. Thus, it is not unreasonable to conclude that both the raising and base-generation strategies are available in deriving the head NP of RCs (Carlson, 1977; Sauerland, 2000, 2003). In the following sections, I review the previous literature about the head derivation in Chinese and Japanese RCs and identity key gaps in the empirical data.

3.2 Chinese RCs

This section reviews previous studies on the syntax of Chinese RCs, focusing on the derivation of the head NP.

3.2.1 Structure of Chinese RCs

As discussed in 3.1, according to Kayne's (1994) Antisymmetry approach, right-adjunction is prohibited and post-nominal RCs such as those in English are analyzed as involving a complementation structure and an NP-movement, which is shown in (23a), repeated as (38) below:

(38) [$_{DP}$ the [$_{CP}$ book$_i$ [$_{C'}$ that [$_{IP}$ I bought t$_i$]]]]

Under Kayne's (1994) theoretical framework, many studies (e.g., Saito, Lin, & Murasugi, 2008; Simpson, 2002) argue that Chinese RCs are underlyingly post-nominal and involve a complementation structure, just like English RCs. They assume that the head NP in Chinese RCs is raised to [Spec, CP]. Moreover, according to Simpson (2002) and Wu (2000), *de*, the obligatory particle in Chinese RCs, is a determiner taking CP as its complement. Under Bianchi's (1999) analysis, the raising of the head NP can be attributed to the strong selectional phi features and categorical features of the external D *de* that have to be checked locally with a [+N] phrase. Moreover, Lin, Murasugi and Saito (2001) propose that *de* is generated in C and raised to D afterwards, which makes the specifiers of DP and CP 'equidistant' from the IP at the complement position of CP.

Under Kayne's (1994) framework, one important difference between English and Chinese RCs is that only in Chinese RCs does the IP embedded inside the CP move to [Spec, DP]. This is why Chinese RCs are pre-nominal. One example is in (39a), with its analysis in (39b).

(39a) Xiaoming mai   de   shu
       Xiaoming buy   DE   book
       'the book that Xiaoming bought'

(39b) [DP [IP Xiaoming mai ti]k [D' de [CP shui [C' tk]]]]

The structure right before the movement of the IP to [Spec, DP] in (39b) is in (40a) and its tree structure is presented in (40b):

(40a) [DP dej [CP shui [C' [IP Xiaoming   mai ti] tj]]]
           DE   book   Xiaoming   buy
       'the book that Xiaoming bought'

(40b)
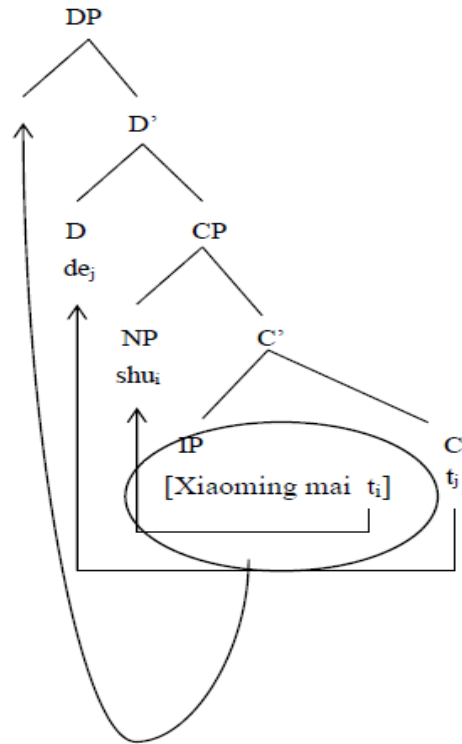
On the other hand, several studies (e.g., Aoun & Li, 2003; Huang, et al., 2008) argue for an adjunction structure for Chinese RCs. (39a) is analyzed as (41a) under the adjunction analysis, whose tree structure is in (41b):

(41a)   [$_{CP}$ Xiaoming mai t$_i$ de] [shu]$_i$
        Xiaoming buy   DE   book
     'the book that Xiaoming bought'

(41b)
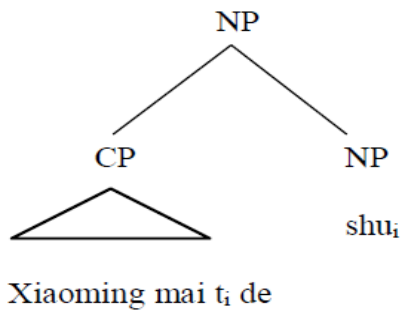
Under the adjunction structure analysis, the head NP *shu* 'book' in (41b) is raised from within the CP *Xiaoming mai* 'Xiaoming bought' and the CP is then left-adjoined to the head NP. In what follows, I first review the major evidence from Aoun and Li (2003) and Huang et al. (2008) for the adjunction structure analysis of Chinese RCs.

3.2.1.1 Adjunction structure analysis of Chinese RCs

Aoun and Li (2003) and Huang et al. (2008) argue that the projection containing the head NP and the RC must be an NP in Chinese. Their major motivation is from Chinese conjunction structures.

First, the Chinese connective *jian* 'and' can connect two properties or activities of a single individual:

(42a) ta shi yi-ge mishu   jian daziyuan.
      he is one-CL secretary and typist
      'He is a secretary and typist.'   (Aoun & Li, 2003, p. 141)

(42b) Zhangsan nianshu jian   zuoshi, hen   mang.
      Zhangsan study   and   work   very busy
      'Zhangsan studies and works; (he is) busy'   (Aoun & Li, 2003, p. 143)

However, *jian* cannot connect individual-denoting expressions such as proper names, pronouns and phrases involving number+classifier expressions:

(43a) *wo hen xihuan ta   jian   Zhangsan.
       I very like   him and   Zhangsan
       'I like him and Zhangsan.'   (Aoun & Li, 2003, p. 143)

(43b) *wo xiang zhao yi-ge   mishu   jian yi-ge   daziyuan.
       I   want find one-CL secretary and one-CL typist
       'I want to find a secretary and a typist.'   (Aoun & Li, 2003, p. 142)

Based on (42a)-(43b), Aoun and Li argue that the connective *jian* only connect either NPs or VPs and cannot connect DPs.[15]

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[15] Aoun and Li (2003) and Huang et al. (2008) assume that a typical nominal expression in Chinese is [DP Demonstrative [NumP Number Classifier [NP N]]] and what follows the classifier is an NP.

In addition, *jian* can connect two complex nominals involving RCs, as shown in (44):

(44)　wo xiang zhao yi-ge [[fuze　yingwen de mishu]　jian [jiao　xiaohai de
　　　I　want find one-CL charge English DE secretary and　teach kid　　DE
　　　jiajiao]].
　　　tutor
　　　'I want to find a secretary that takes care of English (matters) and tutor that
　　　teaches kids.'　　　　　　　　　　　　　　　　　(Aoun & Li, 2003, p. 144)

According to Aoun and Li, the complex nominals *fuze yingwen de mishu* 'the secretary
that takes care of English matters' and *jiao xiaohai de jiajiao* 'the tutor that teaches kids'
in (44) must be NPs rather than DPs because they are connected by the connective *jian*.
This is in contrast to the English connective *and*, which only connects DPs (e.g.,
Longobardi, 1994):

(45a)　He is an [[actor that wants to do everything] and [*a* producer that wants to please
　　　everyone]].

(45b) *He is an [[actor that wants to do everything] and [producer that wants to please
　　　everyone]].
　　　　　　　　　　　　　　　　　　　　　　　　　　(Aoun & Li, 2003, p. 145)

Thus, Aoun and Li (2003) and Huang et al. (2008) assert that the Chinese complex
nominal expression 'RC + head NP' is an NP rather than a DP, which supports the
adjunction structure analysis.

3.2.1.2 Complementation structure analysis of Chinese RCs

By following Kayne's (1994) theoretical framework, many studies (e.g., Miyamoto, 2014;
Saito, et al., 2008; Simpson, 2002; Wu, 2000) argue that Chinese RCs involve a
complementation structure, in parallel to English RCs such as (46):

(46)　　[$_{DP}$ the [$_{CP}$ book$_i$ [$_{C'}$ that [$_{IP}$ I bought t$_i$]]]]

The reason why Chinese RCs are pre-nominal is because the embedded IP moves to [Spec, DP]. One example has been shown in (39a), repeated in (46a), with the complementation structure analysis in (46b).

(46a) Xiaoming   mai   de   shu
      Xiaoming   buy   DE   book
      'the book that Xiaoming bought'

(46b) [DP [IP Xiaoming mai t_i]_k [D' de [CP shu_i [C' t_k]]]]

To argue for the complementation structure analysis, previous studies presented different motivations to show that *de* in Chinese RCs is a determiner taking a CP as its complement.

First, Simpson (2002) argues against the traditional perspective (e.g., Huang, 1982) that the *de* in Chinese RCs is a complementizer. In an investigation of Yoruba and Amharic that involve pre-nominal RCs with a complementizer, Simpson (2002) found that the position of the complementizer can only be either before the RC or immediately after the head NP, as illustrated in (47a) and (47b):

(47a) man (Comp) I met the   (Yoruba)
(47b) I met the man (Comp)   (Amharic)

In Yoruba, RCs have been analyzed as involving a movement of the entire CP to [Spec, DP], as in (48a), whereas in Amharic, RCs involve a movement of the IP to [Spec, DP], as in (48b):

(48a) [DP [CP man_i [C' that [IP I met t_i]]]_k [D the] t_k]   (Yoruba)
(48b) [DP [IP I met t_i]]_k [D the] [CP man_i that t_k]   (Amharic)
                                                      (Simpson, 2002, p. 3)

Thus, in Yoruba and Amharic, the pre-nominal RCs can be derived by moving CP or IP, which is compatible with Kayne's (1994) framework of RCs.

As for Chinese RCs, if *de* is a complementizer, the two word orders shown in (49a) and (49b) should occur to convey the meaning 'the book that Xiaoming bought.' However, (49a) and (49b), which are based on (47a) and (47b), are not allowed in Chinese RCs.

(49a) * shu   de   Xiaoming   mai
      book DE   Xiaoming   buy
      Intended: 'the book that Xiaoming bought'

(49b) * Xiaoming mai   shu   de
      Xiaoming buy book DE
      Intended: 'the book that Xiaoming bought'

Thus, Simpson (2002) claims that the only possible way to approach the syntactic structure of Chinese RCs is to consider that *de* is a determiner in the D^0 position and the IP moves to [Spec, DP], as shown in (46b). To support his proposal, Simpson examined determiners across different languages and concluded that *de* in Chinese RCs should belong to one type of determiner that lacks specification of outwardly identifiable definiteness. Additionally, he argues that *de* is one of the determiners that may provide an external variable in an unsaturated open predication, which can also be found in many other languages. In Chinese, the RC has to move to [Spec, DP] to saturate an open predication.

The second motivation for the *de*-as-a-determiner proposal is from N'-ellipsis.

First, Jackendoff (1971) observes that N'-ellipsis is allowed only when it is in a genitive phrase:

(50a)   I have read Bill's book, but I haven't read [DP John's [NP ~~book~~]]
(50b) * I have edited a book, but I haven't written [DP a [NP ~~book~~]]
(50c) * I have seen the book, but I haven't had a chance to read [DP the [NP ~~book~~]]

Lobeck (1990) and Saito and Murasugi (1990) argue that the N'-ellipsis observed by Jackendoff can be analyzed as the same way as VP-ellipsis and TP-ellipsis (sluicing), all of which involve the functional heads D, T, and C:

(51) a. N'-ellipsis   b. VP-ellipsis   c. Sluicing

```
        DP                    TP                    CP
       /  \                  /  \                  /  \
     XP    D'              XP    T'              XP    C'
          /  \                  /  \                  /  \
         D    N̶P̶              T    v̶P̶              C    T̶P̶
```
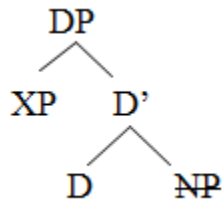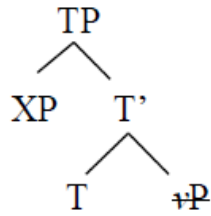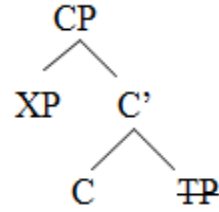
(Saito et al., 2008, p. 252)

For example, TP-ellipsis can occur only when a *wh*-phrase moves to [Spec, CP], as in (52a).

(52a)   John bought something, but I don't know [CP what [TP ~~he bought *t*~~]]

(52b) *John insisted that he turned in his homework, but I wasn't sure [CP whether [TP ~~he turned in his homework~~]]

(52c) *John insisted that he turned in his homework, and Bill reported to Mary [CP that [TP ~~he turned in his homework~~]].

(Saito et al., 2008, p. 252)

The TP in (52a) can be deleted because the *wh*-phrase *what* moves to [Spec, CP]. By contrast, the TPs in (52b) and (52c) cannot be deleted because nothing fills [Spec, CP].

Saito et al. (2008) provide evidence from Japanese to argue that N'-ellipsis is only allowed when [Spec, DP] is filled:

(53a) [Taroo-no   taido]-wa   yoi ga,   [Hanako-no ~~taido~~]-wa   yoku-nai.
       Taroo-GEN attitude-TOP good though Hanako-GEN attitude-TOP good-NEG
       'Though Taroo's attitude is good, Hanako's isn't.'

(53b)* [Hare-no   hi]-wa   yoi   ga,   [ame-no   ~~hi~~]-wa   ochikomu
       clear-GEN day-TOP   good though rain-GEN day-TOP feel depressed
       'Clear days are ok, but I feel depressed on rainy days.'

(Saito et al., 2008, p. 253)

According to Saito et al., *Hanako* is an argument in (53a), which can move to [Spec, DP] to satisfy the feature requirement of D. In contrast, *ame* 'rain' in (53b) is an adjunct and

cannot move to [Spec, DP]. The contrast between (53a) and (53b) with respect to N'-ellipsis supports that the NP, which D takes as its complement, can be deleted only when [Spec, DP] is filled.

After establishing that N'-ellipsis as a diagnostic, Saito et al. argue that *de* is a determiner in Chinese RCs[16] and the RC must move to [Spec, DP], as shown in (54):

(54)
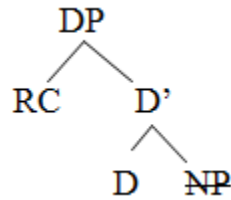
(Saito et al., 2008, p. 263)

This analysis can be supported by the following example:

(55) [[wo kanjian] de nanhai] bi   [[ni   kanjian] de ~~nanhai~~] geng youqian
       I   see   DE boy   than you see   DE boy   more rich
      'The boy I saw is richer than the boy you saw.'   (Saito et al., 2008, p. 263)

Since N'-ellipsis is allowed only when [Spec, DP] is filled, the fact that the head NP *nanhai* 'boy' of the second RC in (55) can be deleted supports the analysis that *de* is a determiner in Chinese RCs.

Furthermore, this argument can be further strengthened by the difference between Chinese and Japanese RCs with respect to N'-ellipsis. In Japanese RCs, the head NP cannot be deleted, as in (56):

(56) *[[Taroo-ga   kinoo   at-ta]   hito]-wa   yasashii ga,   [[Hanako-ga
        Taroo-NOM yesterday meet-PST person-TOP kind   though Hanako-NOM
        kinoo   at-ta]   ~~hito~~]-wa   kowai
        yesterday meet-PST person-TOP scary
       'The person Taroo saw yesterday is kind, but the person Hanako saw yesterday is scary.'

---

[16] As mentioned in 3.2.1, Lin et al. (2001) claim that *de* is generated in C and raised to D afterwards.

According to Fukui and Takano (2000), the RC in Japanese is left-adjoined to a base-generated head NP and there is no D involved in the structure. The fact that that the head NP can be deleted in Chinese RCs but not in Japanese RCs can be well accounted for by the proposal that *de* in Chinese RCs is a determiner.

3.2.1.3 Adjunction vs. Complementation

As we have seen, the connective *jian* 'and,' which connects property-denoting NPs only, can connect two complex nominals (RC+head NP). (44) is repeated in (57):

(57)   wo xiang zhao yi-ge [[fuze   yingwen de mishu]   jian [jiao   xiaohai de
        I   want find one-CL charge English DE secretary and   teach kid   DE
        jiajiao]].
        tutor
        'I want to find a secretary that takes care of English (matters) and tutor that
        teaches kids.'   (Aoun & Li, 2003, p. 144)

If the complex nominals *fuze yinwen de mishu* 'the secretary that takes care of English matters' and *jiao xiaohai de jiajiao* 'the tutor that teaches kids' are DPs, as claimed by the complementation structure analysis, the grammatical status of (57) cannot be accounted for because the connective *jian* cannot connect DPs. Thus, it seems that the head NPs *mishu* 'secretary' and *jiajiao* 'tutor' have to be base-generated and left-adjoined by the RCs, under the constraint of the connective *jian* that only NPs are allowed to be connected. The complex nominal *fuze yinwen de mishu* 'the secretary that takes care of English matters' should be derived as in (58):

(58)

41
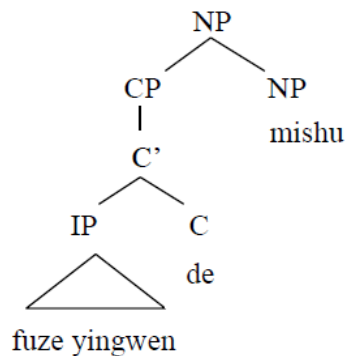
Under this analysis, we predict that N'-ellipsis to be impossible when *jian* connects two complex nominals. Such a prediction is born out in the following pair of examples:

(59a)   wo xiang zhao yi-ming [[fuze   yingyu ke   de   mishu]   jian [fuze
         I   want find one-CL   charge English class DE   secretary and   charge
         fayu   ke   de mishu]]
         French class DE secretary
         'I want to find one secretary who is in charge of English and French classes.'

(59b) *wo xiang zhao yi-ming [[fuze   yingyu ke   de   mishu]   jian [fuze
         I   want find one-CL   charge English class DE   secretary and   charge
         fayu   ke   de   ~~mishu~~]]
         French class DE secretary
         'I want to find one secretary who is in charge of English and French classes.'

The ungrammatical status of (59b) suggests that N'-ellipsis is impossible. In contrast, I observe that it is possible when *he*, the connective that connects two DPs, is used to connect the two complex nominals:

(60a)   wo xiang zhao[yi-ming   fuze   yingyu ke   de   mishu]   he [yi-ming
         I   want find one-CL   charge English class DE   secretary and one-CL
         fuze   fayu   ke   de   mishu]]
         charge   French class DE secretary
         'I want to find one secretary who is in charge of English and another one who is in charge of French classes.'

(60b)   wo xiang zhao[yi-ming   fuze   yingyu ke   de   mishu]   he [yi-ming
         I   want find one-CL   charge English class DE   secretary and one-CL
         fuze   fayu   ke   de   ~~mishu~~]]
         charge   French class DE secretary
         'I want to find one secretary who is in charge of English and another one who is in charge of French classes.'

If *de* is not a determiner, it would be puzzling why the head NP *mishu* 'secretary' of the second RC can be deleted. Thus, the above examples imply that Chinese RCs cannot always involve the adjunction structure claimed by Aoun and Li (2003) and Huang et al. (2008). If they do, the difference (59b) and (60b) concerning N'-ellipsis would not be accounted for. On the one hand, the ungrammatical status of (59b) suggests that the

complex nominals (RC+ head NP) connected by *jian* can only be derived by adjunction. On the other hand, the possible N'-ellipsis in (60b) indicates that the complex nominals connected by *he* must be derived by complementation.

Given the above issue in the adjunction structure analysis, in this dissertation, I adopt the complementation structure analysis for Chinese RCs, as shown in (40b). Additionally, the adjunction structure, as shown in (58), should also be available when the relativized head NP is an adjunct such as *fangfa* 'method' or when there is a resumptive pronoun (RP) inside the RC. The evidence can be found from N'-ellipsis:

(61a)   [[ta xiu che de] fangfa] bi   [[wo xiu che de] fangfa] hao.
          he fix car DE method than   I   fix car DE   method good
        'The way he fixes cars is better than the way I fix cars.'

(61b) *[[ta xiu che de] fangfa] bi   [[wo xiu che de] ~~fangfa~~] hao.
          he fix car DE method than   I   fix car DE   method   good
        'The way he fixes cars is better than the way I fix cars.'

                                                                    (Aoun & Li, 2003, p. 181)

According to Aoun and Li (2003), the head NP *fangfa* 'method' in (61a) cannot be raised from within the RC because it is an adjunct rather than an argument. Instead, it should be base-generated and left-adjoined by the RC. This is predicted by N'-ellipsis: the head NP of the second RC cannot be deleted, as in (61b), which suggests that the RC does not fill [Spec, DP].

Moreover, when an RP occurs inside Chinese RCs, as illustrated in (62a), it has been claimed that the head NP must be base-generated external to the RC and left-adjoined by the RC (e.g., Aoun & Li, 2003; Miyamoto, 2014). This proposal is also supported by N'-ellipsis: the head NP of the second RC in (62a) cannot be deleted, as shown in (62b). It is in contrast to its equivalent RC with a gap, as in (62c), where N'-ellipsis is possible, as in (62d).

(62a)   [[Eli song **ta** hua]   de nuhai] bi [[Leo song **ta** dangao] de nuhai] geng keai
          Eli give her flower DE girl   than Leo give her cake   DE girl   more cute
        'The girl Eli gave a flower to is cuter than the girl Leo gave a cake to.'

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(62b) *[[Eli song **ta** hua]   de nuhai]bi [[Leo song **ta** dangao] de ~~nuhai~~]geng keai
         Eli give her flower DE girl   than Leo give her cake   DE girl   more cute
         'The girl Eli gave a flower to is cuter than the girl Leo gave a cake to.'

(62c) [[Eli song hua]   de nuhai]bi [[Leo song dangao]de nuhai]geng keai
         Eli give flower DE girl   than Leo give cake   DE girl   more cute
         'The girl Eli gave a flower to is cuter than the girl Leo gave a cake to.'

(62d) [[Eli song hua]   de nuhai]bi [[Leo song dangao] de ~~nuhai~~]geng keai
         Eli give flower DE girl   than Leo give cake   DE girl   more cute
         'The girl Eli gave a flower to is cuter than the girl Leo gave a cake to.'

In the following sections, I will review arguments for the head-raising and head-base-generation analyses of Chinese RCs.

3.2.2 The head-raising analysis of Chinese RCs and its evidence

Although Chinese RCs have been argued to involve either a complementation structure or an adjunction structure, what is uncontroversial is that the head NP is raised rather than base-generated when the RC has a gap and does not involve any islands.

Aoun and Li (2003) and Huang et al. (2008) provided relevant arguments from idioms and binding facts, the two diagnostics that have been used to argue for the head-raising approach in English RCs (e.g., Schachter, 1973), as reviewed in 3.1.1.

First, according to Aoun and Li and Huang et al., part of an idiom can be relativized in Chinese RCs, as illustrated in (63a) and (63b):

(63a) [[ta   chi t_i de] cu_i]   bi   shei dou   da.
          he   eat   DE   vinegar than who   all   big
          'Lit. The vinegar he eats is greater than anyone else's.'
          'His jealousy is greater than anyone else's.'

(63b) wo   ting   bu   dong   [ta   you t_i de] mo_i.
          I   listen not   understand   he   make   DE silence
          'Lit. I do not understand the humor he made.'
          'I do not understand his humor.'

                                                                    (Aoun & Li, 2003, p. 138)

The idioms *chi cu* and *you mo* mean 'be jealous' and 'be humorous' respectively. In (63a) and (63b), the head NPs *cu* 'vinegar' and *mo* 'silence' can only receive their idiomatic meanings with the embedded predicates *chi* 'eat' and *you* 'make.' With the assumption that individual parts of an idiom should be interpreted together at LF (Schachter, 1973), Aoun and Li claim that the head NP must move back inside the RC at LF, i.e., to reconstruct into the RC. Since reconstruction implies syntactic movement, these examples motivate the head-raising analysis of Chinese RCs.

The second argument discussed by Aoun and Li and Huang et al. comes from binding facts. First of all, the anaphor *ziji* 'self' in Chinese is subject-oriented, which means it can refer only to the subject (e.g,, Huang et al., 2009).

(64)   John$_i$ yijing   tongzhi Bill$_j$ ziji$_{i/*j}$-de fenshu le.   (Chinese)
        John already inform   Bill   self-GEN   grade   PST
        'John$_i$ already told Bill$_j$ his$_{i/*j}$ grade.'   (Huang et al., 2009, p. 337)

In (64), the anaphor *ziji* can only be co-referential with the subject *John*, not the indirect object *Bill*. In addition, in Chinese RCs, the subject-oriented anaphor *ziji* within the head NP can be bound by the RC subject (Aoun & Li, 2003), as in (65), which suggests that the head NP *ziji de chezi* 'self's car' can reconstruct and be interpreted inside the RC.

(65)   Zhangsan$_k$ kanjian-le [Xiaoming$_i$ kai   t$_j$ lai   de] [ziji$_{i/k}$-de   chezi]$_j$
        Zhangsan see-PST   Xiaoming drive   over DE self-GEN   car
        'Zhangsan$_k$ saw self$_{i/k}$'s car that Xiaoming$_i$ drove.'   (Aoun & Li, 2003, p. 132)

Finally, I would like to add an additional piece of evidence for the head-raising approach to Chinese RCs that has not been discussed previously. This novel argument has to do with Condition C. Observe the following example.

(66)   Mary   kanjian-le [ta$_{*i/l}$ kai   t$_j$ lai   de] [Xiaoming$_i$-de   chezi]$_j$
        Mary   see-PST   he   drive   over DE Xiaoming-GEN   car
        'Mary saw Xiaoming$_i$'s car that he$_{*i/l}$ drove.'

In (66), the R-expression *Xiaoming* within the head NP cannot be co-referential with the RC subject pronoun *ta* 'he,' which can be attributed to the violation of Condition C of the

binding theory. Since *Xiaoming* and the pronoun *ta* do not c-command each other in their surface positions, the apparent Condition C violation in (66) is puzzling if the head NP is generated outside the RC. However, under the head-raising approach, the Condition C violation is expected because the head NP is obligatorily reconstructed to be inside the RC, where the R-expression *Xiaoming* would be bound by the pronoun *ta* within the embedded IP.

To summarize, two diagnostics, idioms and binding facts, argue for the head-raising derivation in Chinese RCs. However, just like English RCs, it is not the end of the story. In what follows, I discuss Aoun and Li's (2003) claim that the head NP of Chinese RCs can also be base-generated external to the RC.

3.2.3 The head-base-generation analysis of Chinese RCs and its evidence

While Aoun and Li (2003) argue that Chinese RCs can be derived via raising of the head NP, they also claim that the head NP can be base-generated external to the RC. There are several arguments for this.

First, recall that English allows the head NP of an RC to be part of an idiom in the matrix clause. Aoun and Li show that Chinese does the same, as in (67a) and (67b):

(67a) ta laoshi ai chi [rang ren   shou-bu-liao   de] [cu]
       he always like eat let   people receive-not-complete DE vinegar
       'Lit. He always likes to eat vinegar that cannot be put up with.'
       'He always likes to be jealous to such a degree that is beyond
       what can be put up with.'   (Aoun & Li, 2003, p. 139)

(67b) ta zhi hui you [[meiren   ting-de-dong   de] [mo]
       he only can make   nobody   listen-DE-understand DE   silence
       'Lit. He can only make the humor that nobody understands.'
       'He can only say humorous things that nobody can understand.'
                                                          (Aoun & Li, 2003, p. 139)

As we have seen in (67a) and (67b), the Chinese idioms *chi cu* and *you mo* mean 'be jealous' and 'be humorous' respectively. In (67a), the head NP *cu* 'vinegar' is interpreted as the direct object of the matrix predicate *chi* 'to eat' and in (67b), the head NP *mo* 'silence' is interpreted as the direct object of the matrix predicate *you*, meaning 'to make

humor.' Therefore, under the assumption that all elements of an idiom should be generated as a whole unit (Schachter, 1973), it must be the case that the head NPs *cu* and *mo* in (67a) and (67b) are generated external to the RCs.

Second, Aoun and Li (2003) observe that an RP may occur inside the RC, as shown in (68):

(68)　wo xiang kan [$_{CP}$ ni　shuo [$_{CP}$Zhangsan hui dai　　**ta**$_i$　huilai de]] [xiaohai]$_i$
　　　　I　want see　　you say　　Zhangsan will bring　him back　DE　child
　　　　'I want to see the child that you said that Zhangsan would bring back.'
　　　　　　　　　　　　　　　　　　　　　　　　　(Aoun & Li, 2003, p. 170)

In (68), there is an RP *ta* inside the RC. Aoun and Li argue that if the head NP *xiaohai* 'child' is raised from inside the RC, the RP *ta* 'him' is not expected to occur at the trace position of *xiaohai*. This argument is based on Sells (1984) and Safir (1986): the RP is a variable bound by a base-generated null operator in [Spec, CP]. Aoun and Li further propose that Chinese RCs with an RP involve an adjunction structure, i.e., an RC is directly adjoined to a base-generated NP, which binds a null operator in [Spec, CP], as in (69):

(69)　[$_{NP}$[$_{CP}$ op$_i$ [$_{IP}$ Zhangsan　hui　dai　　　**ta**$_i$　　huilai]　de] [$_{NP}$ xiaohai]$_i$]
　　　　　　　　　　　　Zhangsan　will　bring　him　　back　DE　child
　　　　'the child$_i$ that Zhangsan would bring (him$_i$) back.'

To support this head-base-generation analysis, Aoun and Li first provide evidence from binding facts: when an RP occurs within an RC, the anaphor *ziji* within the head NP cannot be bound by the RC subject, as in (70a).

(70a) * wo xiang kan [op$_i$ [meigeren$_j$ hui　dai　　**ta**$_i$　huilai] de] [ziji$_j$-de　pengyou]$_i$
　　　　I　want see　　everyone　will　bring him back　DE　self-GEN friend
　　　　'I want to see self$_j$'s friend$_i$ that everyone$_j$ would bring (him$_i$) back.'
　　　　　　　　　　　　　　　　　　　(Aoun & Li, 2003, p. 169, with slight modification)

(70b)　wo xiang kan　　[meigeren$_j$ hui dai　**t**$_i$ huilai de]　[ziji$_j$-de　pengyou]$_i$
　　　　I　want see　　everyone　will bring　back　DE　self-GEN friend
　　　　'I want to see self$_j$'s friend that everyone$_j$ would bring back.'
　　　　　　　　　　　　　　　　　　　(Aoun & Li, 2003, p. 170, with slight modification)

In (70a), the RC has an RP, which is co-indexed with the head NP *ziji de pengyou* 'self's friend.' In this example, the anaphor *ziji* within the head NP cannot take the RC subject *meigeren* 'everyone' as its antecedent. In contrast, in (70b), where the RC is identical to that in (70a) except that it has a gap instead of an RP, the anaphor *ziji* 'self' within the head NP can take the universal quantifier *meigeren* 'everyone' as its antecedent. This contrast suggests that the head NP of Chinese RCs with an RP does not reconstruct into the RC, which in turn supports the proposal that the head NP of Chinese RCs can be base-generated external to the RC.

Furthermore, to argue that there is a null operator in [Spec, CP], Aoun and Li present the following evidence with respect to the interpretation of the *wh*-interrogative phrase inside the RC:

(71a) * shei xihuan [shei dasuan qing **ta**$_i$ lai yanjiang] de zuojia$_i$
       who like   who plan ask him come talk   DE author
       'Who likes the author$_i$ that who planned to ask (him$_i$) to come to give a talk?'
<div align="right">(Aoun & Li, 2003, p. 171)</div>

(71b) shei xihuan [shei dasuan qing **t**$_i$ lai yanjiang] de   zuojia$_i$
       who like   who   plan   ask   come talk   DE   author
       'Who likes the author that who planned to ask to come to give a talk?'
<div align="right">(Aoun & Li, 2003, p. 171)</div>

In (71a) with an RP, the embedded *wh*-interrogative phrase *shei* 'who' cannot move out of the RC to have a matrix scope interpretation, which is in contrast to (71b), where such an interpretation is possible. [17] The contrast between (71a) and (71b) in terms of the availability of the matrix scope interpretation of *shei* 'who' supports the analysis that when the Chinese RC has an RP, there is a null operator in [Spec, CP], which prevents the embedded *wh*-interrogative phrase from moving out of the RC. On the other hand, when the Chinese RC has a gap, there is no such operator in [Spec, CP] and the embedded *wh*-interrogative phrase can move out of the RC to have a matrix scope interpretation, as in (71b).

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[17] The answer to (71b) can be listed as the following: 'John likes the author that Mary planned to ask to come to give a talk, Bill likes the author that Mike planned to ask to come to give a talk and Lily likes the author that Sam planned to ask to come to give a talk.'

3.2.4 Section summary

We have seen that idioms and binding facts argue for a head-raising derivation in Chinese RCs. At the same time, there are also other facts suggesting a head-base-generation derivation, such as possible licensing of an RP within the RC. Given this conflicting state of affairs, Aoun and Li (2003) made the following proposal for the head derivation of Chinese RCs: the head NP is raised out of the RC when there is a gap but it is base-generated external to the RC when there is an RP. In other words, both the head-raising and the head-base-generation derivations are possible in Chinese RCs, as illustrated in (72a) and (72b):

(72a)　[$_{DP}$ [$_{IP}$ Xiaoming　jian　**t**$_i$]$_k$ [$_{D'}$　de [$_{CP}$　ren$_i$ [$_{C'}$ t$_k$]]]]
　　　　　Xiaoming　meet　　　DE　　person
　　'the person that Xiaoming met'

(72b)　[$_{NP}$ [$_{CP}$ Xiaoming　jian　　**ta**$_i$　de] [$_{NP}$ ren]$_i$　]
　　　　　Xiaoming　meet　him DE　　person
　　'the person$_i$ that Xiaoming met (him$_i$)'

However, the licensing and distribution of the RP inside Chinese RCs have been controversial and Chapter 4 is devoted to investigating whether the RP can occur in the subject and object positions of Chinese RCs.

3.3 Japanese RCs

We have seen that English RCs are post-nominal and Chinese RCs are pre-nominal. Since both of them are analyzed as involving a D, as reviewed in 3.1 and 3.2, we can infer that the ordering between the RC and the head NP it modifies is determined by the D: in Chinese RCs, [18] the IP has to move to [Spec, DP] to check strong features of D, whereas in English RCs, the IP does not move. On the other hand, although Japanese RCs are pre-nominal, the same as Chinese RCs, they do not seem to have an equivalent of *de*. Following Kayne's (1994) Antisymmetry approach with the ban on right-adjunction, Fukui and Takano (2000) propose that the Japanese RC is left-adjoined to the head NP

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[18] Unless otherwise noted, Chinese RCs only refer to those with a gap, which have been argued to involve head raising.

since there is no D involved. Under their analysis, a Japanese RC such as (73a) has the underlying structure in (73b):

(73a) [$_{CP}$ John-ga   kinoo pro$_i$ mi-ta][$_{NP}$ shasin]$_i$
            John-NOM   yesterday   see-PST   picture
          'the/a picture that John saw yesterday.'   (Fukui & Nakano, 2000, p. 230)

(73b)

```
                        NP
                       /  \
                      /    \
                    CP      NP
                   /  \    shashin_i
                  /____\
        John-ga kinoo pro_i mi-ta
```
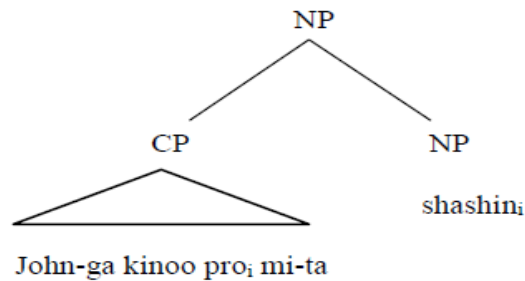
As shown in (73a) and (73b), the RC is left-adjoined to the head NP, which is base-generated external to the RC. Moreover, the head NP binds a null *pro* inside the RC and there is no syntactic movement involved (e.g., Fukui & Takano, 2000; Kuno, 1973; Murasugi, 2000; Perlmutter, 1972). This is known as the '*pro*-binding' analysis of Japanese RCs.

    However, there have been claims that Japanese RCs involve syntactic movement. Ishii (1991) proposes an operator movement analysis for Japanese RCs, under which there is a null operator generated inside the RC that moves to [Spec, CP] to be co-indexed with the base-generated head NP. What the head-base-generation analysis and the operator movement analysis have in common is that the head NP is base-generated external to the RC so we can consider both analyses as a single head-base-generation analysis. In contrast, there are also many studies that argue for the head-raising analysis of Japanese RCs (e.g., Hoshi, 2004; Kitao, 2011; Morita, 2013).

    The three different approaches to the syntactic structure of Japanese RCs are summarized in Table 1, with a focus on the following three elements: (i) the way to derive the head NP; (ii) the type of the empty category within the RC and (iii) whether there is any movement involved:

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Table 1. Summary of the three main approaches to Japanese RCs

Property / Approach	Way to derive the head NP	Type of the empty category	Existence of a movement
The *pro*-binding analysis (e.g., Fukui & Takano, 2000)	base-generated	a null pronoun	No
The operator movement analysis (Ishii, 1991)	base-generated	a null operator	Yes
The head-raising analysis (e.g., Hoshi, 2004)	raised	trace	Yes

In what follows, I review the arguments for the three main approaches to the syntactic structure of Japanese RCs.

3.3.1 The *pro*-binding analysis of Japanese RCs

The *pro*-binding analysis of Japanese RCs is comprised of the following three elements, each of which has its independent evidence: (i) the lack of syntactic movement of the head NP or an operator; (ii) the empty category within the RC is a *pro*, not a trace, and (iii) the head NP is base-generated external to the RC. The three arguments and their corresponding evidence are reviewed below.

3.3.1.1 Arguments for lack of syntactic movement in Japanese RCs

First, Kuno (1973) observe that in Japanese, relativization can occur across a complex NP island:

(74a) $[_{NP} [_{CP} [_{NP} [_{CP} e_i e_j$ ki-te-iru] yoohuku$_j$]-ga yogore-te-iru] $[_{NP}$ shinsi$_i$]]
                   wear-GER-ASP clothes-NOM get dirty-GER-ASP gentleman
      'a gentleman$_i$ who the suit that (he$_i$) is wearing is dirty.' (Kuno, 1973, p. 239)

(74b) $[_{NP} [_{CP} [_{NP} [_{CP} e_i e_j$ oshie-ta] seito$_j$]-ga rakudaishi-ta] $[_{NP}$ sensei$_i$]]
                   teach-PST student-NOM flunk-PST teacher
      'the teacher who the students that (he) was teaching flunked.'(Kuno, 1973, p. 239)

(75a) ?[NP [CP [NP [CP Bill-ga eᵢ koroshi-tato yuu] jihaku]-o keisatu-ga
                      Bill-NOM kill-PST COMP say confession-ACC police-NOM

    mada urazukeshi-te-i-nai]   [NP on'naᵢ]]
    yet substantiate-GER-ASP-NEG   woman

    'the womanᵢ who the police have not substantiated yet Bill's confession that he
    has killed herᵢ.'   (Kuno, 1973, p. 240)

(75b) ?[NP [CP [NP [CP eᵢ John-o koroshi-ta] jijitsu]-o watakushi-ga tsukitome-ta]
                      John-ACC kill-PST fact-ACC I-NOM ascertain-PST

    [NP on'naᵢ]]
       woman

    'the woman who I have ascertained the fact that (she) killed John.'
                                       (Kuno, 1973, p. 240)

(74a) and (74b) involve an RC island in the matrix subject position. In (74a), the head NP
shinshi 'gentleman' is relativized out of the RC island headed by the NP *yoohuku*
'clothes.' Similarly, in (74b), the head NP *sensei* 'teacher' is relativized out of an RC
island headed by the NP *seito* 'student.' In (75a) and (75b), there is a complex NP headed
by *jihaku* 'confession' and *jijitsu* 'fact,' respectively. In both sentences, the head NP *onna*
'woman' is relativized out of the embedded complex NP. The fact that these RCs are
acceptable suggests that no movement, i.e., neither raising of the head NP nor movement
of a null operator, is involved in the formation of Japanese RCs. If there were syntactic
movement involved, the island constraints (Ross, 1967) would be violated.[19]

3.3.1.2 Arguments that the empty category within Japanese RCs is a *pro*
Murasugi (2000) claims that the head NP's apparent relativizaiton across a complex NP
island can be accounted for by Perlmutter's (1972) and Saito's (1985) proposal that the
gap inside the Japanese RC is occupied by a *pro*. If the gap is a *pro*, in principle, an overt
NP should be able to occur in the same position. In fact, Kuno (1973) argues that an RP
can occur within the RC, if certain conditions are met:

(76a) [watakushi-ga proᵢ namae-o wasure-teshimat-ta] okyaku-sanᵢ
        I-NOM name-ACC forget-end-up-PST guest
        'a guest whose name I have forgotten'   (Kuno, 1973, p. 237)

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[19] More studies such as Kuroda (1986a, 1986b; 1992) and Sakai (1994) argued that these RCs that seem to
violate the island constraints do actually involve NP movement, which will be discussed in Section 3.3.3.

(76b) [watakushi-ga **kare**/**so**-no namae-o wasurete-shimat-ta] okyaku-san
      I-NOM   he/that-GEN name-ACC forget-end-up-PST   guest
      'a guest whose name I have forgotten'   (Kuno, 1973, p. 237)

In (76a) and (76b), the optionality between the gap and the RP *kare* 'he' is compatible with the *pro*-binding analysis that the empty category within the RC is a *pro*.

Murasugi (2000) provided another independent piece of evidence for the *pro*-binding analysis. In Japanese, relativizing reason/manner adjuncts is subject to the island constraints whereas relativization of an argument is not. For example:

(77a) [$_{NP}$ [$_{CP}$ hito-ga   e$_i$ kubini   nat-ta]   riyuu$_i$]
            person-NOM   be fired become-PST   reason
      'the reason why the people get fired'

(77b) *[$_{NP}$ [$_{CP}$ [$_{NP}$ [$_{CP}$ e$_i$ e$_j$ kubini   nat-ta]   hito$_j$]-ga   minna okot-te-iru]
                   be fired   become-PST person-NOM all   get angry-GER-ASP
      riyuu$_i$]
      reason
      'the reason (x) that all people are angry because they were fired because of (x)'
                                          (Murasugi, 2000, p. 233)

(78a) [$_{NP}$ [$_{CP}$ Mary-ga   e$_i$ mondai-o   toi-ta]   hoohoo$_i$]
            Mary-NOM   problem-ACC   solve-PST method
      'the method$_i$ by which Mary solved problems e$_i$'   (Murasugi, 2000, p.234)

(78b)* [$_{NP}$ [$_{CP}$ [$_{NP}$ [$_{CP}$ e$_i$ e$_j$ mondai-o   toi-ta]   hito$_j$]-ga   minna shiken-ni ochiru]
                    problem-ACC solve-PST person-NOM all   exam in   fail
      hoohoo$_i$]
      method
      'the method$_i$ that [all of the people who solved problems] failed the exam e$_i$'
                                       (Murasugi, 2000, p. 234)

(77a) and (78a) are grammatical while (77b) and (78b) are not. The ungrammatical status of (77b) and (78b) indicates that the head NP *riyuu* 'reason' and *hoohoo* 'method' cannot be relativized across a complex NP island headed by the NP *hito* 'person'. Murasugi argues that relativization of adjunct NPs is simply impossible and the complex NPs in (77a) and (78a) do not contain a gap. If the adjunct RCs (77b) and (78b) involve a *pro,* as in the argument RCs like (74a) and (74b), the ungrammaticality of (77b) and (78b) is not

expected. This in turn supports the *pro*–binding analysis of argument RCs in Japanese, because there is no such syntactic movement that may lead to violation of the island constraints.

In the next section, I review the evidence arguing that the head NP of Japanese RCs is base-generated external to the RC.

3.3.1.3 Arguments that the head NP in Japanese RCs is base-generated externally

One important piece of evidence arguing for the head-base-generation derivation in Japanese RCs comes from the observation that the anaphor *jibun* within the head NP cannot be bound by the RC subject (e.g., Hoji, 1985). As demonstrated earlier, if the anaphor within the head NP can be bound by the RC subject, as observed with English and Chinese RCs, it would suggest the head NP reconstructs into the RC to be interpreted at its base position at LF, i.e., the head NP reconstructs into the RC. A relevant example is repeated below in (79), where the anaphor *himself* within the head NP *the portrait of himself* can be co-referential with the RC subject *John*:

(79)   [The portrait of *himself*$_j$]$_i$ that John$_j$ painted t$_i$ is extremely flattering.
                                                                                (Schachter, 1973, p. 32)

Under the assumptions that (i) the head NP c-commands the RC and (ii) the anaphor must be c-commanded by its antecedent, the only way to establish the binding relation is to reconstruct the head NP *the portrait of himself* into its base position at LF. With the assumption that reconstruction occurs only when syntactic movement is involved (Chomsky, 1993), the co-reference between *himself* and *John* in (79) suggests that the head NP is raised from within the RC.

The same diagnostic has been applied to investigate the structure of Japanese RCs. Studies such as Hasegawa (1988), Hoji (1985) and Murasugi (2000) argue that the anaphor *jibun* 'self' within the head NP of RCs cannot refer to the RC subject:

(80)* [NP [CP John$_i$-ga   e$_j$ taipushi-ta] [NP jibun$_i$-no   ronbun]$_j$]
        John-NOM   type-PST   self-GEN   paper
    'self$_i$'s paper that John$_i$ typed'   (Hasegawa, 1988, p. 59)

According to the above mentioned studies, in (80), the anaphor *jibun* within the head NP cannot have the RC subject *John* as its antecedent, which suggests that the head NP does not reconstruct into the RC at LF. This observation motivates the analysis that the head NP of Japanese RCs is base-generated external to the RC.

　　To summarize, there are three important elements that make up the *pro*-binding analysis of Japanese RCs: (i) no movement occurs within the RC; (ii) the empty category within the RC is a *pro* co-indexed with the head NP and (iii) the head NP is base-generated external to the RC. In the following section, I review the arguments for the operator movement analysis of Japanese RCs.

3.3.2 The operator movement analysis of Japanese RCs

Ishii (1991) proposes an operator movement analysis of Japanese RCs. According to Ishii, a null operator is raised to [Spec, CP] inside Japanese RCs, as in (81).

(81)   [NP [CP op$_j$ [C' …t$_j$…]] NP$_j$]

In 3.1.2, we have seen that the operator movement analysis does not predict reconstruction effects of the head NP if it is base-generated externally rather than raised from within the RC. However, Ishii's proposal concerning reconstruction of the head NP is different, which claims that reconstruction effects may occur with the head NP through the null operator. This proposal is compatible with the recent proposals with respect to the *matching* analysis (e.g., Salzmann, 2006; Sauerland, 1998). His arguments are reviewed below in detail.

3.3.2.1 Anaphor binding

Under Ishii's (1991) analysis, the anaphor within the head NP is expected to be co-referential with the RC subject because the null operator, as an internal counterpart of the head NP, can be interpreted at its trace position at LF. This accords with the proposal that

there is an internal counterpart of the external head NP within the RC, which gets phonologically deleted by ellipsis (Chomsky, 1965; Lees, 1960, 1961; Sauerland, 1998). Ishii's evidence for the existence of the reconstruction effects is in (82), where a complex anaphor *kare-jishin* 'himself' occurs:

(82)   Mary-wa   [John$_i$-ga   e$_j$ taipushi-ta] [kare-jishin$_i$-no ronbun-o]$_j$ motteki-ta.
       Mary-TOP   John-NOM   type-PST   himself-GEN   paper-ACC   bring-PST
       'Mary brought himself$_i$'s paper that John$_i$ typed.'   (Ishii, 1991, p. 29)

The possible co-reference between *kare-jishin* and the RC subject *John* in (82) suggests that the head NP can be interpreted within the RC. However, as shown in (80), which is repeated in (83), *jibun* 'self' cannot take the RC subject *John* as its antecedent:

(83)   *[$_{NP}$ [$_{CP}$ John$_i$-ga   e$_j$ taipushi-ta]   [$_{NP}$ jibun$_i$-no ronbun]$_j$]
               John-NOM   type-PST   self-GEN   paper
           'self$_i$'s paper that John$_i$ typed'   (Hasegawa, 1988, p. 59)

If the null operator, which is an internal copy of the head NP that contains an anaphor, can reconstruct at its base position, the ungrammatical status of (83) would be unexpected. Ishii's (1991) account is that the reconstruction of the anaphor *jibun* within the RC is simply blocked at LF. His argument is based on the comparison between RCs and scrambled sentences such as (84):

(84)   [$_{NP}$ [$_{CP}$ Mary-ga   jibun$_i$-ni kure-ta] hon$_j$]-o   John$_i$-ga t$_j$ sute-ta.
               Mary-NOM   self-to   give-PST book-ACC John-NOM   throw away-PST
           'John$_i$ threw away the book that Mary gave him$_i$.'   (Ishii, 1991, p. 26)

In the scrambled sentence (84), the anaphor *jibun* is co-referential with the matrix subject NP *John*, which suggests that the complex NP headed by *hon* 'book' reconstructs at its base position at LF. In contrast, in (83), the anaphor *jibun* within the head NP cannot be co-referential with the RC subject *John*. Since scrambled sentences involve an NP

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movement[20] while RCs just involve operator movement, Ishii argues that *jibun* can reconstruct only when the NP containing it actually moves, as in scrambled sentences, while the reconstruction is blocked in RCs as the head NP is not raised from within the RC. But a remaining important question is why the reconstruction of *kare-jishin* 'himself' and *kanojo-jishin* 'herself' is possible while that of *jibun* is not. In addition, judgment of whether the morphologically complex anaphors *kare-jishin* and *kanojo-jishin* can be interpreted within the RC varies among the native speakers of Japanese that I consulted. Thus, in this dissertation, I adopt what the traditional operator movement analysis claims for Japanese RCs: the head NP is base-generated external to the RC and does not reconstruct into the RC.

3.3.2.2 The empty category within Japanese RCs is a trace

Ishii (1991) claims that the empty category within Japanese RCs is a trace rather than a *pro*. One motivation for the trace analysis of the gap inside Japanese RCs comes from weak crossover (WCO) effects. WCO effects are observed when the following condition (85) is violated (Lasnik & Stowell, 1991). (86) is an English example where a WCO violation occurs.

(85)   In a condition where a pronoun P and a trace T are both bound by a QP,
        T must c-command P.   (Lasnik & Stowell, 1991)

(86) ?* Who$_i$ does his$_i$ mother love t$_i$?

In (86), the QP *who* binds the possessive pronoun *his* and the trace. Since the trace does not c-command the pronoun *his*, the constraint in (85) is violated. Now consider the following example with a bound pronoun *soitsu* 'that guy'.

(87)   Dare$_i$-ga   soitsu$_i$-no   hahaoya-o   aishi-te-iru   no
        who-NOM   that guy-GEN   mother-ACC   love-GER-ASP   Q
        'Who$_i$ loved his$_i$ mother?'   (Yoshimura, 1990)

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[20] Scrambling in Japanese has been argued to have properties of both A-movement and A'-movement (Nemoto, 2002).

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In (87), it is possible to have an interpretation in which the pronoun *soitsu* is bound by *dare* 'who.' Ishii states that WCO effects are observed in examples like (88) where we have the same bound pronoun *soitsu*:

(88) *Soitsu$_i$-no   hahaoya-ga   dare$_i$-o   aishi-te-iru   no
       that guy-GEN   mother-NOM   who-ACC   love-GER-ASP   Q
       'Who$_i$ does his$_i$ mother love?'   (Ishii, 1991, p. 41)

Under the assumption that the QP *dare* 'who' is raised to [Spec, CP] at LF in (88), the pronoun *soitsu* and the trace of the QP *dare* 'who' are both bound by the raised QP. But since the trace does not c-command the pronoun *soitsu*, the constraint in (85) is violated. Ishii (1991) further points out that WCO also occurs in RCs in Japanese:

(89a) [op$_i$ [soitsu$_i$-ga   [op$_j$ [pro$_i$ t$_j$ hihanshi-ta]] [onna]$_j$-o   nagut-ta]] otoko$_i$
         that guy-NOM   criticize-PST   woman-ACC hit-PST   man
     'the man$_i$ who$_i$ hit [the woman he$_i$ criticized]'   (Ishii, 1991, p. 41)

(89b)? [op$_i$ [op$_j$ [soitsu$_i$-ga   t$_j$ hihanshi-ta]] [onna]$_j$-ga   t$_i$ nagut-ta] otoko$_i$
            that guy-NOM   criticize-PST   woman-NOM   hit-PST   man
     'the man$_i$ that the woman$_j$ hit, who$_i$ criticized her$_j$'   (Ishii, 1991, p. 41)

First, (89a) involves a complex NP island headed by the NP *onna* 'woman.' Its grammatical status indicates that the empty category within the RC island must be a *pro*. In contrast, (89b), which does not involve any island, is marginally grammatical. If the empty category in (89b) is a *pro*, the marginally grammatical status cannot be accounted for because no island constraint is violated. Thus, Ishii argues that the empty category inside the RC in (89b) must be a trace and (89b) involves a WCO violation: the trace of *otoko* 'man' does not c-command the pronoun *soitsu*. Thus, the grammaticality contrast between (89a) and (89b) supports the analysis that the empty category within Japanese RCs is a trace when there are no islands involved. The trace status of the gap further supports the analysis that an operator movement occurs within Japanese RCs.

    However, Murasugi (1991) argues that there is no [Spec, CP] inside Japanese RCs for an operator to move to because Japanese RCs are TPs. The evidence is that long-distance dependency is not possible in Japanese adjunct RCs.

(90a) [Hanako-ga   [[Taroo-ga   oyoi-da] to]   omot-te-iru]   [riyuu]
      Hanako-NOM   Taroo-NOM swim-PST COMP think-GER-ASP   reason
      'the reason that Hanako thinks that Taroo swam'

(90b) [Hanako   juede [Taroo youyong-le] de]   [liyou]
      Hanako   think Taroo swim-LE   DE   reason
      'The reason that Hanako thinks Taroo swam'

In the Japanese RC (90a), the head NP *riyuu* 'reason' cannot refer to why *Taroo* swam. It only indicates why *Hanako* thinks that way. By contrast, the equivalent RC in Chinese can have two interpretations (e.g., Aoun & Li, 2003), as in (90b), where the head NP *liyou* 'reason' can be either the reason *why Taroo swam* or the reason *why Hanako thinks that way*. Given that operator movement is available in Chinese RCs (Aoun & Li, 2003, Miyamoto, 2014), the contrast between (90a) and (90b) cannot be accounted for if Japanese RCs involve operator movement.

In the following section, the arguments for the head-raising analysis of Japanese RCs are reviewed.

3.3.3 The head-raising analysis of Japanese RCs

Several studies argue for a head-raising derivation in Japanese RCs (e.g., Hoshi, 2004; Ishizuka, 2010; Kitao, 2011), in parallel to Kayne's (1994) proposal for pre-nominal RCs. Hoshi (2004) and many others provide evidence that the head NP of Japanese RCs is raised out of the RC. Their arguments are presented in the following sections.

3.3.3.1 The 'major subject' analysis of the apparent island violations

As reviewed in 3.3.1.1, Kuno (1973) observed that Japanese RCs seem to allow violations of island constraints, which suggests that no movement occurs in Japanese RCs. However, more recent studies argue that the apparent violations of island constraints do not necessarily indicate lack of movement. In particular, they argue that the Japanese RCs that apparently violate island constraints can have a movement analysis if they are analyzed as involving movement of 'major subjects' (Kuroda, 1986a, 1986b, 1992; Sakai, 1994). The major subject is an 'additional' subject occuring to the left of what appears to be a full sentence rather than a predicate, such as *shinshi* 'gentleman' in (91a). It has been

observed in many languages such as Japanese, Korean, Modern Hebrew and Modern Standard Arabic (e.g., Doron & Heycock, 1999).

Sakai (1994) proposes that Japanese RCs involve a null operator, which is raised from the major subject position to [Spec, CP]. Under his analysis, in (91a), the NP *shinshi* 'gentleman' is a major subject, which binds a *pro* within the RC headed by the NP *yoohuku* 'clothes.'

(91a) [CP [IP (sono) shinshi$_i$-ga   [NP [pro$_i$ e$_j$ ki-tei-ru]   [yoohuku$_j$]]-ga yogore-te-iru]]
          that gentleman-NOM   wear-GER-ASP clothes-NOM   dirty- GER-ASP
       '(that) gentleman$_i$ is such that the suit that he$_i$ is wearing is dirty.'

(91b) [CP op$_i$ [IP t$_i$ [NP [pro$_i$ e$_j$ ki-tei-ru]   [yoohuku$_j$]]-ga yogore-te-iru][shinshi]$_i$]
                                 wear-GER-ASP clothes-NOM   dirty-GER-ASP gentleman
       'the gentleman$_i$ that the suit that he$_i$ is wearing is dirty.'

Moreover, in the RC (91b), a null operator, which is co-indexed with the head NP *shinshi* 'gentleman,' is generated in a major subject position and raised to [Spec, CP]. Note that under Sakai's analysis, the null operator does not cross any island when it is raised.

By incorporating Sakai's analysis into Kayne's (1994) head-raising approach to RCs, Hoshi (2004) argues that in (92), the head NP *shinshi* 'gentleman' is initially base-generated at a major subject position and then raised to [Spec, CP], which is followed by remnant IP moving to [Spec, DP]:

(92)   [DP [IP t$_i$ ki-te-iru   yoohuku-ga yogore-te-iru]$_j$ [CP shinshi$_i$ t$_j$]]
                  wear-GER-ASP suit-NOM   dirty- GER-ASP   gentleman
       'the gentleman$_i$ that the suit that he$_i$ is wearing is dirty'   (Hoshi, 2004, p. 117)

Thus, previous studies such as Sakai (1994) and Hoshi (2004) argue that the apparent violations of island constraints in Japanese RCs in examples like (76) do not necessarily indicate a head-base-generation derivation, and should not be used to argue against the head-raising analysis of Japanese RCs.

3.3.3.2 Anaphor binding

As reviewed in 3.3.1.3, many previous studies share the judgment that in Japanese RCs like (93), the subject-oriented anaphor *jibun* 'self' within the head NP cannot be co-referential with the RC subject (e.g., Hasegawa, 1988; Hoji, 1985; Murasugi, 2000):

(93)* [NP [CP John$_i$-ga   e$_j$ taipushi-ta] [NP jibun$_i$-no   ronbun]$_j$]
              John-NOM   type-PST   self-GEN   paper
        'self$_i$'s paper that John$_i$ typed'   (Hasegawa, 1988, p. 59)

This evidence supports the proposal that the head NP of Japanese RCs is base-generated external to the RC. Nevertheless, there are also many studies arguing that it is possible for the anaphor *jibun* to be co-referential with the RC subject (Gunji, 2002; Hoshi, 2004; Ishizuka, 2010; Kitao, 2009, 2011; Morita, 2013). Gunji (2002) and Morita (2013) provided the examples (94a) and (94b), respectively:

(94a) [[Ken$_i$-ga   kai-ta]   [jibun$_i$-no denki]]-ga   besutoseera-ni nat-ta
          Ken-NOM   write-PST self-GEN biography-NOM best seller-to   become-PST
          'The biography of himself$_i$ that Ken$_i$ wrote became a bestseller.'
                                                                              (Gunji, 2002, p. 212)

(94b) [[Mary$_i$-ga   tot-ta]   [jibun$_i$-no shashin]]-ga soko-ni aru
          Mary-NOM take-PST   self-GEN photo-NOM   there-at is
          'The picture of herself$_i$ that Mary$_i$ took is there.'   (Morita, 2013, p. 649)

Moreover, Hoshi (2004) and Ishizuka (2010) note that in cases in which the simplex anaphor *jibun* 'self' may not be co-referential with the RC subject, replacing *jibun* 'self' with the complex anaphor *jibun-jishin* 'self-self' makes the co-reference between the anaphor and the RC subject fully acceptable:

(95)   [NP [CP John$_i$-ga   e$_j$ taipushi-ta] [NP jibun-jishin$_i$-no ronbun]$_j$]
              John-NOM   type-PST   self-GEN   paper
        'self$_i$'s paper that John$_i$ typed'   (Hoshi, 2004, p. 121)

Furthermore, Hoshi (2004), Ishii (1991) and Kitao (2009) claim that the co-reference can also occur with the complex anaphors *kare-jishin* 'himself' and *kanojyo-jishin* 'herself,' as in (96) and (97):

(96) Mary-wa [[John$_i$-ga e$_j$ taipushi-ta] [kare-jishin$_i$-no ronbun]$_j$]-o motteki-ta.
Mary-TOP John-NOM type-PST himself-GEN paper-ACC bring-PST
'Mary bought the paper of himself$_i$ that John$_i$ typed.' (Hoshi, 2004, p. 122)

(97) Katie-wa [[Paul$_i$-ga egai-ta] kare-jishin$_i$-no e$_j$]-o taisoo hoshigat-ta.
Katie-TOP Paul-NOM draw-PST himself-GEN picture-ACC very want-PST
'Katie badly wanted the picture of himself$_i$ that Paul$_i$ drew.' (Kitao, 2009, p. 31)

To summarize, previous studies present different speaker intuition-based judgments on whether the anaphor within the head NP of Japanese RCs can be co-referential with the RC subject. What remains to be resolved is whether the RC subject can serve as the antecedent for (i) the simplex anaphor anaphor *jibun* 'self' and (ii) the complex anaphors such as *kare-jishin* 'himself' and *jibun-jishin* 'self-self' within the head NP.

3.3.3.3 Idioms
Kitao (2009, 2011) and Morita (2006, 2013) state that part of a Japanese idiom can be relativized, as in (98) and (99):

(98) sono eiga-wa [[Mary-ga e$_i$ watat-ta] abunai hashi$_i$]-o migotoni
that movie-TOP Mary-NOM cross-PST dangerous bridge-ACC elegantly
saigenshi-ta.
reconstruct-PST
'(Lit.) That movie elegantly reconstructed the dangerous bridge that Mary crossed.'
'That movie elegantly reconstructed the dangerous action that Mary committed.'
(Morita, 2006, p.120)

(99) raibaru-wa [[John-ga mizukara e$_i$ hot-ta] boketsu$_i$]-o totemo yorokon-da.
rival-TOP John-NOM himself dug-PST grave-ACC very happy-PST
'(Lit.) The rival was very happy about the grave that John dug himself.'
'The rival was very happy about the ruin that John brought about.'
(Kitao, 2009, p. 33)

Morita (2006) and Kitao (2009) claim that in (98) and (99), it is possible for the head NP to be interpreted with the embedded predicate as part of an idiom. In other words, the idiomatic interpretations of *abunai hashi-o wataru* 'to make a risky attempt' and *boketsu-o horu* 'to bring about one's own ruin' are accessible in (98) and (99), even though part of the idiom is relativized out of the RC[21]. This evidence supports the head-raising analysis of Japanese RCs.

3.3.4 Section summary

We have seen three main approaches to the syntactic structure of Japanese RCs: (i) the *pro*-binding analysis, (ii) the operator movement analysis and (iii) the head-raising analysis. These three analyses have different claims for the following three elements: (i) how the head NP is derived; (ii) the type of empty category within the RC and (iii) whether there is any syntactic movement involved. Regarding the derivation of the head NP, while the head-raising analysis claims that it is raised out of the RC, the *pro*-binding and the operator movement analyses propose that it is base-generated out of the RC. Also, while the head-raising analysis predicts reconstruction effects of the head NP, the *pro*-binding and the operator movement analyses do not.

3.4 Summary

This chapter first reviewed two main approaches to RCs: the head-raising approach and the operator movement approach, with a focus on their implications for the derivation of the head NP. Based on the findings from two diagnostics, idioms and binding facts, we can infer that both the raising and base-generation strategies are available in deriving the head NP of RCs, depending on circumstances (e.g., Sauerland, 2000, 2003).

In the second part of this chapter, I reviewed how idioms and binding facts are used to argue for a head-raising derivation in Chinese RCs in Aoun and Li (2003). However, when there is an RP occurring within the RC, Aoun and Li argue that the head NP must be base-generated. Thus, both the raising and the base-generation strategies seem to be available to derive the head NP in Chinese RCs. Yet, one remaining issue relates to the

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[21] However, based on my consultation with native speakers of Japanese, the idiomatic interpretations are not available for some speakers.

distribution of the RP inside Chinese RCs. That is, it is unclear whether the RP can occur in the subject and object positions of Chinese RCs, which I investigate in Chapter 4.

In the third part of this chapter, three main analyses of the syntactic structure of Japanese RCs were reviewed: (i) the *pro*-binding analysis, (ii) the operator movement analysis and (iii) the head-raising analysis. While the *pro*-binding and the operator movement analyses claim that the head NP is base-generated external to the RC, the head-raising analysis proposes that the head NP is raised from within the RC. As previous studies have conflicting judgments on whether the subject-oriented anaphor *jibun* 'self' within the head NP can reconstruct and be bound by the RC subject, an experimental study conducted to address this issue is reported on in Chapter 5.

CHAPTER 4. THE RESUMPTIVE PRONOUN IN CHINESE RELATIVE CLAUSES

As reviewed in Chapter 3, Aoun and Li (2003) argue that the head NP of Chinese RCs can be derived by a base-generation strategy. Their arguments for the claim include: (i) the head NP may be part of an idiomatic expression in the matrix clause, (ii) the gap inside the RC can be replaced with an RP and (iii) when an RP occurs, co-reference between an anaphor inside the head NP and the RC subject is prohibited. However, since the head NP can also be part of an idiomatic expression inside the RC, as discussed in 3.2.1, the only unambiguous argument for the head-base-generation analysis appears to be the one based on RCs with an RP inside, so it is crucial to have a solid understanding of the distribution of the RP in Chinese RCs.

This chapter investigates the acceptability of the RP *ta* 'he/she/it' in the subject and object positions of Chinese RCs,[22] in order to better understand the syntactic processes involved in the derivation of the head NP in Chinese RCs. As stated in Chapter 3, it has been observed that, under certain circumstances, Chinese RCs can involve either a gap or an RP (Gu, 2001; Hawkins & Chan, 1997; Hsiao, 2003; Li & Thompson, 1981), as in the following example:

(100)　[Mali　yizhi　　zai　　anlian　　　　t_i/ **ta**$_i$　de]　[na-ge　nanren]$_i$
　　　　　Mary　for long　ASP　　love secretly　　him　DE　　that-CL　man
　　　　　'that man that Mary loves secretly for a long time'　　　　　(Gu, 2001, p. 36)

Based on this observation, Aoun and Li (2003) and Huang et al. (2009) argue that the head NP of Chinese RCs can be either raised out of the RC or base-generated external to the RC, co-indexed with an RP inside the RC. According to Sells (1984), an RP is 'grammatically licensed' when it is bound in-situ by a base-generated null operator. However, the acceptability of the RP in the subject and object positions of Chinese RCs remains controversial in both theoretical and experimental studies.

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[22] In this chapter, RCs refer to argument relative clauses without any islands, unless otherwise noted.

First, most previous theoretical studies claim that the RP is not allowed in subject position but can optionally occur in object position[23] inside RCs in Chinese (e.g., Hawkins & Chan, 1997; Hsiao, 2003; Keenan, 1985). However, there are studies that disagree with this claim. Gu (2001) states that the RP can freely occur in both subject and object positions while Tarallo and Myhill (1983) argue that neither subject nor object positions allow an RP.

Second, the results from previous experimental studies are also mixed: while the findings from Hitz (2012) and Yuan and Zhao (2005) suggest that the RP is prohibited in both subject and object positions, Hu and Liu's (2007) results imply that the RP can actually occur in the object position.

With this background, this chapter explores the following three questions with an acceptability judgment experiment. First, can the RP be grammatically licensed in the subject and object positions of Chinese RCs? In order to answer this question, we have to first decide what counts as 'grammatically licensed.' In this study, I assume that an RP is grammatically licensed if it has a similar acceptability to a gap. Second, if such RPs can be grammatically licensed, does the grammatical function of the RP matter in its acceptability? Third, does the structural distance between the head NP and the RP (in singly and doubly embedded RCs) matter in the acceptability of the RP? These questions are important because previous theoretical and experimental studies present contradictory intuitive judgments/results over the acceptability of the RP in subject and object positions, which will be reviewed in detail in 4.1. Additionally, Francis, Lam, Zheng, Hitz, and Matthews (2015) conducted an experiment that found that the RP is more acceptable in more complex structural environments in Cantonese. If their findings apply to Mandarin Chinese, we predict that the RP becomes more acceptable as the structural distance between the head NP and the RP increases.

An acceptability judgment experiment was created to address the above questions. The study manipulated three factors: (i) whether an RC is a subject RC, i.e., an RC with the head NP relativized from the subject position, or an object RC, i.e., an RC with the head NP relativized from the object position, (ii) whether the head NP is co-referential

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[23] In this chapter, I focus only on the subject and object positions because the L2 issue in Chapter 6 is about how L1 Chinese L2 Japanese learners interpret the anaphor inside the head NP of Japanese RCs, and all head NPs are relativized from the object position.

with a gap or an RP inside the RC, and (iii) whether the RC involves a single level of embedding (simple RCs) or two levels of embedding (embedded RCs). The results show that the RP is generally significantly less preferable than the gap. However, it is as acceptable as the gap in the object position of embedded RCs, evidenced by their insignificant mean rating difference. In other words, the mean acceptability of gaps is significantly different from that of RPs in (i) simple RC subject positions, (ii) simple RC object positions and (iii) embedded RC subject positions, but not in (iv) embedded RC object positions.

Thus, the RP should be considered to be grammatically licensed in the object position because, if it is not, it should always be less acceptable than the gap, no matter how many levels it is embedded inside the RC (e.g., Hofmeister & Norcliffe, 2013). Under Aoun and Li's (2003) proposal that the head NP of Chinese RCs is raised out of the RC when there is a gap but is base-generated external to the RC when there is an RP, an important implication of these findings is that a base-generation strategy is available to derive the head NP from the object position of Chinese RCs. However, since the gap is preferred to the RP in both subject and object positions of simple RCs, the head-raising strategy, as reviewed in Chapter 3, is the preferred option over the base-generation strategy to derive the head NP in Chinese RCs. In other words, my findings suggest two things to be true to Chinese RCs. First, there are two alternative strategies for deriving the head NP from the object position of RCs: a head-base-generation derivation with an RP inside the RC, and a head-raising derivation that leaves a gap inside the RC. Second, while both strategies are available to derive the head NP from the object position of Chinese RCs, the head-raising strategy is preferred over the head-base-generation strategy in simple RCs.

I will argue that these findings can be accounted for by Hawkins' (2004) proposal that if a language permits either a gap or an RP inside the RC, the gap is preferred in simple syntactic environments because it requires less morphological processing than the RP.

The rest of this chapter is structured as follows. In 4.1, previous theoretical and experimental studies about the RP inside the RC are reviewed. Then I present my research questions in 4.2 and lay out the details of the experiment in 4.3. Section 4.4 presents the results, followed by a discussion in 4.5. Section 4.6 concludes the chapter.

4.1 Previous studies about the RP within RCs

Using an RP to form dependency in RCs is cross-linguistically common. In Chinese, it has been claimed that RPs can be grammatically licensed within RCs (e.g., Aoun and Li, 2003; Gu, 2001; Hawkins & Chan, 1997; Hsiao, 2003; Keenan, 1985; Xu & Langendoen, 1985), as suggested by the acceptable status of examples like (101).

(101)   wo xiang kan [[$_{CP}$ op$_i$ Zhangsan hui dai   ta$_i$ huilai de] xiaohai$_i$]
        I   want see   Zhangsan will bring him   back   DE   child
        'I want to see the child that Zhangsan would bring back.'
                                        (Aoun & Li, 2003, p. 170, with slight modification)

For the studies that argue that RPs can appear inside Chinese RCs, the RPs inside Chinese RCs are categorized as 'grammatically licensed' RPs, along with RPs in languages like Hebrew and Irish (Francis, et al., 2015; Gu, 2001). They are different from 'intrusive' RPs (Sells, 1984) in languages such as English, which cause significant degradation of the acceptability of the sentence (e.g., Ferreira & Swets, 2005; Han et al., 2012; Keffala & Goodall, 2011).

Even if a language allows the 'grammatically licensed' RP inside the RC, the RP may not occur in all structural positions. Based on evidence from Irish and Hebrew, McCloskey (1990) argues that, a 'grammatically licensed' RP cannot occur in the highest subject position of RCs, i.e., the subject position of simple RCs, because it would violate a constraint that prohibits the A'-binding of the highest subject RP by a null operator, which is proposed as the *Highest Subject Restriction*. However, for Chinese RCs, there has been no consensus on whether an RP can occur at the highest subject position.

Before delving into previous theoretical and experimental studies about the RP inside Chinese RCs, in the following section, I first review McCloskey's (1990) *Highest Subject Restriction* on the distribution of the RP within RCs, which is further claimed by Asudeh (2012) to hold for all languages that involve a grammatically licensed RP.

4.1.1 RPs and the Highest Subject Restriction

By examining the distribution of the RP in Irish RCs, McCloskey (1990) proposes the following constraint: the RP is prohibited in the subject position immediately subjacent[24] to the head of the RC, which means it cannot occur in the subject position of simple RCs, as in (102):

(102) *an   fear$_i$ [$_{CP}$ a   raibh   sé$_i$ breoite]   (Irish)
       the man   COMP   was   he   ill
       'the man that (he) was ill'   (McCloskey, 1990, p. 82)

This restriction has also been claimed by Shlonsky (1992) to apply to Hebrew RCs, as in (103):

(103)   ha- ʔis   [$_{CP}$ še-(*hu)   ʔohev ʔet   Rina]   (Hebrew)
        the-man   that-(he)   love   ACC Rina
        'the man who loves Rina'   (Shlonsky, 1992, p. 445)

In contrast, the RP can freely occur in the object[25] position of simple RCs in Irish (McCloskey, 1990) and Hebrew (Shlonsky, 1992), as shown in (104) and (105):

(104)   an   fear$_i$ [$_{CP}$ ar   bhuail tŭ   é$_i$]   (Irish)
       the man   COMP   struck you him
       'the man that you struck'   (McCloskey, 1990, p. 73)

(105)   ha- ʔis[$_{CP}$ še-   ra ʔti   (ʔoto)]   (Hebrew)
       the-man   that-(I)   saw   (him)
       'the man that I saw (him)'   (Shlonsky, 1992, p. 444)

Moreover, the RP can freely occur at the subject and object positions of embedded RCs in both Irish (McCloskey, 1990) (106a-b) and Hebrew (Shlonsky, 1992) (107a-b):

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[24] What McCloskey means is subjacent in hierarchical structure, not *linearly* subjacent.
[25] The object position refers to the *direct object* position throughout this dissertation, unless stated otherwise.

(106a) an   t-ŏrseo [CP ar   chreid   corr-dhuine[CP go   raibh   sé   ann]] (Irish)
        this gold   COMPpro believed a few people   COMP was   it   there
        'this gold that a few people believed (it) was there'   (McCloskey, 1990, p. 78)

(106b) an   rud_i [CP ar   duirt sé[CP go   gcoinneodh   sé ceilte é]]   (Irish)
        the thing COMPpro said   he COMP keep   he hidden it
        'the thing that he said he would keep (it) hidden'   (McCloskey, 1990, p. 75)

(107a) ha- ʔis [CP še-   xašavt [CP še(-hu)   melamed   ʔanglit]]   (Hebrew)
        the-man   that(-you) thought that(-he)   teaches   English
        'the man that you thought teaches English.'   (Shlonsky, 1992, p. 444)

(107b) ha- ʔis[CP še-   xašavt [CP še-Dani   pagaš (ʔoto)]]   (Hebrew)
        the-man that(-you) thought   that Dani   met   him
        'the man that you thought that Dani met.'   (Shlonsky, 1992, p. 445)

To sum up, the distribution of RPs inside RCs in Hebrew and Irish is parallel (Shlonsky, 1992): (i) the RP is prohibited in the subject position but is allowed in the object position of *simple* RCs; (ii) the RP is allowed in both subject and object positions of *embedded* RCs. The above similarities between Hebrew and Irish are summarized in Table 2.

Table 2. Distribution of the RP in Hebrew and Irish RCs

Structual Positions	Clause Types	
	Simple	Embedded
Subject	**No**	Yes
Object	Yes	Yes

Moreover, Asudeh (2012) states that McCloskey's (1990) *Highest Subject Restriction* should hold for all languages that involve a grammatically licensed RP. Under the assumption that the RP can be grammatically licensed within Chinese RCs, i.e., it can be bound by a base-generated null operator at [Spec, CP] inside the RC, if Asudeh is correct, the *Highest Subject Restriction* should apply to the RP in Chinese RCs.

4.1.2 Previous theoretical studies on the RP within Chinese RCs

As stated at the beginning of this chapter, most scholars agree that in Chinese RCs, a gap can alternate freely with an RP in the object position, but not the subject position, as in (108a) and (108b) (e.g., Hawkins & Chan, 1997; Hsiao, 2003; Keenan, 1985). In contrast,

Gu (2001) claims that either a gap or an RP can freely occur in both subject and object positions of Chinese RCs, as in (109a) and (109b):

(108a) wo xihuan t$_{i/}$ **ta**$_i$ de [na-ge nvhai]$_i$
   I like   her DE that-CL girl
   'The girl that I like'   (Hawkins & Chan, 1997, p. 193)

(108b) t$_i$/* **ta**$_i$ gongzuo qinglao de [na-ge nvhai]$_i$
    she work   hard DE that-CL girl
   'the girl that worked hard'   (Hawkins & Chan, 1997, p. 193)

(109a) t$_i$/ **ta**$_i$ neng jiang liuli yingyu de [na-ge ren]$_i$
    he can speak fluent English DE that-CL man
   'the man that can speak fluent English'   (Gu, 2001, p. 35)

(109b) Mali yizhi   anlian   t$_i$/**ta**$_i$ de   [na-ge nanren]$_i$
   Mary for long love secretly   him DE   that-CL man
   'the man that Mary loves secretly for long'   (Gu, 2001, p. 36)

However, Tarallo and Myhill (1983) argue that the RP cannot occur in either subject or object positions of RCs in Chinese.

  To sum up, although the most common opinion in the literature is that in Chinese RCs, the RP cannot occur in the subject position but is optional in the object position, there are researchers who disagree. In addition, previous experimental studies show mixed results, which are reviewed in the following section.

4.1.3 Previous experimental studies about the RP within Chinese RCs
Many experimental studies have been conducted to investigate whether the RP can occur within Chinese RCs (Hitz, 2012; Hu & Liu, 2007; Ning, 2008; Su, 2004; Yuan & Zhao, 2005) but the results are not consistent.

  First, based on the results of an acceptability judgment experiment with a 5-point scale, as in Table 3, Yuan and Zhao (2005) argue that the gap is preferred to the RP in both subject and object positions of Chinese RCs.

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Table 3. Means ratings of the critical items in Yuan and Zhao (2005)

RC Type	RCs with a gap	RCs with an RP
Subject RCs	4.8	1.6
Object RCs	4.7	1.8

Based on the results in Table 3, Yuan and Zhao conclude that the RP is not acceptable in either subject or object positions of Chinese RCs, supporting Tarallo and Myhill's (1983) claim.

Hitz (2012) also conducted a similar acceptability judgment task with a 4-point scale. The results show that the RP received low ratings in both subject and object positions, as in Table 4. Also, the RP did not significantly differ in its mean rating in the subject and object positions. These findings are similar to those in Yuan and Zhao (2005).

Table 4. Mean ratings of the critical items in Hitz (2012)

RC Type	Items with a gap	Items with an RP
Subject RCs	3.95	1.39
Object RCs	3.9	1.64

Although the acceptability judgment results from Hitz (2012) and Yuan and Zhao (2005) suggest that the RP is not acceptable regardless of its grammatical function (subject/object), there are problems with their experimental design, which could have affected the results. First, in both studies, each native participant saw all 4 conditions from the same token set, i.e., subject gap, object gap, subject RP and object RP. However, acceptability judgment studies commonly use multiple lexicalizations with a Latin square design to avoid having a single participant judge sentences of different conditions from the same lexicalization because participants' judgment in one condition may affect their judgment in another condition (Cowart, 1997). Second, in Yuan and Zhao (2005), there were only 9 participants, and no fillers were included in their lists. Furthermore, although the RP was rated significantly lower than the gap in both studies, it does not necessarily mean the RP is unacceptable or ungrammatical.

On the other hand, other experimental studies have different results. Hu and Liu (2007) conducted a forced-choice acceptability judgment task, where participants judged whether a given sentence is acceptable or unacceptable. They find that Chinese simple RCs with an object RP were judged acceptable by 14 out of 15 participants while those

with a subject RP were consistently rejected. The result suggests that the RP is allowed in the object position of Chinese RCs, which is in accord with most previous theoretical studies (e.g., Hawkins & Chan, 1997; Keenan, 1985). However, it is unclear why a difference in acceptability was seen for subject and object RPs in Hu and Liu's (2007) forced-choice acceptability task, but not in the 5-point scale acceptability tasks of Hitz (2002) and Yuan and Zhao (2005).

Moreover, Francis et al. (2015) examined the acceptability of the RP inside Cantonese RCs using a 7-point scale acceptability judgment task and a production task. They find that the RP becomes more acceptable when occurring as a possessor inside a possessive NP. Based on this, they argue that the RP should be more acceptable in more structurally complex environments. Their experimental results also show that in the subject position of simple RCs, the RP is rated significantly lower than the gap. However, in the object position, the RP and the gap do not significantly differ in their mean ratings. Thus, Francis et al.'s findings suggest that the RP is as acceptable as the gap in the object position but is less preferable than the gap in the subject position in simple Cantonese RCs, which supports Hu and Liu (2007). However, according to previous studies (e.g., Matthews & Yip, 2011), Cantonese and Mandarin Chinese have many syntactic differences so the experimental findings about Cantonese RCs from Francis et al. (2015) may not apply to Mandarin Chinese RCs.

4.2 Research questions

As reviewed above, most theoretical studies claim that in Chinese RCs, the RP can optionally occur in the object positon but is prohibited in the subject position. However, previous experimental studies have mixed results: while the findings in Hitz (2012) and Yuan and Zhao (2005) suggest that the RP may not be grammatically licensed in either subject or object positions, Hu and Liu (2007) and Francis et al. (2015) find that the RP in the object position is as acceptable as the gap. However, as I have mentioned, the participants in Hitz (2012) and Yuan and Zhao (2005) saw all four different conditions for the same lexical item, which might have affected their judgments. Also, Francis et al.'s (2015) experimental findings from Cantonese may not apply to Mandarin Chinese.

To address this controversial issue about the acceptability of the RP in the subject and object positions of Chinese RCs, I conducted an acceptability judgment experiment (Experiment 1), which was designed to answer the following research questions (RQs):

(110) *RQ 1*: Is there any significant difference between native speakers' judgments of the gap and the RP?

        RQ 2: Does the grammatical function of the RP matter in its acceptability?

        RQ3: Does the structural distance between the head NP and the RP in simple and embedded RCs matter?

4.3 Experiment 1

An acceptability judgment experiment was conducted to address the three research questions above. It examined the acceptability of the gap and the RP in the subject and object positions of simple and embedded Chinese RCs.

4.3.1 Participants

A total of 32 adult native speakers of Chinese were recruited to participate in the experiment. They were all undergraduate students from a university in Southwest China, whose age ranged from 18 to 23. After the experiment, they were given one extra course credit for their time. According to a short background survey conducted before the experiment, no one had ever lived outside China.

4.3.2 Design and materials

There were 41 experimental items in total: 9 unannounced practice items, 16 critical items and 16 fillers.

All critical items involved the sentence pattern in (111). The blank, which was located at the object position of the matrix clause, was filled in with a complex NP, which had an RC inside.

(111) nali   you _____.
       there have
       'Something/Someone is over there.'

All critical items were created from 16 token sets, which involved 16 different lexical items. One sample token with a gap at the RC subject position is shown below:

(112) nali   you [t$_i$ xiji-le   dianyuan de   [na-ge   zuifan]$_i$].[26]
       there have   attack-LE cashier   DE   that-CL criminal
       'The criminal that attacked the cashier is over there.'

The critical items had 3 factors with binary values: (i) *Gap Type* (gap or RP); (ii) *Structural Position* (the subject or object position where the gap/RP is located); and (iii) *Clause Type* (simple or embedded). Thus, there were 8 conditions for each token set: (i) a simple RC with a subject gap (Subject-Gap-Simple) (113a); (ii) a simple RC with a subject RP (Subject-RP-Simple) (113b); (iii) an embedded RC with a subject gap (Subject-Gap-Embedded) (113c); (iv) an embedded RC with a subject RP (Subject-RP-Embedded) (113d); (v) a simple RC with an object gap (Object-Gap-Simple) (113e); (vi) a simple RC with an object RP (Object-RP-Simple) (113f); (vii) an embedded RC with an object gap (Object-Gap-Embedded) (113g); and (viii) an embedded RC with an object RP (Object-RP-Embedded) (113h). Following Cowart (1997), in each token set, the vocabulary was kept constant and experimental items differ only in the syntactic variables that were manipulated.

(113a) Subject gap in a simple Chinese RC (SGS)
        nali   you t$_i$ xiji-le   dianyuan   de   [na-ge   zuifan]$_i$.
        there have   attack-LE   cashier   DE   that-CL   criminal
        'The criminal that attacked the cashier is over there.'

(113b) Subject RP in a simple Chinese RC (SRPS)
        nali   you **ta**$_i$ xiji-le   dianyuan de   [na-ge   zuifan]$_i$.
        there have he   attack-LE   cashier   DE   that-CL   criminal
        'The criminal$_i$ that (he$_i$) attacked the cashier is over there.'

---

[26] Based on my consultation with native Chinese speakers, some pointed out that the RC may sound more natural if the head NP is replaced with an indefinite NP *yige zuifan* 'one criminal.'

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(113c) Subject gap in an embedded Chinese RC (SGE)
nali you   jingcha duanding t$_i$ xiji-le   dianyuan de [na-ge zuifan]$_i$.
there have   police   assert   attack-LE cashier DE that-CL criminal
'The criminal that the policeman asserts attacked the cashier is over there.'

(113d) Subject RP in an embedded Chinese RC (SRPE)
nali   you jingcha duanding **ta**$_i$ xiji-le   dianyuan de [na-ge   zuifan]$_i$.
there have police   believe   he attack-LE cashier   DE that-CL criminal
'The criminal$_i$ that the policeman asserts (he$_i$) attacked the cashier is over there.'

(113e) Object gap in a simple Chinese RC (OGS)
nali   you   zuifan   xiji-le   t$_i$ de [na-ge   dianyuan]$_i$.
there have   criminal attack-LE   DE   that-CL   cashier
'The cashier that the criminal attacked is over there.'

(113f) Object RP in a simple Chinese RC (ORPS)
nali   you   zuifan   xiji-le   **ta**$_i$ de [na-ge   dianyuan]$_i$.
there have   criminal attack-LE him   DE   that-CL cashier
'The cashier$_i$ that the criminal attacked (him$_i$) is over there.'

(113g) Object gap in an embedded Chinese RC (OGE)
nali   you jingcha duanding zuifan   xiji-le t$_i$ de [na-ge   dianyuan]$_i$.
there have police   assert   criminal attack-LE DE that-CL cashier
'The cashier that the policeman asserts the criminal attacked is over there.'

(113h) Object RP in an embedded Chinese RC (ORPE)
nali   you   jingcha duanding zuifan   xiji-le   **ta**$_i$ de [na-ge dianyuan]$_i$.
there have   police   assert   criminal attack-LE him DE   that-CL cashier
'The cashier$_i$ that the policeman asserts the criminal attacked (him$_i$) is over there.'

A total of 128 experimental sentences (16 lexicalizations × 8 conditions) were distributed across eight lists. A Latin square design was used to balance the number of conditions in each list so that each participant only saw one condition from each token set. The use of multiple lexicalizations is a standard procedure in acceptability judgment experiments (Cowart, 1997). As discussed in Section 4.1.3, in the experiments conducted by Hitz (2012) and Yuan and Zhao (2005), the participants saw all conditions of the same lexical item. As I pointed out earlier, this is problematic because participants' judgment in one condition may affect their judgment in another condition for the same lexical item (Cowart, 1997).

Additionally, 16 fillers were created: 8 Type 1 fillers and 8 Type 2 fillers. The Type 1 fillers were topic sentences involving an RC island. Two subtypes were created: (i) a gap occurs within an RC island, as in (114a); (ii) an RP occurs within an RC island, as in (114b). Each subtype had 4 items.

(114a)*[DP na-ge   xuesheng]i, laoshi   gangcai faxian-le [NP [ei kan   de] manhua]
        that-CL student   teacher just now find-LE   read DE manga
      'That studenti, the teacher just found the manga hei read.'

(114b) [DP na-ge   xuesheng]i, laoshi   gangcai faxian-le [NP [**ta**i kan   de] manhua]
        that-CL student   teacher just now find-LE   he read DE   manga
      'That studenti, the teacher found the manga hei read.'

According to Huang et al. (2009), (114a) is not acceptable but inserting an RP can save it, as in (114b). Thus, half of the type 1 fillers were expected to be judged as acceptable, and the other half unacceptable.

The Type 2 fillers were RCs with an RC island at their matrix object position. Four items involved a gap and the other four items involved an RP, as in (115a) and (115b):

(115a)* [NP[CP nvhaiwei-le [NP [CP ti qian de] gou] de]   na-ge nanhaii] zai nali.
          girl   feed-LE   take DE dog DE   that-CL boy   is   there
      'The boyi (x) that [a girl fed the dog [that (x) was taking] is over there.'

(115b) [NP[CP nvhai wei-le [NP [CP **ta**i qian de] gou] de] na-ge   nanhaii] zai nali.
        girl   feed-LE   he take DE dog DE that-CL boy   is   there
      'The boyi (x) that [a girl fed the dog [that (x) was taking] is over there.'

According to Huang (1984), a gap is unacceptable in sentences like (115a) due to two reasons. First, a trace cannot occur at the gap position because it would violate the island constraints (Ross, 1967). Second, a *pro* cannot occur in the same position because it would violate the Generalized Control Rule (GCR):

(116) Generalized Control Rule (GCR):
      Co-index an empty pronominal with the closest nominal element (NP or Agr).
                                                              (Huang, 1984, p. 552)

Li (2002) states that the ungrammatical status of (115a) can be saved by inserting an RP, as in (115b). Therefore, the RP can only occur within an object-modifying RC island inside an RC. Again, according to the above literature, a half of the type 2 fillers were expected to be judged as acceptable and the other half unacceptable.

The same fillers were included in each experimental list. The order of critical and filler items was randomized to counterbalance the ordering effects. The complete list of stimuli can be found in Appendix A.

4.3.3 Predictions

Different existing proposals make different predictions for the experimental results. First, if the RP can optionally occur in the object position but is prohibited in the subject position, we predict that (i) in the subject position, the mean rating of the gap would be significantly higher than that of the RP, (ii) in the object position, the mean ratings of the gap and the RP would not be significantly different. In contrast, if the RP cannot be grammatically licensed in either subject or object position, we predict that it is always rated significantly lower than the gap. Moreover, if the RP becomes more acceptable when its structural environment becomes more complex, as claimed by Francis et al. (2015), we expect that the mean rating of the RP would be significantly higher in doubly embedded RCs than singly embedded RCs, regardless of whether it is in a subject or object position.

4.3.4 Procedure

Participants were asked to assess the naturalness of sentences on a 7-point Likert scale from 1 (unacceptable) to 7 (acceptable). The experiment was hosted by Ibex Farm, an online software tool for creating and running linguistic experiments (http://spellout.net/ibexfarm/). All participants did the experiment with a computer and only Chinese characters were displayed on the computer screen. Before reading the instructions, participants were asked to fill out a short background survey, which included age, class standing, native language, and experience of living abroad. Then participants proceeded to a training phase: they were presented with several sentences of varying degree of acceptability, which were used to demonstrate what 'acceptable' and

'unacceptable' sentences looked like. After the training phase, participants started the experiment. There were 9 unannounced practice items located at the beginning as part of the main experiment. They were intended to span the full range of acceptability. In other words, they were assumed to have different degrees of acceptability, from 'severely unacceptable' to 'perfectly acceptable,' and therefore, encourage participants to use the full range of the 7-point scale. All participants were able to finish the experiment within 20 minutes.

The obtained raw ratings were transformed into standardized z-scores, which were analyzed by three-way repeated measures ANOVA. Since there was a significant interaction between the *Gap Type* and the *Structural Position*, the simple and embedded RC conditions were analyzed separately, in order to examine the effects of the *Gap Type* and the *Structural Position* within each level of the *Clause Type*. Also, since there was a significant interaction between the *Gap Type* and the *Clause Type*, the subject and object conditions were analyzed separately. Pairwise comparisons were also conducted and the results are reported in the next section.

4.4 Findings

Recall that there are eight critical conditions in total: (i) simple RCs with a subject gap (SGS); (ii) simple RCs with a subject RP (SRPS); (iii) embedded RCs with a subject gap (SGE); (iv) embedded RCs with a subject RP (SRPE); (v) simple RCs with an object gap (OGS); (vi) simple RCs with an object RP (ORPS); (vii) embedded RCs with an object gap (OGE); (viii) embedded RCs with an object RP (ORPE). The mean raw score, standard deviation (SD) and standard error (SE) of each condition are shown in Figure 1[27] and Table 5:

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[27] The error bars represent 95% confidence intervals.
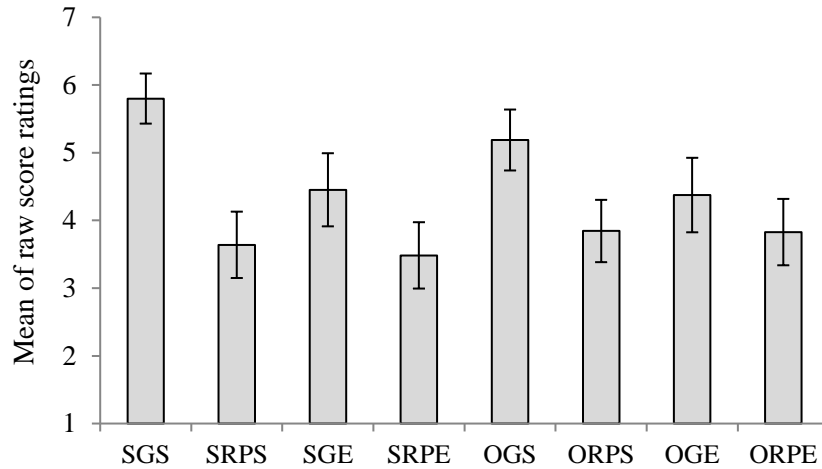
Figure 1. Raw ratings of the critical conditions in Experiment 1

Table 5. Raw score means, standard deviations (SDs) and standard errors (SEs) of the critical conditions in Experiment 1

Condition	Mean	SD	SE
SGS (Subject gap in a simple RC)	5.8	1.08	0.19
SRPS (Subject RP in a simple RC)	3.64	1.4	0.25
SGE (Subject gap in an embedded RC)	4.45	1.57	0.28
SRPE (Subject RP in an embedded RC)	3.48	1.42	0.25
OGS (Object gap in a simple RC)	5.19	1.31	0.23
ORPS (Object RP in a simple RC)	3.84	1.32	0.23
OGE (Object gap in an embedded RC)	4.38	1.6	0.28
ORPE (Object RP in an embedded RC)	3.83	1.4	0.25

The Shapiro-Wilk test shows that the participants' judgments come from a normal distribution in all conditions except for SGS. Since simple RCs with a gap should be grammatical and easy to process, a ceiling effect in SGS is expected.

The mean, SD and SE of each condition in standardized *z*-scores are shown in Figure 2 and Table 6. The absolute value of the *z*-score shows how many standard deviations it is aways from the mean.
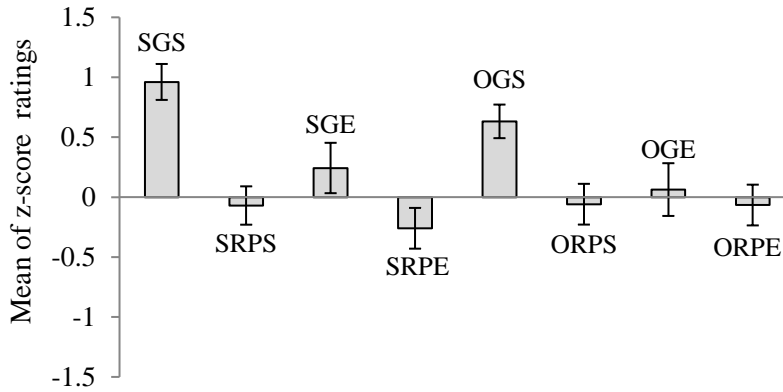
Figure 2. *Z*-score ratings of the critical conditions in Experiment 1

Table 6. Z-score means, SDs and SEs of the critical conditions in Experiment 1

Conditions	Mean	SD	SE
SGS(Subject gap in a simple RC)	0.96	0.43	0.08
SRPS (Subject RP in a simple RC)	-0.07	0.47	0.08
SGE (Subject gap in an embedded RC)	0.24	0.61	0.11
SRPE (Subject RP in an embedded RC)	-0.26	0.49	0.09
OGS (Object gap in a simple RC)	0.63	0.42	0.07
ORPS (Object RP in a simple RC)	-0.06	0.5	0.09
OGE(Object gap in an embedded RC)	0.06	0.65	0.11
ORPE (Object RP in an embedded RC)	-0.07	0.49	0.09

Three-way repeated measures ANOVA were run on the *z*-scores to investigate the effect of the three factors: the *Gap Type* (gap or RP), the *Structural Position* (the subject or object position where the gap/RP is located), and the *Clause Type* (simple or embedded). The ANOVA and pairwise comparison tests were performed on both participant (F_1 and t_1) and item (F_2 and t_2). The statistical analysis shows that there is no significant three-way interaction among the three factors ($F_1(1, 31) = 0.03$, $p = .87$; $F_2(1, 15) = 0.52$, $p = .48$). But there are significant interactions between *Gap Type* and *Structural Position* ($F_1(1, 31) = 9.82$, $p < .01$; $F_2(1, 15) = 13.19$, $p < .01$) and between *Gap Type* and *Clause Type* ($F_1(1, 31) = 17$, $p < .01$; $F_2 (1, 15) = 3.99$, $p = .06$[28]). In contrast, there is no significant interaction between *Structural Position* and *Clause Type* in the participant analysis ($F_1(1, 31) = 1.79$, $p = .19$) while there is a significant interaction in the item analysis ($F_2(1, 15) = 5.4$, $p = .04$).

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[28] This *p*-value is considered to be marginally significant.

Figure 3 shows the *z*-score means of the four conditions within the simple RC condition.

	Subject	Object
Gap	0.96	0.63
RP	-0.07	-0.06
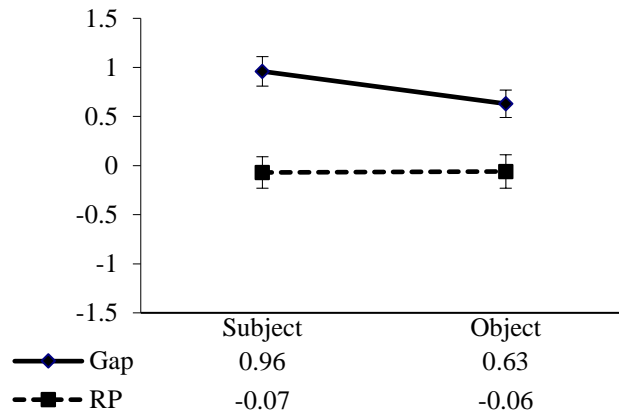
Figure 3.Mean ratings of acceptability for **simple** RCs

A visual inspection of Figure 3 suggests that the gap conditions were rated higher than the RP conditions. Also, the mean rating of the gap decreases from the subject position to the object position while that of the RP does not vary between the two positions. These observations are confirmed by the statistical analysis. First, there is a significant interaction between *Gap Type* and *Structural Position* in the participant analysis ($F_1(1, 31) = 6$, $p = .02$) but not in the item analysis ($F_2(1, 15) = 1.25$, $p = .28$). The pairwise comparison shows that the mean difference between the subject gap RCs (SGS) (0.96±0.48) and the object gap RCs (OGS) (0.63 ± 0.42) is significant ($t_1 = 3.2$, $p < .01$; $t_2 = 2.58$, $p = .02$) with a mean difference of 0.33. However, the mean rating difference between the subject RP RCs (SRPS) (-0.07±0.47) and the object RP RCs (ORPS) (-0.06±0.5) is not significant: ($t_1 = .1$, $p = .92$; $t_2 = 1.2$, $p = .25$). Moreover, the mean rating differences between the subject gap RCs (SGS) (0.96 ± 0.48) and the subject RP RCs (SRPS) (-0.07 ± 0.47) and between the object gap RCs (OGS) (0.63 ± 0.42) and the object RP RCs (ORPS) (-0.06 ± 0.5) are both significant (subject: $t_1 = 8.67$, $p < .01$; $t_2 = 7.83$, $p < .01$; object: $t_1 = 7$, $p < .01$; $t_2 = 4.81$, $p < .01$).

Figure 4 shows the *z*-score means of the four conditions within the embedded RC condition.

	Subject	Object
Gap	0.24	0.06
RP	-0.26	-0.07
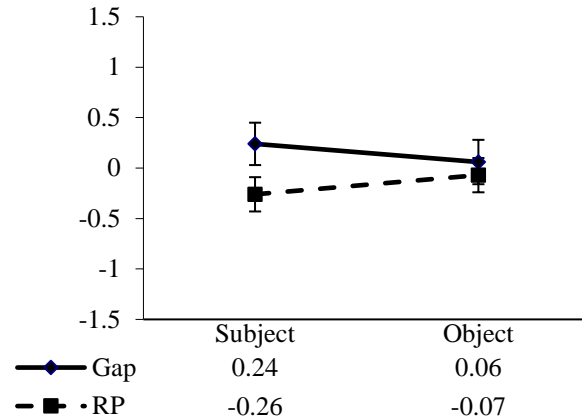
Figure 4. Mean ratings of acceptability for **embedded** RCs

A visual inspection of Figure 4 suggests that there is an interaction between *Gap Type* and *Structural Position*, as the mean rating of the gap decreases and that of the RP increases from subject position to object position. This is confirmed by the statistical analysis. First, there is a significant interaction between *Gap Type* and *Structural Position* ($F_1(1, 31) = 4.93$, $p = .03$; $F_2(1, 15) = 4.93$, $p = .03$). Second, pairwise comparison shows that the mean rating difference between subject gap RCs (SGE) (0.24 ± 0.61) and object gap RCs (OGE) (0.06 ± 0.65) is not significant ($t_1 = 1.22$, $p = .23$; $t_2 = 0.72$, $p = .48$). While the mean rating difference between subject RP RCs (SRPE) (-0.26 ± 0.49) and object RP RCs (ORPE) (-0.07 ± 0.49) is marginally significant in the participant analysis ($t_1 = 1.87$, $p = .07$) but not in the item analysis ($t_2 = 1.78$, $p = .1$). Further, the mean rating difference between subject gap RCs (SGE) (0.24 ± 0.61) and subject RP RCs (SRPE) (-0.26 ± 0.49) is significant ($t_1 = 4.22$, $p < .01$; $t_2 = 3.22$, $p < .01$), with a mean difference of 0.5. By contrast, the mean rating difference between object gap RCs (OGE) (0.06 ± 0.65) and object RP RCs (ORPE) (-0.07 ± 0.49) is not significant ($t_1 = 1$, $p = .31$; $t_2 = 0.28$, $p = .78$).

The conditions of the subject and object positions were also analyzed separately, since the results show a significant difference between *Gap Type* and *Clause Type*. We will discuss the effects of *Gap Type* and *Clause Type* within the level of the subject position and the level of the object position separately.

Figure 5 shows the *z*-score means of the four conditions within the subject condition.

	Simple	Embedded
Gap	0.96	0.243
RP	-0.07	-0.26
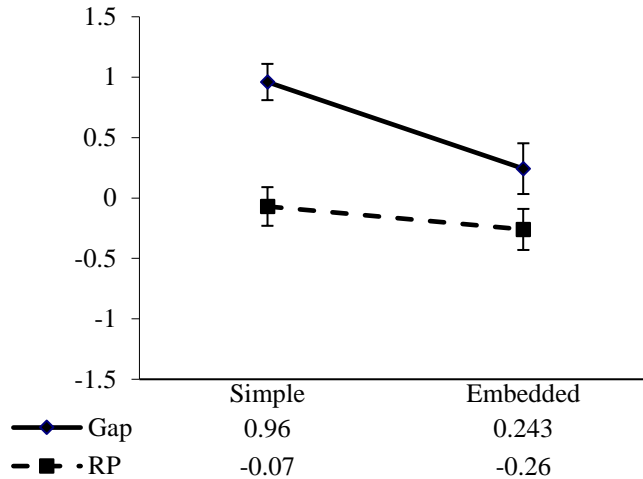
Figure 5. Mean ratings of acceptability for **subject** RCs

A visual inspection of Figure 5 indicates that the mean ratings of both the gap and the RP decrease when the RC is embedded deeper, and that of the gap has a steeper line. The statistical analysis shows that there is a significant two-way interaction between *Gap Type* and *Clause Type* ($F_1(1, 31) = 10.03$, $p < .01$; $F_2(1, 15) = 4.87$, $p = .04$). Pairwise comparison shows that the mean rating difference between simple gap RCs (SGS) (0.96 ± 0.48) and embedded gap RCs (SGE) (0.24 ± 0.61) is significant ($t_1 = 5.46$, $p < .01$; $t_2 = 4.74$, $p < .01$) with a mean difference of 0.72. However, the mean rating difference between simple RP RCs (SRPS) ((-0.07 ± 0.47) and embedded RP RCs (SRPE) (-0.26 ± 0.49) is not significant in the participant analysis ($t_1 = 1.54$, $p = .13$) but is significant in the item analysis ($t_2 = 2.33$, $p = .03$).

Figure 6 shows the *z*-score means of the four conditions within the object condition.

	Simple	Embedded
Gap	0.63	0.06
RP	-0.06	-0.07
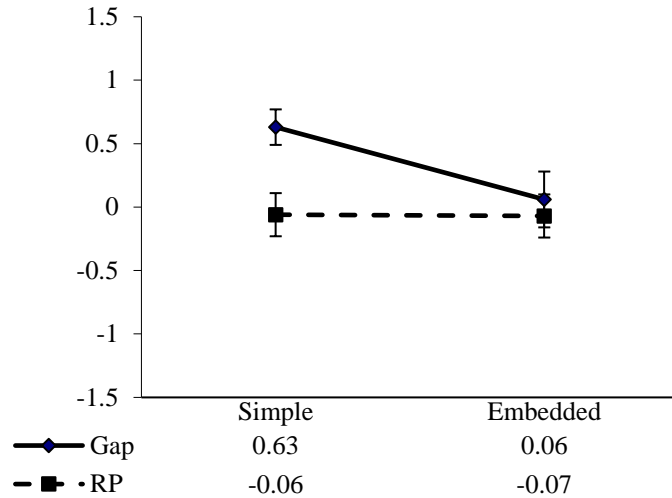
Figure 6. Mean ratings of acceptability for **object** RCs

A visual inspection suggests that the mean rating of the gap decreases when it is embedded deeper, while that of the RP does not vary. A statistical analysis shows that there is a significant interaction between *Gap Type* and *Clause Type* (F_1(1, 31) = 10.98, $p < .01$; F_2 (1, 15) = 11.11, $p < .01$). Pairwise comparison shows that the mean rating difference between simple gap RCs (OGS) (0.63±0.42) and embedded gap RCs (OGE) (0.06±0.65) is significant ($t_1 = 3.97$, $p < .01$; $t_2 = 4.56$, $p < .01$) with a mean difference of 0.57. Additionally, the mean rating difference between simple RP RCs (ORPS) (-0.07±0.47) and embedded RP RCs (ORPE) (-0.07±0.49) is not significant ($t_1 = 0.07$, $p = .95$; $t_2 = 0.61$, $p = .55$).

4.5 Discussion

In this section, implications of the findings from Experiment 1 for the following three research questions (RQs) are discussed:

(117) *RQ 1*: Is there significant difference between native speakers' judgments of the gap and the RP?

RQ 2: Does the grammatical function of the gap/RP matter in its acceptability?

RQ 3: Does the structural distance between the head NP and the RP matter?

(i) RQ1: Is there significant difference between native speakers' judgments of the gap and the RP?

The results show that in simple RCs, the gap is always rated significantly higher than the RP, regardless of whether it is in subject or object position. By contrast, in embedded RCs, the gap is rated significantly higher than the RP in subject position but they are not significantly different in their mean ratings in object position. Thus, our findings suggest that both the grammatical function of the gap/RP and the structural distance between the head NP and the gap/RP matter. When there is a greater structural distance between the head NP and the gap/RP, the RP can be as acceptable as the gap if it is in object position.

This supports the conclusion that the RP is grammatically licensed in the object position of Chinese RCs. This is so because, if there is a grammatical constraint that the RP cannot occur in object position, we predict that it would always be rated significantly lower than the gap, no matter how many levels it is embedded, as observed with the English RP (Alexopoulou & Keller, 2007; Heestand, Xiang, & Polinsky, 2011; Hofmeister & Norcliffe, 2013). As we have seen that the RP is as acceptable as the gap in the embedded object position, we can infer that the RP is grammatically licensed in that position, as is claimed in most theoretical studies (e.g., Hawkins & Chan, 1997; Hsiao, 2003; Keenan, 1985; Xu & Langendoen, 1985) on this issue. Thus, Hitz's (2012) and Yuan and Zhao's (2015) argument that the RP is ungrammatical in the object position of Chinese RCs needs to be reconsidered. What makes the rating of simple RCs with an RP very low in these two studies might be attributed to extra-grammatical factors rather than a grammatical constraint. One factor might be the processing ease of gaps, as Hawkins (2004) claims that gaps in simpler structures have greater efficiency than RPs due to less morphological processing.

(ii) RQ2: Does the grammatical function of the gap/RP matter in its acceptability?

The most common viewpoint in previous theoretical studies on Chinese RCs is that the RP cannot be grammatically licensed in the subject position. My experimental results confirmed this. As shown in Figure 3, the gap is rated significantly higher than the RP at

the subject position of simple RCs. This is compatible with McCloskey's (1990) *Highest Subject Restriction*, which states that an RP is prohibited at the highest subject position, i.e., the subject position of simple RCs. Moreover, as shown in Figure 4, the gap is, again, rated significantly higher than the RP at the subject position of embedded RCs, which is in contrast to what is found at the object position of embedded RCs: the mean rating difference between the RP and the gap in embedded RCs is not significantly different. Thus, we can infer that the grammatical function of the gap/RP does matter in its acceptability. In embedded RCs, the RP is as acceptable as the gap at the object position, but is less acceptable than the gap at the subject position. It should be noted that there is a difference between my experimental results and those of Francis et al. (2015). Francis et al. find that in simple Cantonese RCs, the RP is rated significantly lower in subject position than object position, whereas in my experiment, the RP receives low ratings in both subject and object positions of simple RCs with no significant difference. It seems that the RP is more acceptable in Cantonese simple RCs than Mandarin Chinese RCs.

(iii) RQ 3: Does the structural distance between the head NP and the RP in simple and embedded RCs matter?

First, in embedded Chinese RCs, the RP was rated marginally significantly higher in the object position than the subject position in the participant analysis ($t_1 = 1.87$, $p = .07$) but not in the item analysis ($t_2 = 1.78$, $p = .1$). This finding is in line with Keenan and Comrie's (1977, 1979) Noun Phrase Accessibility Hierarchy (NPAH), which proposes the implicational hierarchy for the distribution of the RP within RCs:

(118)   Subject>Direct Object>Indirect Object>Oblique>Genitive>Object of Comparison
(Keenan & Comrie, 1977, p. 66)

Keenan and Comrie (1977) identified two crucial implications of the NPAH. First, if the grammar licenses a gap in one structural position on the hierarchy, it can license a gap in all other positions to its left. Second, if the grammar licenses an RP in one structural position on the hierarchy, it can license an RP in all other positions to its right. The two implications have been claimed to be related to processing difficulty: each structural

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position in (118) has more syntactically complex filler-gap dependency than all positions to its left. As the complexity increases, the RP would be more likely to occur because it makes complex dependencies easier to process. Simultaneously, the gap would be less likely to occur for the same reason. This proposal predicts the following two findings of this study: (i) as in Figure 3, since simple subject RCs with a gap were rated significantly higher than simple object RCs with a gap, we can infer that in simple RCs, the gap is more acceptable in the subject position than the object position; (ii) as in Figure 4, since embedded object RCs with an RP were rated significantly higher than embedded subject RCs with an RP, we can infer that in embedded RCs, the RP is more acceptable in the object position than the subject position.

However, Keenan and Comrie's NPAH fails to predict two other findings: (iii) the acceptability of simple subject RCs and simple object RCs with an RP did not significantly differ from each other, as in Figure 3; (iv) the acceptability of the embedded subject RCs and the embedded object RCs with a gap did not significantly differ from each other, as in Figure 4.

Based on Keenan and Comrie's (1977, 1979) NPAH, Hawkins (2004) claims that the gap is more advantageous than the RP in simple syntactic environments because greater efficiency can be achieved without processing any morphological form. Also, he argues that when the syntactic environment becomes more complex, an RP is more acceptable because its overt morphological form can facilitate processing without reference to the head NP of RCs. Under this proposal, we predict that the gap is more acceptable in simple RCs than embedded RCs while the RP is more acceptable in embedded RCs than simple RCs. In fact, Hawkins' proposal can account for (iii) and (iv) that the NPAH fails to predict.

Under the NPAH, the RP is expected to be more acceptable in object position than subject position, which is not supported by (iii). According to Hawkins, the advantage of the RP in object position over subject position inside simple RCs can be offset by the simplicity of the syntactic environment, which favors a gap as the more efficient strategy. In contrast, when the RP occurs in embedded RCs, which are syntactically more complex than simple RCs, its advantage in the object position over the subject position emerges, as

evidenced by (ii), since the structural distance between the object position and the head NP is greater than that between the subject position and the head NP.

Second, under the NPAH, the gap is expected to always be more acceptable in the subject position than the object position because the structural distance between the subject position and the head NP is shorter than that between the object position and the head NP. By comparing (i) and (iv), we can see that while the gap is more advantageous in the subject position than the object position inside a simple RC, such advantage disappears when it occurs inside an embedded RC. Then the question is why the advantage of the gap in subject position disappears in embedded RCs. Under Hawkins' (2004) proposal, I suggest that the advantage of the gap in subject position over object position might be offset by the structural complexity of the embedded RC. In other words, when the RC is embedded, the syntactic environment requires much more processing effort from the gap and its advantage in subject position, which is arguably observed in simple RCs, would be cancelled out.

However, Hawkins' proposal has its own challenges. My results reveal that the RP in subject position does not significantly differ in its mean ratings in simple and embedded RCs in the participant analysis ($t_1 = 1.54$, $p = .13$), although it is significant in the item analysis ($t_2 = 2.33$, $p = .03$). Also, the RP in object position does not significantly differ in its mean ratings in simple and embedded RCs ($t_1 = 0.07$, $p = .95$; $t_2 = 0.61$, $p = .55$). It suggests that embedding the RP deeper within the RC may not make it more acceptable, which is not predicted by Hawkins' (2004) proposal.

Furthermore, the current experimental results are also incompatible with Francis et al.'s (2015) experimental results on Cantonese RCs. As discussed in Section 4.1.3, by using an acceptability judgment task and a production task, Francis et al. (2015) find that the RP becomes more acceptable when occurring as a possessor inside a possessive NP, based on which they argue that the RP should be more acceptable in more complex structural environments. However, such structural complexity effects are not found in my study, as we have seen that when the RP is doubly embedded within the RC, its acceptability does not always significantly improve. Thus, the acceptability of the RP may or may not improve as the structural complexity increases. In future studies, I will explore how the RP is sensitive to different syntactic environments.

To sum up, the results of this experimental study suggest that the RP can be grammatically licensed only in the object position of Chinese RCs. An important implication is that both the base-generation and raising strategies are available to derive the head NP from the object position of Chinese RCs, under Aoun and Li's (2003) proposal that the head NP is raised out of the RC when there is a gap but is base-generated external to the RC when there is an RP. In addition, the experimental results also suggest that the gap is preferred to the RP in both subject and object positions of simple Chinese RCs, based on which we can infer that the head-raising strategy is preferred to the head-base-generation strategy in deriving simple Chinese RCs. But why is the head-raising strategy preferred over the head-base-generation strategy? The advantage of the head-raising strategy can be considered as the advantage of the gap over the RP. One tentative account is from Hawkins (2004): the gap is preferred over the RP in simple structures because it requires less morphological processing.

4.6 Conclusion

In this chapter, a controlled acceptability judgment experiment was conducted to investigate the acceptability of the RP in the subject and object positions of Chinese RCs. The experimental results revealed that the gap and the RP in the embedded object position are not significantly different in their mean ratings, which suggests that the RP is as acceptable as the gap in that position. Under the assumption that the RP should always be rated significantly lower than the gap in the same structural environment if the RP cannot be grammatically licensed, we can infer that the RP is grammatical in the object position of Chinese RCs, which is in accord with most previous theoretical studies. In addition, the experimental results suggest that the RP cannot be grammatically licensed in the subject position of Chinese RCs, as the RP is rated significantly lower than the gap in both simple and embedded RCs.

To summarize, the results of Experiment 1 suggest that the RP can be grammatically licensed in the object position of Chinese RCs, which provides novel empirical support for Aoun and Li's (2003) proposal that the head NP of Chinese RCs can be either raised out of the RC or base-generated external to the RC. Moreover, the data suggest that the gap is preferred to the RP in the subject and object positions of simple RCs in Chinese.

Thus, we can infer that while the head NP of Chinese RCs can be derived with two possible strategies from the object position, the raising strategy is preferred over the base-generation strategy in simple RCs. Additionally, the experimental findings raise another question: why is the head-raising derivation the preferable option to form Chinese RCs? I suggest Hawkins' (2004) proposal that the gap requires less morphological processing as a potential account.

In the next chapter, I discuss my second experimental investigation that examines the derivation of the head NP in Japanese RCs. Among the results of the previous studies that were reviewed in Chapter 3, it is controversial whether the subject-oriented anaphors within the head NP can be co-referential with the RC subject because researchers have different intuitive judgments.

CHAPTER 5. ANAPHOR RECONSTRUCTION IN JAPANESE RELATIVE CLAUSES

The structure of Japanese RCs has been investigated in many studies (e.g., Fukui & Takano, 2000; Ishii, 1991; Kuno, 1973; Matsumoto, 1997; Murasugi, 1991, 2000). As reviewed in Chapter 3, existing proposals for the structure of Japanese RCs[29] can be divided into three major approaches: (i) the *pro*-binding analysis, (ii) the operator movement analysis and (iii) the head-raising analysis. According to the *pro*-binding analysis and the operator movement analysis, the head NP of Japanese RCs is base-generated external to the RC (Fukui & Takano, 2000; Ishii, 1991; Kuno, 1973; Murasugi, 2000; Perlmutter, 1972) while according to the head-raising analysis, the head NP of Japanese RCs originates inside the RC and is raised out of it (e.g., Hoshi, 2004; Kitao, 2011; Morita, 2013). One key difference between the *pro*-binding analysis and the operator movement analysis on the one hand, and the head-raising analysis on the other, is that only the head-raising analysis analysis predicts the presence of reconstruction effects of the head NP. In what follows, I will consider the *pro*-binding analysis and the operator movement analysis together as a single *head-base-generation* analysis, as they make the same prediction concerning the reconstructability of the head NP.

Given this background, as reviewed in Chapter 3, whether an anaphor within the head NP can be bound by the RC subject is an important diagnostic for the head derivation in RCs. If the anaphor can be bound by the RC subject, under the assumption that the anaphor must have a c-commanding subject as its antecedent, the head NP must be analyzed as being reconstructed into the RC at LF (Chomsky, 1993). This diagnostic has been applied to Japanese RCs in many previous studies. However, there are conflicting intuitive judgments on whether the subject-oriented anaphors inside the head NP can be co-referential with the RC subject. On one hand, several studies claim that such co-reference is prohibited (e.g., Fukui & Takano, 2000; Hasegawa, 1988; Hoji, 1985; Murasugi, 2000), arguing for the head-base-generation analysis. On the other hand, many other studies state that the co-reference is possible (e.g., Gunji, 2002; Hoshi, 2004; Ishizuka, 2010; Kitao, 2009, 2011; Morita, 2013), arguing for the head-raising analysis.

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[29] In this chapter, I only consider the Japanese RCs with a gap.

To complicate the matter further, Hoshi (2004) and Ishizuka (2010) claim that while co-indexing the morphologically simple anaphor *jibun* with the RC subject is just marginally acceptable at best, it becomes fully acceptable if *jibun* 'self' is replaced with a more morphologically complex anaphor such as *jibun-jishin* 'self-self.' Therefore, according to these studies, the morphological make-up of the anaphor may affect its ability to be co-indexed with the RC subject.

This chapter addresses the above issues with a carefully controlled truth value judgment experiment (Crain & Thornton, 1998), where participants judged whether the interpretation of a given sentence matched a given picture. The results show that neither the simplex anaphor *jibun* nor the complex anaphor *jibun-jishin* within the head NP of RCs can take the RC subject as its antecedent, which implies that the head NP does not reconstruct into the RC. It therefore provides strong support for the head-base-generation analysis of Japanese RCs. Moreover, the findings also suggest that the morphological make-up of the anaphor does not affect its ability to take the RC subject as its antecedent, contrary to claims that it is more acceptable for the complex anaphor *jibun-jishin* than the simplex anaphor *jibun* to be co-indexed with the RC subject (Hoshi, 2004; Ishizuka, 2010).

The rest of this chapter is structured as follows. In 5.1, I review the basic properties of the morphologically simplex anaphor *jibun* 'self' and the morphologically complex anaphors *jibun-jishin* 'self-self' and *kare-jishin* 'himself' and argue that *jibun* and *jibun-jishin* are more comparable if one seeks to investigate whether or not the morphological complexity of an anaphor affects the reconstruction of the head NP in Japanese RCs. In 5.2, I present my research questions, followed by details of the experiment in 5.3 with which my research questions are examined. Section 5.4 presents the findings of the experiment, which are discussed in 5.5. Section 5.6 concludes this chapter.

5.1 Morphologically simplex and complex anaphors in Japanese

Before delving into the details of the experiment, I would like to first review some properties of the simplex anaphor *jibun* 'self' and the complex anaphors *jibun-jishin* 'self-self' and *kare-jishin* 'himself,' as their morphological differences have been claimed to affect their interpretation within the head NP of Japanese RCs (Hoshi, 2004; Ishizuka,

2010). In addition to reviewing the relevant literature, I will also show that *jibun* shares more properties with *jibun-jishin* than with *kare-jishin,* in order to justify the choice of *jibun-jishin*, rather than *kare-jishin*, as the complex anaphor for my experiment.

One important difference between the simplex anaphor *jibun* and the complex anaphors *jibun-jishin/kare-jishin/kanojo-jishin* is that *jibun* can participate in long-distance binding while the complex anaphors cannot (Aikawa, 2002; Katada, 1991; Nakamura, 1987), although both types of anaphors must have a c-commanding subject as antecedent (e.g., Aikawa, 2002).[30] In other words, all types of complex anaphors must be locally bound while the simplex anaphor need not, as in (119).

(119) Taroo$_i$-ga   Jiroo$_j$-ga   jibun$_{i/j}$/jibun-jishin$_{*i/j}$/kare-jishin$_{*i/j}$-o   seme-ta   to
Taroo-NOM Jiroo-NOM self/self/he-self-ACC   blame-PST COMP
it-ta
say-PST
'Taroo said that Jiro blamed himself.'   (Aikawa, 2002, p. 177)

Since complex anaphors must be bound by the local subject, if a complex anaphor within the head NP can take the RC subject as its antecedent, it would indicate that the head NP reconstructs within the RC at LF.

Now, as mentioned above, studies such as Hoshi (2004) and Ishizuka (2010) claim that morphologically complex anaphors undergo reconstruction but the simplex ones might not. In order to examine the validity of this claim, one should compare the availability of reconstruction with morphologically simplex and complex anaphors. The question is which ones to compare. There are four reasons that I have chosen to compare the simplex anaphor *jibun* with the complex anaphor *jibun-jishin* 'self-self' rather than *kare-jishin* 'himself'/*kanojo-jishin* 'herself.'

First, the only morphological difference between *jibun* and *jibun-jishin* is the addition of *jishin* in the complex anaphor. Thus, if reconstruction effects are found with *jibun-jishin*, but not *jibun*, it would be reasonable to conclude that it is the morpheme *-jishin* that makes the reconstruction happen. In contrast, *jibun* and *kare-jishin/kanojo-jishin* have nothing in common morphologically. Moreover, it is the suffix *-jishin* that makes

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[30] *Jibun* 'self' can also be used as a logophor (e.g., Kameyama, 1984, 1985; Kuno, 1978), which does not need a c-commanding antecedent. The logophor is also called an 'exempt anaphor,' which is argued to be licensed by extra-grammatical mechanisms (e.g., Kim & Yoon, 2009; Pollard & Sag, 1992).

the complex anaphor local (Katada, 1991). Since the issue is whether the simplex anaphor *jibun* and the complex anaphors behave similarly in reconstruction, one should compare *jibun* and *jibun-jishin*, whose difference is only the extra morpheme *-jishin* in the latter.

Second, *jibun-jishin* is more similar to *jibun* because they do not have to agree with their antecedent in phi features, unlike *kare-jishin* and *kanojo-jishin* (Aikawa, 2002; Nakamura, 1987):

(120a) Taroo$_i$/Hanako$_j$/[$_{NP}$ Taroo-to   Hanako]$_k$-ga jiun$_{i/j/k}$/jibun-jishin$_{i/j/k}$-o seme-ta.
  Taro/Hanako/Taro-and Hanako-NOM   self/self-self-ACC   blame-PST
  'Taro$_i$/Hanako$_j$/[Taroo$_k$ and Hanako]$_k$ blamed self$_{i/j/k}$/self-self$_{i/j/k}$.'
                                                            (Aikawa, 2002, p. 178)

(120b) Taroo$_i$/Hanako$_j$/[$_{NP}$ Taroo-to Hanako]$_k$-ga   kare-jishin$_{i/*j/*k}$ -o   seme-ta.
  Taroo/Hanako/Taro-and Hanako-NOM   he-self-ACC   blame-PST
  'Taro$_i$/Hanako$_j$/[Taroo and Hanako]$_k$ blamed him-self$_{i/*j/*k}$.'
                                                            (Aikawa, 2002, p. 178)

(120c) Taroo$_i$/Hanako$_j$/[$_{NP}$ Taroo-to Hanako]$_k$-ga   kanojo-jishin$_{*i/j/*k}$ -o   seme-ta.
  Taroo/Hanako/Taro-and Hanako-NOM   she-self-ACC   blame-PST
  'Taro$_i$/Hanako$_j$/[Taroo and Hanako]$_k$ blamed her-self$_{*i/j/*k}$.'

In (120a), both *jibun* and *jibun-jishin* can take *Taroo*, *Hanako*, or *Taroo and Hanako* as their antecedent, which suggests that *jibun* and *jibun-jishin* do not need to agree with their antecedent in gender or number features. By contrast, in (120b), *kare-jishin* can only take *Taroo* (a male name) as its antecedent and in (120c), *kanojo-jishin* can only take *Hanako* (a female name) as its antecedent, which shows that they must agree with their antecedent in gender and number features. Thus, *jibun* and *jibun-jishin* are more comparable and have fewer restrictions than *kare-jishin*/*kanojo-jishin*.

Third, both *jibun* and *jibun-jishin* can take the QP *daremo* 'everyone' as their antecedent while *kare-jishin* and *kanojo-jishin* cannot (Aikawa, 2002):

(121a) Daremo$_i$-ga   jibun$_i$/jibun-jishin$_i$-o   hihanshi-ta.
  everyone-NOM   self/self-self-ACC   criticize-PST
  'Everyone$_i$ criticized self$_i$/self-self$_i$.'   (Aikawa, 2002, p. 178)

(121b) *Daremo~i~-ga   kare-jishin~i~/kanojo-jishin~i~-o   hihanshi-ta.
        everyone-NOM   he-self/her-self-ACC   criticize-PST
        'Everyone~i~ criticized himself~i~/herself~i~.'   (Aikawa, 2002, p. 178)

Aikawa argues that the above difference between *jibun/jibun-jishin* and *kare-jishin/kanojo-jishin* can be attributed to the lexical properties of *jibun* and *kare/kanojo*: *jibun* can be interpreted as a bound variable but *kare/kanojo* cannot, which is evidenced by (122a) and (122b) (e.g., Noguchi, 1997):

(122a) Doremo~i~-ga   jibun~i~/*kare~i~-o   seme-ta.
        Everyone-NOM   self/him-ACC   blame-PST
        'Everyone~i~ blamed self~i~/himself*~i~.'

(122b) Doremo~i~-ga   jibun~i~/*kanojo~i~-o   seme-ta.
        Everyone-NOM   self/her-ACC   blame-PST
        'Everyone~i~ blamed self~i~/herself*~i~.'

Thus, *jibun-jishin* is more similar to *jibun*. The complex anaphors *kare-jishin* and *kanojo-jishin* have the property of *kare* and *kanojo* and therefore cannot be interpreted as bound variables.

Fourth, both *jibun* and *jibun-jishin* are subject-oriented while *kare-jishin* and *kanojo-jishin* are not (Aikawa, 2002):

(123a) Taroo~i~-ga   Jiroo~j~-ni   jibun~i/*j~/jibun-jishin~i/*j~-nitsuite   hanashi-ta.
        Taroo-NOM Jiroo-DAT   self/self-self-about   tell-PST
        'Taro~i~ told Jiro~j~ about himself~i/*j~.'   (Aikawa, 2002, p. 178)

(123b) Taroo~i~-ga   Jiroo~j~-ni   kare-jishin~i/j~-nitsuite   hanashi-ta.
        Taroo-NOM Jiroo-DAT   him-self-about   tell-PST
        'Taro~i~ told Jiro~j~ about himself~i/j~.'   (Aikawa, 2002, p. 178)

(123c) Hanako~i~-ga   Mary~j~-ni   kanojo-jishin~i/j~-nitsuite   hanashi-ta.
        Hanako-NOM Mary-DAT her-self-about   tell-PST
        'Hanako~i~ told Mary~j~ about herself~i/j~.'

As shown in the above examples, *jibun* and *jibun-jishin* can only be bound by the subject while *kare-jishin* and *kanojo-jishin* can be bound by either the subject or the indirect object. Thus, among the three complex anaphors, *jibun-jishin* is most similar to *jibun*.

To sum up, by taking into account the differences between *jibun-jishin* and *kare-jishin*/*kanojo-jishin*, we can see that the pair *jibun-jishin* and *jibun* is more comparable than that of *kare-jishin*/*kanojo-jishin* and *jibun*. Thus, if one intends to compare the reconstruction effects of the simplex and complex anaphors inside the head NP of Japanese RCs, *jibun* and *jibun-shin* should be examined.

5.2 Research Questions

Given the above background, a truth value judgment experiment was conducted to address the following two research questions (RQs):

(124) RQ1: Can an anaphor inside the head NP of Japanese RCs take the
       RC subject as its antecedent?

       RQ2: Does the morphological complexity of the anaphor inside the
       head NP affect its availability to be interpreted within the RC?

The three approaches reviewed in Chapter 3 predict different answers for the above questions. First, under the *pro*-binding analysis and the operator movement analysis, the head NP is base-generated external to the RC so the head NP is not predicted to reconstruct into the RC at LF. Thus, the answer to both questions in (124) should be *no*, which means neither *jibun* nor *jibun-jishin* can take the RC subject as its antecedent. Second, under the head-raising analysis, the head NP is raised from within the RC and reconstruction of the head NP should be possible. Thus, we predict that the answer to both questions in (124) should be *yes*, which means both *jibun* and *jibun-jishin* can take the RC subject as their antecedent. Moreover, if complex anaphors are indeed more likely to reconstruct than the simplex anaphor jibun, as claimed by Hoshi (2004), Ishii (1991) and Ishizuka (2010), we predict that there would be a difference between *jibun* and *jibun-jishin* with respect to their ability to refer to the RC subject.

5.3 Experiment 2

A picture-matching truth value judgment experiment was used to investigate whether the simplex anaphor *jibun* 'self' and the complex anaphor *jibun-jishin* 'self-self' within the head NP of Japanese RCs can be co-indexed with the RC subject.

5.3.1 Participants

A total of 31 native speakers of Japanese participated in this experiment, whose age ranged from 18 to 24. They were undergraduate students from a university in Japan. Extra course credits were given to them for participating in the experiment.

5.3.2 Task

A truth value judgment experiment was created. For each set of stimuli, participants saw a picture with a sentence on a computer screen and were asked to decide whether the interpretation of the sentence matched the picture. Four Disney characters, *Mickey*, *Minnie*, *Donald*, and *Daisy*, were briefly introduced at the beginning of the experiment, followed by four multiple-choice questions to confirm that the participants were familiar with these characters. Participants were also informed in advance that all Disney characters always put their face photos on their belongings. An example of a picture used is given below:

(125)

In (125), a picture featured a hat with a face photo of *Mickey*, indicating that the hat belongs to *Mickey*. The example in (126) is an example of a sentence that appears below the picture in (125):

(126) Daisy$_j$-ga [[Mickey$_k$-ga   e$_i$ arat-ta]   [jibun$_{j/k}$-no booshi]$_i$]-o yogoshi-ta.
Daisy-NOM Mickey-NOM   wash-PST   self-GEN   hat-ACC   stain-PST
'Daisy$_j$ stained self$_{j/k}$'s hat that Mickey$_k$ washed.'

Participants were then asked to judge whether the sentence and the picture matched by selecting one of two choices: *atteiru* 'match' or *atteinai* 'mismatch'. Importantly, in order for (126) to match (125), *jibun-no booshi* 'self's hat' must be interpreted as *Mickey's hat.* In other words, the antecedent of the anaphor must be the RC subject.

The online survey website *Wenjuanxing* was used to design and run the experiment (https://www.sojump.com/). Although there was no time limit for the task, all participants were able to finish it within 15 minutes. Each participant did the experiment with a computer in a computer lab.

5.3.3 Design and materials

Experiment 2 had a 2×2 design with (i) *Anaphor Type* (the simplex anaphor *jibun* vs the complex anaphor *jibun-jishin*) and (ii) *Antecedent Position* (whether the intended antecedent is the matrix subject or the RC subject). This design results in the following four conditions:

Table 7. The four conditions in Experiment 2

	Matrix subject antecedent	RC subject antecedent
Simplex anaphor (*jibun*)	Simplex-Matrix	Simplex-RC
Complex anaphor (*jibun-jishin*)	Complex-Matrix	Complex-RC

The four conditions for one sample item are shown in (127) and (128) below:

(127)   a.   b.

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The pictures show that the hat belongs to *Daisy* in (127a) and to *Mickey* in (127b). The sentence in (128a) with a simplex anaphor *jibun* or the sentence in (128b) with a complex anaphor *jibun-jishin* appeared below one of the two pictures.

(128a) Daisy$_j$-ga   [[Mickey$_k$-ga   e$_i$ arat-ta]   [jibun$_{j/k}$-no booshi]$_i$]-o yogoshi-ta.
        Daisy-NOM   Mickey-NOM   wash-PST   self-GEN   hat-ACC   stain-PST
        'Daisy$_j$ stained self$_{j/k}$'s hat that Mickey$_k$ washed.'

(128b) Daisy$_j$-ga   [[Mickey$_k$-ga e$_i$ arat-ta]   [jibun-jishin$_{j/k}$-no booshi]$_i$]-o yogoshi-ta.
        Daisy-NOM   Mickey-NOM wash-PST   self-self-GEN   hat-ACC   stain-PST
        'Daisy$_j$ stained self$_{j/k}$'s hat that Mickey$_k$ washed.'

The Simplex-Matrix condition in Table 7 involves the combination of (127a) and (128a). In order for (128a) to be judged as a true statement with (127a), the matrix subject *Daisy* must be interpreted as the antecedent of the simplex anaphor *jibun*. The Complex-Matrix condition involves the combination of (127a) and (128b). In order for (128b) to be judged as a true statement with (127a), the matrix subject *Daisy* must be interpreted as the antecedent of the complex anaphor *jibun-jishin*.

    The more critical conditions for the experiment are the other two conditions that involve RC subjects. The Simplex-RC condition involves the combination of (127b) and (128a) and the Complex-RC condition involves the combination of (127b) and (128b). In order for (128a) and (128b) to be judged to match the picture in (127b), the RC subject *Mickey* must be interpreted as the antecedent of the simplex and complex anaphors.

    For each of the two conditions within *Anaphor Type*, 40 different lexicalizations were created so there were a total of 80 sentences. Each of the 80 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 160 sentence-picture pairs.[31] These 160 picture-sentence pairs were distributed into four lists using a Latin Square procedure, so that there were 40 critical items in each list, which contained only one condition from the same lexicalization. By using a Latin square design with multiple lexicalizations, we ensured that each participant did not see

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[31] In order to rule out the potential confounding factors of *gender* (i.e., male vs female) and *animal type* (i.e., mouse vs duck) of the characters, *Mickey* was always paired with *Daisy* and *Minnie* was always paired with *Donald* in the stimuli.

sentences of the same lexicalizations in different conditions. Otherwise, the participants'

judgment in one condition may affect their judgment in another condition of the same

lexicalization.

Each of the four resulting lists was combined with the same 40 fillers, which were

used to: (i) monitor whether the participants were careful in reading the sentences and (ii)

examine whether the participants showed the expected subject-orientation for the simplex

and complex anaphors. There were two types of fillers (Type 1 & Type 2), each of which

had 20 items.

For the Type 1 fillers, an example of the picture-sentence pairs for one item is given

below:

(129)   a.   b.

Below the picture (129a)/(129b), either (130a) with *jibun* or (130b) with *jibun-jishin* was

presented.

(130a) Mickey$_j$-ga   Daisy$_k$-ni   jibun$_{j/*k}$-no hon-o   watashi-ta.
       Mickey-NOM   Daisy-DAT self-GEN   book-ACC   hand over-PST
       'Mickey handed over his own book to Daisy.'

(130b) Mickey$_j$-ga   Daisy$_k$-ni   jibun-jishin$_{j/*k}$-no hon-o   watashi-ta.
       Mickey-NOM   Daisy-DAT self-self-GEN   book-ACC   hand over-PST
       'Mickey handed over his own book to Daisy.'

Each Type 1 filler has a ditransitive verb such as *watas* 'to hand over' and *okur* 'to send.'

Due to the constraint that the binding of *jibun* and *jibun-jishin* is subject-oriented, *jibun*

and *jibun-jishin* in (130a) and (130b) can be co-indexed only with the subject *Mickey*, not

the indirect object *Dasiy*. Thus, when participants are shown (129a) with (130a) or (130b),

they are expected to select 'match.' But when they are shown (129b) with (130a) or (130b), they are expected to select 'mismatch.'

As for the Type 2 fillers, an example of picture-sentence pair is given below:

(131)   a.   b.

Below the picture (131)/(131b), either (132a) with *jibun* or (132b) with *jibun-jishin* was presented.

(132a) Minnie$_j$-ga   Donald$_k$-ni   jibun$_j$/*$_k$-no tebukuro-o   sute-ta   to   it-ta.
         Minnie-NOM Donald-DAT self-GEN   glove-ACC   throw away-PST COMP say-PST
         'Minnie said to Donald that she had thrown away her own gloves.'

(132b) Minnie$_j$-ga   Donald$_k$-ni   jibun-jishin$_j$/*$_k$-no   tebukuro-o   sute-ta   to
         Minnie-NOM Donald-DAT self-self-GEN   glove-ACC   throw away-PST COMP
         it-ta.
         say-PST
         'Minnie said to Donald that she had thrown away her own gloves.'

Each Type 2 filler involved a bridge verb that is subcategorized for an indirect object and a clausal complement. The Type 2 fillers were constructed so that the complement clause always had a null subject. Due to the constraint that the binding of *jibun* and *jibun-jishin* is subject-oriented, both *jibun* and *jibun-jishin* can be co-indexed only with the subject, not the indirect object. Thus, when participants see (131a) with (132a) or (132b), they are expected to select 'match.' However, when they see (131b) with (132a) or (132b), they

are expected to select 'mismatch.' Among both the Type 1 and Type 2 fillers, the intended antecedent was the subject in half items and the indirect object in another half items. Due to the constraint that the anaphors *jibun* and *jibun-jishin* are subject-oriented, the participants were expected to reject all 20 items in the two types of fillers where the anaphor refers to an indirect object. Based on the binominal distribution, we would be more than 95% confident that they read the sentences carefully if they reject 16 out of the 20 items. Appendix B contains the complete list of stimuli.

5.3.4 Procedure

At the beginning of the experiment, the participants were asked to fill out a background information survey (Appendix E), which included: (i) name; (ii) age; (iii) native language; (iv) language(s) other than Japanese that they can speak fluently; (v) studying/living abroad experience. After checking their language background information, I excluded one participant's data because he had lived in the U.S. from the age of 2 to 13.

In the instruction section, two examples were presented to show how to do the experiment. One of the example stimuli is below:

(133)

The sentence in (134) was presented below (133):

(134) Donald$_i$-ga   Minnie$_j$-no tonari-de jibun$_{i/*j}$-no dentaku-o   kowashi-ta.
      Donald-NOM Minnie-GEN next-at   self-GEN   calculator-ACC break-PST
      'Donald broke his own calculator right next to Minnie.'

Since the anaphor *jibun* 'self' is subject-oriented, it can refer only to the subject *Donald* in (134). Thus, *dentaku* 'calculator' should belong to *Donald*. Since the face photo in (133) shows *Minnie*, the participants were expected to select 'mismatch.' After seeing the examples, they continued to practice 4 more trials before starting to read the actual experimental items. No feedback or explicit instruction was given when they were practicing the 4 trials.

The results of the experiment were first analyzed with two-way repeated measures ANOVA. When a factor was found to be a significant predictor in the initial analysis, planned pairwise comparisons were conducted to look at the result within the condition. The ANOVA and pairwise comparison tests were performed on both participant (F_1 and t_1) and item (F_2 and t_2). Since participants gave binary judgments ('match' or 'mismatch'), the binominal distribution of individual data was also examined.

5.4 Findings

Recall that Experiment 2 manipulated two factors: (i) *Anaphor Type* (*jibun* vs *jibun-jishin*); (ii) *Antecedent Position* (whether the intended antecedent is the matrix subject or the RC subject). Thus, there were four critical conditions: (i) when the simplex anaphor *jibun* is involved and the face photo presents the matrix subject (Simplex-Matrix); (ii) when the simplex anaphor *jibun* is involved and the face photo presents the RC subject (Simplex-RC); (iii) when the complex anaphor *jibun-jishin* is involved and the face photo presents the matrix subject (Complex-Matrix) and (iv) when the complex anaphor *jibun-jishin* is involved and the face photo presents the RC subject (Complex-RC).

Table 8 summarizes the mean frequencies of 'match' answers, standard deviations (SDs), and standard errors (SEs) of the four conditions. Figure 7 graphically presents the mean frequencies of 'match' answers in each condition. The error bars represent 95% confidence intervals, each of which is a range of values where we can be 95% confident that the true mean is located.

Table 8. Means, SDs and SEs of the critical conditions in Experiment 2

	Mean (SD)	SE
Simplex-Matrix	9.63(0.85)	0.16
Simplex-RC	0.5(0.73)	0.13
Complex-Matrix	9.37(1.07)	0.2
Complex-RC	0.8 (1.19)	0.22
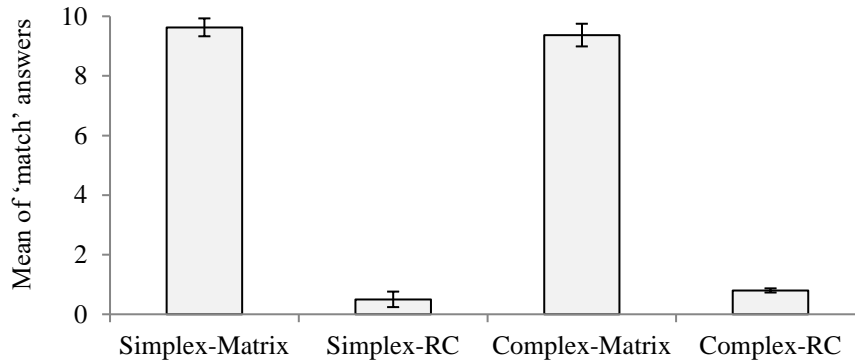
Figure 7. Mean frequencies of 'match' answers in the critical conditions of Experiment 2

A visual inspection of the means clearly shows that the matrix subject is significantly preferred to the RC subject as the antecedent for the anaphors, regardless of the anaphor type. Also, the very low mean frequencies of the match answers with the RC subject conditions suggest that the co-reference between the anaphor and the RC subject is unavailable.

The results of two-way repeated measures ANOVA show that the anaphor type does not have a significant effect on the participants' selection of the 'match' answer ($F_1(1, 29) = 0.02$, $p = .89$; $F_2(1, 39) = 0.02$, $p = .89$), although the antecedent position does ($F_1(1, 29) = 1347.32$, $p < .01$; $F_2(1, 39) = 2864.24$, $p < .01$). The interaction between these two factors is not significant ($F_1(1, 29) = 2.06$, $p = .16$) in the participant analysis but is significant in the item analysis ($F_2(1, 39) = 5.22$, $p = .03$).

Pairwise comparisons further confirm that there is a significant mean difference between Simplex-Matrix and Simplex-RC ($t_1 = 1596.19$, $p < .01$; $t_2 = 55.1$, $p < .01$) and between Complex-Matrix and Complex-RC ($t_1 = 517.54$, $p < .01$; $t_2 = 39.91$, $p < .01$), while there is no significant mean difference between Simplex-RC and Complex-RC ($t_1 = 1.56$, $p = .22$; $t_2 = 1.43$, $p = .16$) or between Simplex-Matrix and Complex-Matrix ($t_1 = 1.48$, $p = .23$; $t_2 = 1.4$, $p = .17$).

Moreover, an analysis of the judgments within each individual participant shows that out of the 10 items in the Simplex-RC condition, 28 out of 30 participants (93.4%) rejected 9 or more items. Since participants' choice was binary ('match' or 'mismatch,'), based on the binominal distribution, we would be 95% confident that participants did not make random judgments if they accepted or rejected 8 or more out of 10 items in each condition. The above finding strongly implies that the participants consistently rejected the co-reference between the simplex anaphor *jibun* and the RC subject. The result with Complex-RC was similar: 27 out of 30 participants rejected more than 8 out of 10 items. In a clear contrast, in the Simplex-Matrix condition, 28 participants (93.3%) accepted 8 or more out of 10 items, and in the Complex-Matrix condition, 27 participants (90%) also accepted 8 or more out of 10 items, which suggests that the matrix antecedent interpretation was consistently available to the participants.

As for the Type 1 fillers and the Type 2 fillers, there were 4 conditions: (i) *jibun* is involved and the face photo presents the matrix subject; (ii) *jibun* is involved and the face photo presents the dative NP; (iii) *jibun-jishin* is involved and the face photo presents the matrix subject; (iv) *jibun-jishin* is involved and the face photo presents the dative NP. Due to the constraint that the anaphors *jibun* and *jibun-jishin* are subject-oriented, the participants were expected to reject 8 or more out of 10 items in (ii) and (iv) of the two types of fillers. The data shows that all participants did as expected in the two conditions, which implies that (i) they were paying attention when reading experimental sentences and (ii) *jibun* and *jibun-jishin* show the expected subject-oriented constraint in their Japanese grammar.

5.5 Discussion

The results of Experiment 2 suggest that, regardless of its morphological complexity, when a subject-oriented anaphor occurs inside the head NP of a Japanese RC, it cannot take the RC subject as its antecedent. As discussed in 5.4, the mean frequencies of matching answers with the RC subject conditions were as low as 0.5 out of 10 for the simplex anaphor *jibun* and 0.8 out of 10 for the complex anaphor *jibun-jishin*. Also, the mean frequencies of matching answers with the matrix subject conditions were as high as 9.63 out of 10 for *jibun* and 9.37 out of 10 for *jibun-jishin*. These findings strongly imply

that the head NP of Japanese RCs does not reconstruct into the RC, which in turn supports the head-base-generation analysis, according to which the head NP of Japanese RCs is base-generated external to the RC.

In addition, the results of the experiment also show that there were no significant effects of the morphological complexity of the anaphors, despite previous studies' claims that complex anaphors are more likely to be interpreted as having the RC subject as their antecedent (Hoshi, 2004; Ishizuka, 2010). Importantly, this finding can only be accounted for under the head-base-generation analysis. As reviewed, *jibun* does not have to be bound locally. If it can be interpreted within the RC, as claimed in the head-raising analysis, we predict that in (135a), *jibun* can take either the RC subject *Mickey* or the matrix subject *Daisy* as its antecedent. However, the results show that only the matrix subject is possible. Additionally, *jibun-jishin* has to be bound locally. If the reconstruction is obligatory, it must be interpreted within the RC and should only be locally bound by the RC subject *Mickey* in (135b). However, this prediction is not born out: *jibun-jishin* can refer only to the matrix subject.

(135a) Daisy$_j$-ga [[Mickey$_k$-ga   e$_i$ arat-ta] [jibun$_{j/*k}$-no booshi]$_i$]-o yogoshi-ta.
       Daisy-NOM Mickey-NOM   wash-PST self-GEN   hat-ACC   stain-PST
       'Daisy stained self$_{j/k}$'s hat that Mickey$_k$ washed.'

(135b) Daisy$_j$-ga [[Mickey$_k$-ga   e$_i$ arat-ta] [jibun-jishin$_{j/*k}$-no booshi]$_i$]-o yogoshi-ta.
       Daisy-NOM Mickey-NOM   wash-PST self-GEN   hat-ACC   stain-PST
       'Daisy stained self$_{j/k}$'s hat that Mickey$_k$ washed.'

This finding is predicted under the head-base-generation analysis, according to which the head NP of Japanese RCs is base-generated external to the RC.

One of the remaining issues is whether the availability of co-reference between a complex anaphor and an RC subject depends on the type of the complex anaphor. As introduced earlier, Ishii (1991) agrees with Hoji's (1985) claim that *jibun* cannot reconstruct, but he further argues that *kare-jishin*/*kanojo-jishin* 'he/she-self' can, as in (136):

(136) Mary-wa [John$_i$-ga e$_j$ taipushi-ta] [kare-jishin$_i$-no ronbun-o]$_j$ motteki-ta.
    Mary-TOP John-NOM type-PST himself-GEN paper-ACC bring-PST
    'Mary brought himself$_i$'s paper that John$_i$ typed.'   (Ishii, 1991, p. 29)

To account for the observation that *kare-jishin/kanojo-jishin* can reconstruct while *jibun* cannot, Ishii proposes that *jibun* can reconstruct only when the head NP actually moves from within the RC, whereas *kare-jishin/kanojo-jishin* is not subject to such a constraint. Rather, according to Ishii, *kare-jishin*/*kanojo-jishin* can reconstruct via an operator at [Spec, CP] because it is co-referential with the head NP. If we want to reconcile the results of my experiment with Ishii's proposal, we have to claim that the reconstruction of *jibun-jishin* is blocked as well. But it is not immediately clear why *jibun* and *jibun-jishin* are blocked from undergoing reconstruction while *kare-jishi* and *kanojo-jishin* are not, or how the two types of anaphors are subject to different constraints.

Another issue is the claims in previous studies that the co-reference between the anaphor *jibun* and the RC subject is available. The results of Experiment 2 suggest that *jibun* cannot refer to the RC subject. However, many previous studies claim that the co-reference between *jibun* and the RC subject is possible, as in (137a) and (137b):

(137a) [[Ken$_i$-ga kai-ta] [jibun$_i$-no denki]]-ga besutoseera-ni nat-ta
      Ken-NOM write-PST self-GEN biography-NOM best seller-to become-PST
      'The biography of himself$_i$ that Ken$_i$ wrote became a bestseller.'
                                            (Gunji, 2002, p. 212)

(137b) [Mary$_i$-ga totta] [jibun$_i$-no shashin]-ga soko-ni aru
      Mary-NOM take-PST self-GEN photo-NOM there-at is
      'The picture of herself$_i$ that Mary$_i$ took is there.'   (Morita, 2013, p. 649)

The question is why the anaphor *jibun* within the head NP in (137a) and (137b) can refer to the RC subject (at least for some speakers) while the native Japanese participants in the current study rejected such co-reference in sentences like (138).

(138) Daisy$_j$-ga [[Mickey$_k$-ga e$_i$ arat-ta] [jibun$_{j/k}$-no booshi]$_i$]-o yogoshi-ta.
    Daisy-NOM Mickey-NOM wash-PST self-GEN hat-ACC stain-PST
    'Daisy$_j$ stained self$_{j/k}$'s hat that Mickey$_k$ washed.'

In previous studies, *jibun* has been claimed to be able to function as a logophoric pronoun (Kameyama, 1984, 1985; Kuno, 1978), which can also be considered as an exempt anaphor (e.g., Kim & Yoon, 2009; Pollard & Sag, 1992). In fact, there are many well-known examples where the anaphor *jibun* does not have to be c-commanded by its antecedent:

(139a) jibun$_i$-ga gan   kamoshirenai koto-ga   Hiroshi$_i$-o   nayamase-ta.
        self-NOM cancer maybe   thing-NOM Hiroshi-ACC   worry-PST
        'That he$_i$ might have cancer worried Hiroshi$_i$.'   (McCawley, 1976, p. 63)

(139b) jibun$_i$-no   jitsu-no   musuko-ga Taroo$_i$-o   kurushime-te-iru.
        self-GEN   real-GEN   son-NOM   Taroo-ACC annoy-GER-ASP
        'His$_i$ own son annoys Taro$_i$.'   (Aikawa, 2002, p. 175)

The notion of *logophoricity* has been used to account for the *jibun*-binding in (139a) and (139b) (e.g., Kameyama, 1984, 1985; Kuno, 1978). According to Clements (1975), a logophoric individual is someone whose speech, thoughts, feelings, or general state of consciousness are reported in the linguistic context where the logophor occurs. In (139a) and (139b), since the matrix subject NP where *jibun* occurs indicates its antecedent's feeling, *jibun* can be a logophor that does not have to be c-commanded. Likewise, the grammatical status of (137a) and (137b) can also be attributed to the logophoric property of *jibun*. It is possible that in (137a), *Ken* is aware of his action of writing his own *biography* while in (137b), *Mary* is aware of her action of taking her own *pictures*. Thus, *jibun* may be interpreted as a logophor. Also, we should note that the above examples of the logophoric pronoun *jibun* do not have a c-commanding subject as its antecedent.

    However, recall that there were also many studies claiming that *jibun* within the head NP cannot be co-referential with the RC subject, as in (140):

(140)* [$_{NP}$ [$_{CP}$John$_i$-ga   e$_j$ taipushi-ta][$_{NP}$ jibun$_i$-no   ronbun]$_j$]
             John-NOM   type-PST   self-GEN   paper
        'self$_i$'s paper that John$_i$ typed'   (Hasegawa, 1988, p. 59)

The question is why the co-reference between *jibun* and the RC subject is possible in (137a) and (137b) but impossible in (140). Comparing the three examples, we can see

that in (137a) and (137b) the RC is located in the matrix subject position, while in (140), the RC stands alone and the structural position is left unspecified. In fact, if (140) occurs in a subject position, the co-reference between *jibun* and the RC subject *John* seems to be possible:

(141) [$_{NP}$ [$_{CP}$John$_i$-ga   e$_j$ taipushi-ta][$_{NP}$ jibun$_i$-no   ronbun]$_j$]-ga soko-ni aru
           John-NOM   type-PST   self-GEN   paper-NOM   there-at is
        'The paper of himself$_i$ that John$_i$ typed is there.'

In contrast, when (140) occurs in an object position, the co-reference between *jibun* and the RC subject *John* becomes impossible, as in (142), which is suggested by the result of Experiment 2:

(142) Daisy$_j$-ga [[John$_k$-ga   e$_i$ taipushi-ta]   [jibun$_{j/*k}$-no ronbun]$_i$]-o   yon-da.
        Daisy-NOM John-NOM   type-PST   self-GEN   thesis-ACC   read-PST
        'Daisy$_j$ read self$_{j/*k}$'s paper that John$_k$ typed.'

Thus, the prohibited co-reference between *jibun* and *John* in (140) might be attributed to the fact that it is just an isolated complex NP. First, the logophoric property of *jibun* may not be easily accessible in a single complex NP because it requires a detailed extra-grammatical or pragmatic condition (e.g., Kuno, 1973; Pollard & Sag, 1992). Second, if a native speaker of Japanese interprets (140) in an object position like (142), the impossible co-reference between *jibun* and *John* is predicted.

But why can *jibun* be interpreted as a logophor in (141) but not (142)? Under the proposal that the head NP of Japanese RCs is base-generated, in (142), *jibun* is c-commanded by the matrix subject *Daisy* while in (141), there is no subject that c-commands *jibun*. Hence, *jibun* may not be interpreted as a logophor when c-commanded by a possible antecedent. This can be accounted for by Abe's (1997) proposal that there are two types of *jibun*: one is a logophoric pronoun and the other is a pure anaphor. This proposal is in line with the claim from many previous studies (e.g., Huang & Liu, 2001; Kim & Yoon, 2009; Pollard & Sag, 1992) that there are two types of anaphors. The first type is the core anaphor that is licensed with grammar-internal principles. That is, it has a superior co-argument or a subject/specifier within a Complete Functional Complex.The

second type is the exempt anaphor/logophor that does not have a c-commanding subject and must be licensed by extra-grammatical conditions. The core/pure anaphor *jibun* is always subject to Condition A of the binding theory. According to Abe, when *jibun* is contained in an argument NP and is c-commanded by a co-argument of that argument NP, it has to be a core/pure anaphor and should always be bound by its antecedent in the local domain. Thus, Abe's analysis explains why *jibun* in (142) can refer only to *Daisy*. First, since the head NP of the Japanese RC is base-generated externally, the matrix subject NP *Daisy* and the head NP that contains the anaphor *jibun* are co-arguments. Second, as *jibun* is c-commanded by *Daisy*, it must be a core/pure anaphor and can only be bound by *Daisy*. By contrast, *jibun* in (141) must be a logophor because it is not c-commanded by its antecedent *John*.

The last remaining issue for Experiment 2 is that the participants might make choices based on their preference. As stated in White, Bruhn-Garavito, Kawasaki, Pater, and Prévost (1997), participants may reject an interpretation that is acceptable but less preferable in TVJTs that involve anaphor binding. Thus, it is quite possible that the anaphors *jibun* and *jibun-jishin* can take either the matrix subject or the RC subject as their antecedent and the matrix subject is just the preferred choice for the participants in Experiment 2. This issue will be addressed in the next chapter, where Experiment 3 is introduced. In Experiment 3, a set of fillers are included to monitor whether the participants make choices based on preference rather than acceptability.

5.6 Conclusion

There are three main approaches to the syntactic structure of Japanese RCs: (i) the *pro*-binding analysis, (ii) the operator movement analysis and (iii) the head-raising analysis. This study conducted a truth value judgment experiment to examine the interpretation of the simplex anaphor *jibun* 'self' and the complex anaphor *jibun-jishin* 'self-self' within the head NP of Japanese RCs. Experiment 2 tested the predictions that the existing three approaches make about the availability of the interpretation that the anaphor inside the head NP is co-referential with the RC subject. Such interpretation is predicted to be available under the head-raising analysis but unavailable under the head-base-generation analysis. Also, several previous studies claim that the interpretation in question is more

accessible with complex anaphors such as *jibun-jishin* than with the simplex anaphor *jibun.* The results of Experiment 2 imply that the anaphor inside the head NP of Japanese RCs, regardless of whether it is morphologically simplex or complex, cannot be interpreted as having the RC subject as its antecedent by native Japanese speakers. This finding provides empirical support for the head-base-generation analysis and fails to motivate the claim that the morphological make-up of an anaphor affects its ability to take the RC subject as its antecedent.

In summary, the findings from Experiment 2 discussed in this chapter support the head-base-generation derivation in Japanese RCs. That is, the head NP of Japanese RCs is base-generated external to the RC. Recall that in Chapter 4, an acceptability judgment experiment suggested that in Chinese RCs, there are two strategies to derive the head NP from the object position: when there is a gap, the head NP is raised out of the RC, whereas when there is an RP, the head NP is base-generated externally. In the next chapter, I investigate whether L1 Chinese learners of L2 Japanese can acquire the syntactic knowledge that the head NP of Japanese RCs can only be base-generated external to the RC. In other words, since L1 Chinese learners have both the head-raising and head-base-generation derivations to form Chinese RCs, I want to explore whether they can exclude the head-raising derivation as an option in their syntactic representation of Japanese RCs.

CHAPTER 6. THE L2 ACQUISITION OF JAPANESE RELATIVE CLAUSES BY L1 CHINESE LEARNERS

In Chapter 3, I reviewed one important motivation provided in Aoun and Li (2003) for the head-raising analysis of Chinese RCs with a gap: the subject-oriented anaphor *ziji* 'self' within the head NP of RCs can take the RC subject as its antecedent, which suggests the head NP can reconstruct into the RC at LF. Under the assumption that reconstruction effects obtain only with syntactic movement (Chomsky, 1993), we can infer that the head NP containing *ziji* is raised out of the RC. In contrast, for Chinese RCs with a resumptive pronoun (RP), the subject-oriented anaphor *ziji* within the head NP cannot be co-referential with the RC subject, which indicates that the head NP is base-generated external to the RC and does not reconstruct into the RC at LF. Moreover, the results of Experiment 1 in Chapter 4 suggest that in Chinese simple (i.e., one-level embedded) RCs, an RP is significantly less acceptable than a gap at both subject and object position, which suggests that the head-raising strategy is preferred over the head-base-generation strategy to derive the head NP from both subject and object positions of simple RCs in Chinese.

On the other hand, as discussed in Chapter 5, previous studies on Japanese RCs present conflicting intuitive judgments on whether a subject-oriented anaphor within the head NP can take the RC subject as its antecedent. While several studies claim that it cannot (e.g., Hasegawa, 1988; Hoji, 1985; Murasugi, 2000), some other studies argue that it can (e.g., Gunji, 2002; Hoshi, 2004; Ishizuka, 2010; Morita, 2013). To address this issue, Experiment 2 was conducted to examine whether the simplex anaphor *jibun* 'self' and the complex anaphor *jibun-jishin* 'self-self' within the head NP of Japanese RCs can be co-referential with the RC subject. The results suggest that neither of them does that. This finding supports the head-base-generation analysis of Japanese RCs[32] (e.g., Fukui & Takano, 2000; Kuno, 1973; Murasugi, 2000; Perlmutter, 1972).

Based on the findings in Chapter 4 and 5, we can conclude that Chinese and Japanese are different in terms of the available interpretations of the subject-oriented simplex

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[32] This chapter is restricted to Japanese and Chinese RCs that have a gap and do not involve any complex NP island.

anaphor inside the head NP of RCs with a gap: in Chinese, the anaphor *ziji* 'self' is co-indexed with the RC subject, whereas in Japanese, the anaphor *jibun* 'self' can never be co-indexed with the RC subject. This contrast is attributed to an underlying syntactic difference between Chinese and Japanese RCs with a gap: in Chinese, the head NP is raised out of the RC, whereas in Japanese, the head NP is base-generated external to the RC.

This difference between Chinese and Japanese RCs with a gap leads to an important question in the context of L2 acquisition: can L1 Chinese learners of L2 Japanese acquire the syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC? If the answer is 'yes,' this would strongly suggest that they are able to 'unlearn' the raising strategy that their L1 Chinese uses with RCs with a gap. In order to investigate whether they can acquire the target syntactic knowledge about Japanese RCs, I examined how L1 Chinese learners interpret the subject-oriented anaphor *jibun* 'self' within the head NP of Japanese RCs.

There are good reasons to believe that learners are not exposed to explicit evidence that the anaphor *jibun* cannot be co-indexed with the RC subject. First, Chinese and Japanese RCs are superficially similar as they are both pre-nominal and the subject-oriented anaphors *ziji* 'self' and *jibun* 'self' can both occur at a possessor position inside the head NP. It is difficult to think of a scenario where the constraint on the Japanese anaphor *jibun* can be made explicit based on the input from L1 Japanese speakers. Second, based on my consultation with Japanese instructors in China, the difference between Japanese and Chinese under discussion is never taught in Japanese language classrooms. Thus, if L1 Chinese learners are found to possess the target Japanese knowledge despite its underdetermined nature, it would strongly suggest that they are able to acquire the syntactic knowledge that the head NP of Japanese RCs is only base-generated external to the RC.

Whether or not the target syntactic knowledge in Japanese can be acquired by L1 Chinese learners has several implications for L2 research. As will be discussed in 6.2 below, the knowledge is predicted to be acquirable under the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996) but not under the 'partial access to UG' hypotheses (e.g., Hawkins & Chan, 1997; Tsimpli & Dimitrakopoulou, 2007).

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In order to understand how L1 Chinese learners interpret the anaphor *jibun* within the head NP of Japanese RCs, I conducted Experiment 3, a picture-matching truth value judgment experiment, with L1 Chinese learners of L2 Japanese and L1 Japanese speakers. The L1 Chinese learners of L2 Japanese were divided into two groups, an advanced level group and an intermediate level group, based on their Japanese language proficiency. The results suggest that most intermediate learners consistently accepted the co-reference between *jibun* and the RC subject, which implies that they used their L1 knowledge to project the structure of Japanese RCs. In contrast, the advanced learners made a distinction between Chinese and Japanese with respect to the interpretation of the subject-oriented anaphor within the head NP of RCs: they accepted the RC subject as an antecedent of *jibun* significantly less frequently than the RC subject as an antecedent of *ziji*. Specifically, six advanced learners consistently rejected the co-reference between *jibun* and the RC subject, which indicates that they have the native-like knowledge that *jibun* cannot be co-indexed with the RC subject. It further implies that they have successfully acquired the target syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC. This supports the Full Transfer/Full Access Hypothesis and argues against the 'partial access to UG' hypotheses.

In 6.1, I first briefly review the the head-raising analysis of Chinese RCs with a gap and the head-base-generation analysis of Japanese RCs with a gap. 6.2 discusses the L2 issues that this chapter aims to address. In 6.3, the difference between Chinese and Japanese with respect to the available interpretations of the subject-oriented anaphor within the head NP of RCs is reviewed. I demonstrate that the interpretation of the anaphor is more restricted in Japanese. This constraint in Japanese is underdetermined for L1 Chinese learners of L2 Japanese, as discussed in 6.4. In 6.5, some important shared properties between the Chinese anaphor *ziji* and the Japanese anaphor *jibun* are reviewed, based on which I argue that the two anaphors can be considered as equivalent to each other. In 6.6, a picture-matching truth value judgment experiment (Experiment 3) is introduced, followed by a discussion of its findings in 6.7. 6.8 will discuss the implications of the experimental results, which address many issues including (i) whether the L1 Japanese participants made their choices based on their preference rather than the acceptability, which is a remaining issue with Experiment 2, (ii) L1 transfer effects, (iii)

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the relationship between the Japanese proficiency level and the acquisition of the target knowledge, and (iv) possible ways L1 Chinese learners may acquire the target syntactic knowledge of the head derivation in Japanese RCs. 6.9 concludes the chapter.

6.1 The syntactic structures of Chinese and Japanese RCs

This section summarizes the syntactic structures of Chinese and Japanese RCs that were reviewed in Chapter 3. Under Kayne's (1994) Antisymmetry approach to word order and phrase structures, right-adjunction is disallowed, and post-nominal RCs such as those in English are analyzed as involving a complementation structure and an NP movement:

(143)   [$_{DP}$ the [$_{CP}$ book$_i$ [$_{C'}$ that [$_{IP}$ I bought t$_i$]]]]

Following Kayne' (1994) framework, Simpson (2002) and Wu (2000) argue that Chinese RCs also have a head-complement structure, where *de* is a determiner and takes a CP as its complement:

(144)   [$_{DP}$ [$_{IP}$ Xiaoming   mai   t$_i$]$_k$ de   [$_{CP}$ shu$_i$ [$_{C'}$ t$_k$]]]
                 Xiaoming   buy   DE   book
         'the book that Xiaoming bought'

However, Chinese RCs involve one more step in their derivation than English RCs, according to Simpson (2002): the embedded IP, which contains the trace of the raised head NP, moves to [Spec, DP] to check the uninterpretable features of the D.

   One crucial assumption that Simpson (2002) adopts in analyzing Chinese RCs under Kayne's (1994) framework of antisymmetry theory is that the head NP is raised to [Spec, CP], in parallel with English RCs:[33]

(145)   [$_{DP}$ [de [$_{CP}$ [$_{NP}$ shu$_i$] C^0 [$_{IP}$ Xiaoming mai t$_i$]
                DE   book   Xiaoming buy
         'the book that Xiaoming bought'

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[33] Aoun and Li (2003) provide several motivations to argue that the head NP is raised in Chinese RCs with a gap, which is reviewed in Chapter 3 of this dissertation.

According to Bianchi (2000), the raising of the head NP is triggered by the strong uninterpretable feature(s) of the external D. That is, the D has strong selectional phi features that have to be checked locally with an [+N] phrase.

The two-step derivation of the Chinese RC in (144) is illustrated in (146):

(146)
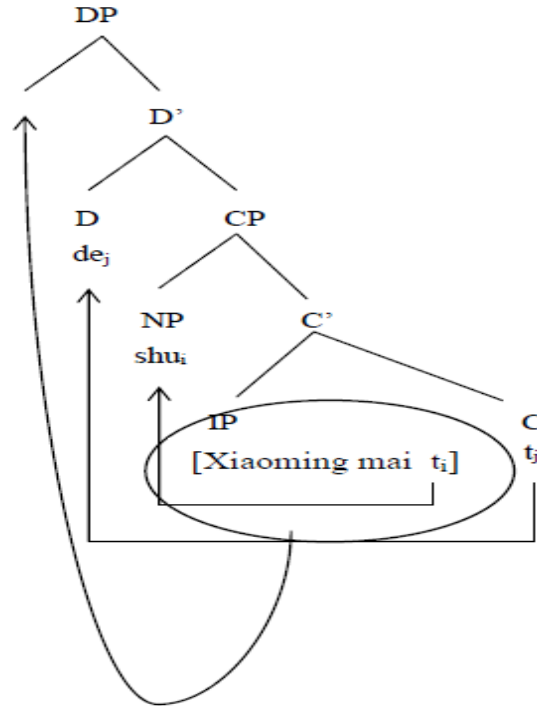
Fukui and Takano (2000) propose an analysis for the syntactic structure of Japanese RCs, by following Kayne's (1994) Antisymmetry approach. They claim that the RC is left-adjoined to the head NP in Japanese RCs, which is compatible with Kayne's proposal that only left-adjunction is allowed in the grammar. (147a) is an example, whose tree structure is in (147b):

(147a) [$_{CP}$ John-ga   kinoo   pro$_i$ mi-ta]   [$_{NP}$ syashin]$_i$
        John-NOM   yesterday   see-PST   picture
     'the/a picture that John saw yesterday.'   (Fukui & Nakano, 2000, p. 230)

(147b)

NP
├── CP
│   John-ga kinoo pro$_i$ mita
└── NP
      shashin$_i$
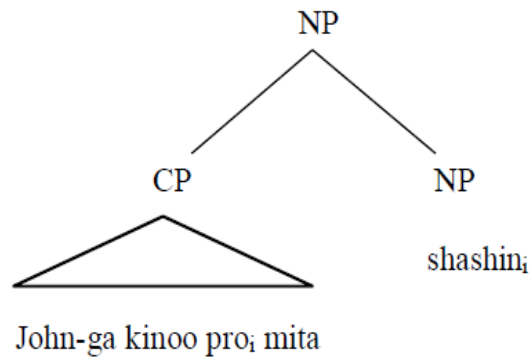
To summarize, according to previous studies, Chinese and Japanese RCs differ in how the head NP is derived: the head NP is raised out of the RC in Chinese but is base-generated externally in Japanese.

6.2 The L2 issues

By following Bianchi (2000), I assume that in Chinese RCs, the raising of the head NP is triggered by the feature-checking requirements of D. On the other hand, according to Fukui and Takano (2000), in Japanese RCs, there is no D and the RC is directly adjoined to a base-generated head NP. This difference leads to two important questions in the context of L2 acquisition:

(148a) When L1 Chinese learners learn Japanese RCs, do they initially use the head-raising strategy to project the structure of Japanese RCs?

(148b) If they do so, can they restructure their L2 grammar and adopt the head-base-generation strategy to project the structure of Japanese RCs?

The answers to the two questions have important implications for the L2 research.

First, if L1 Chinese learners initially use the head-raising strategy for Japanese RCs, a DP must be involved, which is predicted by the *full transfer* proposal that the entire L1 grammar is transferred to the L2 grammar in the initial state (Schwartz & Sprouse, 1994, 1996; see also Haznedar, 1997; Marsden, 2004; Slabakova, 2000; Yuan, 1998).

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Second, the existing L2 hypotheses make different predictions on whether or not L1 Chinese learners could reconstrue their initial analysis of Japanese RCs.

The Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996) states that UG, including the functional domain, is fully accessible for restructuring the L2 grammar in response to the properties of input. Thus, under this 'full access to UG' hypothesis, if L1 Chinese learners initially use the head-raising strategy for Japanese RCs, it would be possible for them to restructure the L2 grammar and adopt the head-base-generation strategy. In that case, the strong uninterpretable feature of D that triggers NP movement must be revised.[34]

On the other hand, under the 'partial access to UG' accounts, functional categories, along with their features, are confined to L1 and not accessible after a critical period (e.g., Hawkins & Chan, 1997; Smith & Tsimpli, 1995). In particular, according to the recent Interpretability Hypothesis (Tsimpli & Dimitrakopoulou, 2007), the set of uninterpretable features in UG cannot be accessed in adulthood. Thus, we predict that L2 learners would not be able to acquire new uninterpretable feature values that are different from those in their L1, and only the uninterpretable features that are instantiated in the L1 can be used to construct the L2 grammar. In the context of L1 Chinese learners learning Japanese RCs, if they initially use the head-raising strategy for Japanese RCs, they would not be able to restructure the grammar and adopt the head-base-generation strategy because the strong uninterpretable feature of D that is instantiated in their L1 cannot be revised. The same prediction is also made by the No Parameter Resetting Hypothesis (e.g., Smith & Tsimpli, 1995) and the Failed Functional Features Hypothesis (Hawkins & Chan, 1997), both of which claim that the functional domain of UG is not available in adult L2 acquisition.

In order to find out whether L1 Chinese learners of L2 Japanese can acquire the implicit syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC, I investigated whether they can acquire the underdetermined knowledge of the constraint that the anaphor *jibun* within the head NP of Japanese RCs disallows the RC subject as antecedent. By examining the acquisition of such underdetermined knowledge,

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[34] Although it is unclear whether such interlanguage development necessarily involves unlearning of the whole functional DP, we can be sure that the uninterpretable feature of D that triggers the raising of the head NP should be accessed and revised.

we can rule out many confounding factors such as positive evidence from L2 learners' input and explicit instruction in Japanese language classrooms.

In the next section, I review the available interpretations of the anaphor within the head NP of Chinese and Japanese RCs.

6.3 Interpretation of the anaphor within the head NP of RCs in Chinese and Japanese

As discussed in Chapter 3, whether an anaphor within the head NP of RCs can take the RC subject as its antecedent is a commonly applied diagnostic to test the derivation of the head NP in RCs (e.g., Aoun & Li, 2003; Bhatt, 2002; Schachter, 1973). Indeed, the syntactic difference between Chinese and Japanese with regard to the head derivation in RCs has been partially motivated by the available interpretations of an anaphor within the head NP.

For Chinese RCs, Aoun and Li (2003) claim that the simplex anaphor *ziji* 'self' within the head NP of an RC can refer to either the RC subject or the matrix subject, as in (149):

(149) [Zhangsan$_k$ kanjian-le [[Xiaoming$_i$ kai   t$_j$ lai   de] [ziji$_{i/k}$-de   chezi]$_j$]]
        Zhangsan see-LE   Xiaoming   drive   over DE self-GEN   car
      'Zhangsan$_k$ saw self$_{i/k}$'s car that Xiaoming$_i$ drove over.' (Aoun & Li, 2003, p. 132)

In (149), the anaphor *ziji* can be bound by either the RC subject *Xiaoming* or the matrix subject *Zhangsan.* Aoun and Li argue that the co-reference between the anaphor and the RC subject indicates that the head NP can reconstruct into the RC at LF. Under the assumption that reconstruction occurs only when syntactic movement is involved (Chomsky, 1993), the head NP of Chinese RCs must be raised from within the RC.

For Japanese RCs, the results of Experiment 2 discussed in Chapter 5 suggest that neither the simplex anaphor *jibun* 'self' nor the complex anaphor *jibun-jishin* 'self-self' within the head NP of an RC can be co-indexed with the RC subject, which implies that the head NP is base-generated external to the RC and cannot be interpreted within the RC at LF. As in (150a) and (150b), the anaphor can refer only to the matrix subject *Daisy*, regardless of whether it is morphologically simplex or complex:

(150a) Daisy_j-ga [[Mickey_k-ga e_i arat-ta] [jibun_{j/∗k}-no booshi]_i]-o yogoshi-ta.
       Daisy-NOM   Mickey-NOM   wash-PST   self-GEN   hat-ACC   stain-PST
       'Daisy_j stained self_{j/∗k}'s hat that Mickey_k washed.'

(150b) Daisy_j-ga [[Mickey_k-ga e_i arat-ta] [jibun-jishin_{j/∗k}-no booshi]_i]-o yogoshi-ta.
       Daisy-NOM   Mickey-NOM   wash-PST self-GEN   hat-ACC   stain-PST
       'Daisy_j stained self_{j/∗k}'s hat that Mickey_k washed.'

Thus, we can see Chinese and Japanese differ in terms of the available interpretations of an anaphor inside the head NP of RCs: in Chinese, the anaphor can be co-indexed with either the matrix subject or the RC subject, whereas in Japanese, the anaphor can only be co-indexed with the matrix subject. This difference is summarized in Table 9.

Table 9. Antecedent of an anaphor within the head NP of Chinese and Japanese RCs

Language	Matrix subject	RC subject
Chinese	Yes	Yes
Japanese	Yes	**No**

Hence, Japanese is more restrictive than Chinese regarding the available interpretations of an anaphor within the head NP of RCs.

6.4 Underdetermined knowledge for L1 Chinese learners of L2 Japanese

Given that Japanese is more restrictive than Chinese with respect to the available interpretations of an anaphor within the head NP of RCs, for L1 Chinese learners of L2 Japanese, the knowledge of such a constraint in Japanese is underdetermined (See Schwartz & Sprouse, 2000, 2013, 2017). This is because: (i) there is no positive evidence from input that directly exhibits the constraint that the anaphor within the head NP cannot refer to the RC subject; (ii) based on my consultation with Japanese instructors in China, there is no classroom instruction about the interpretation of the anaphor within the head NP of Japanese RCs. In addition, the co-indexation between the anaphor and the RC subject is possible in learners' L1 Chinese. Therefore, L1 Chinese learners of L2 Japanese are faced with a challenging task of coming to know that what is permitted in their L1 Chinese is actually prohibited in the L2 without any direct evidence. Importantly, if they are found to possess this piece of knowledge, it would strongly

suggest that they have acquired the target syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC.

By following the above logic, this chapter explores the following two specific research questions, (151a) and (151b), with a controlled truth value judgment experiment (Experiment 3):

(151a) Are there L1 transfer effects when L1 Chinese learners of L2 Japanese interpret the anaphor *jibun* within the head NP of Japanese RCs?

(151b) Can L1 Chinese learners of L2 Japanese acquire the knowledge that the anaphor *jibun* within the head NP of Japanese RCs cannot have the RC subject as antecedent?

In addition, a Japanese proficiency test (Marsden, 2004) was used to assess the L2 participants' Japanese proficiency, based on which the L2 participants were categorized as advanced learners and intermediate learners. Before going into the details of the experiment, however, I would like to discuss some properties shared between the Chinese anaphor *ziji* 'self' and the Japanese anaphor *jibun* 'self.'

6.5 The Chinese anaphor *ziji* and the Japanese anaphor *jibun*

Ziji and *jibun* are the most representative anaphors in Chinese and Japanese (e.g., Tsujimura, 1996; Yu, 2000), and they share several similarities.

First, *ziji* and *jibun* lack specification of phi features (Aikawa, 2002; Huang et al., 2009) including person and gender features. As in (152a) and (152b), both *ziji* and *jibun* can take the first person pronoun *wo/watashi* 'I', *John* or *Mary* as their antecedent, which suggests that *ziji* and *jibun* do not have to agree with the antecedent in person and gender features.

(152a) wo_i/$John_j$/$Mary_k$ piping-le $ziji_{i/j/k}$.   (Chinese)
        I/John/Mary   blame-LE   self
        'I_i/$John_j$/$Mary_k$ blamed $myself_i$/$himself_j$/$herself_k$.'

(152b) watashi$_i$/John$_j$/Mary$_k$-ga   jibun$_{i/j/k}$-o   seme-ta.   (Japanese)

       I/John/Mary-NOM   self-ACC   blame-PST

       'I$_i$/John$_i$/Mary$_k$ balmed myself$_i$/himself$_j$/herself$_k$.'   (Aikawa, 2002, p. 157)

Second, neither *ziji* nor *jibun* can take an inanimate NP as its antecedent, as in (153a) and (153b):

(153a) *na-fen   baozhi$_i$ zaifengzhong   dakai-le   ziji$_i$.   (Chinese)

       that-CL   newspaper   in wind   unfold-LE   itself

       'That newspaper$_i$ unfolded itself$_i$ in the wind.'

(153b)* sono shinbun$_i$-wa   kaze-de jibun$_i$-o   hiroge-ta.   (Japanese)

       that   newspaper-TOP   wind-by   self-ACC   unfold-PST

       'That newspaper$_i$ unfolded itself$_i$ in the wind.'

                                   (Aikawa, 2002, p. 157, slightly modified)

Third, both *ziji* and *jibun* allow long-distance binding. In (154a) and (154b), *ziji* and *jibun* can be bound by the NP *John*, which is located outside of the clause in which the anaphor occurs:

(154a) John$_i$ shuo Bill$_j$ biaoyang-le ziji$_{i/j}$.   (Chinese)

       John   say   Bill   praise-LE   self

       'John$_i$ said that Bill$_j$ praised self$_{i/j}$.'

(154b) John$_i$-ga   Bill$_j$-ga   jibun$_{i/j}$-o   home-ta   to   it-ta. (Japanese)

       John-NOM Bill-NOM self-ACC   praise-PST   COMP say-PST

       'John$_i$ said that Bill$_j$ praised self$_{i/j}$.'

Fourth, both *ziji* and *jibun* are subject-oriented (Aikawa, 2002; Huang et al., 2009).[35] As in (155a) and (155b), *ziji* and *jibun* can be bound only by the subject NP *John*:

(155a) John$_i$ yijing   tongzhi Bill$_j$ ziji$_{i/*j}$-de fenshu   le.   (Chinese)

       John   already inform Bill   self-GEN   grade   LE

       'John$_i$ already told Bill$_j$ his$_{i/*j}$ grade.'   (Huang et al., 2009, p. 337)

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[35] Several studies (e.g., Hara, 2002; Kameyama, 1984) present examples showing that *jibun* can be bound by a non-subject antecedent. However, Kishida (2011) argues that *jibun* in those examples should be considered logophors/exempt anaphors rather than anaphors. On the other hand, Pollard and Xue (2001) note that *ziji* can also refer to a non-subject antecedent when the antecedent is prominent in the discourse. I leave this issue open.

(155b) John$_i$-ga Bill$_j$-ni jibun$_{i/*j}$-nitsuite hanashi-ta.   (Japanese)
John-NOM Bill-DAT self-about   tell-PST
'John$_i$ told Bill$_j$ about himself$_{i/*j}$.'   (Aikawa, 2002, p. 157)

Fifth, *ziji* can be free and interpreted as referring to the speaker (Yu, 1992), as in (156a).
Jibun also has the same function in some dialects of Japanese (Aikawa, 2002), as in
(156b).

(156a) zhe nanren yiding dui ziji you yisi.   Buran   weishenme lao   wang
this man   must   to self have interest otherwise why   always to
zher kan?   (Chinese)
here look
'This man must be interested in me; otherwise why does he keep looking this
way?'   (Huang et al., 2009, p. 332)

(156b) John-ga   jibun-o   seme-ta.   (Japanese)
John-NOM   self-ACC blame-PST
'John$_i$ blamed me/himself$_i$.'   (Aikawa, 2002, p. 158)

Sixth, Aikawa (2002) observed that *jibun* can be the head NP of Japanese RCs, as in
(157b), and *ziji* has the same property, as in (157a).

(157a) John bu xihuan yizhi   dui ren   lengmo de   ziji.   (Chinese)
John not like   always to people cold   DE   self
'John does not like himself, who is always cold to people.'

(157b) John$_i$-wa Mary-ni   tsumetaku atat-ta   jibun$_i$-o   seme-ta.   (Japanese)
John-TOP Mary-DAT cold   treat-PST self-ACC   blame-PST
'John blamed himself, who was hard on Mary.'   (Aikawa, 2002, p. 158)

To sum up, *ziji* and *jibun* share at least six properties, which are summarized in Table 10.
Considering these similarities, I assume that the two anaphors are the closest equivalents
to each other in the two languages.

Table 10. Similarities between the Chinese anaphor *ziji* and the Japanese anaphor *jibun*

Properties	Chinese *ziji*	Japanese *jibun*
lack of phi features	yes	yes
being compatible with an inanimate antecedent	no	no
allowing long-distance binding	yes	yes
being subject-oriented	yes	yes
being able to refer to the speaker	yes	yes
being able to be the head NP	yes	yes

Moreover, according to the Japanese instructors in China that I consulted with, *jibun* is always translated to *ziji* in Japanese language textbooks. As shown in Table 10 that there are as many as six properties shared between *ziji* and *jibun*, it would not be suprising if L1 Chinese learners initially use their knowledge of *ziji* to interpret the anaphor *jibun* inside the head NP of Japanese RCs. But the question is whether they can ultimately come to know that the interpretation of *jibun* is actually more restricted than that of *ziji* inside the head NP of RCs.

In the following section, I introduce the details of Experiment 3, which was created to investigate how L1 Chinese learners of L2 Japanese interpret the anaphor *jibun* within the head NP of Japanese RCs, in order to understand whether they can acquire the syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC.

6.6 Experiment 3

This section presents the design of Experiment 3, which aimed to address the two research questions (151a) and (151b), repeated as (158a) and (158b):

(158a) Are there L1 transfer effects when L1 Chinese learners of L2 Japanese interpret the anaphor *jibun* within the head NP of Japanese RCs?

(158b) Can L1 Chinese learners of L2 Japanese acquire the knowledge that the anaphor *jibun* within the head NP of Japanese RCs cannot have the RC subject as antecedent?

6.6.1 Participants

A total of 81 L1 Chinese learners of L2 Japanese and 31 L1 Japanese speakers participated in the experiment.[36] The L2 participants were 2nd-year, 3rd-year and 4th-year undergraduate students majoring in Japanese from three different universities in Southwest China. The L1 Japanese participants were undergraduate students from one university in Japan. The background information survey shows that one of them lived in the US between the age of 2 and 13 and another was a heritage speaker of Chinese, who arrived in Japan at the age of 5, so their data were excluded. In addition, the data from one L1 Japanese participant and 12 L2 participants were excluded for reasons that will be discussed in 6.7.3.

Marsden's (2004) Japanese cloze test was adopted to assess the L2 participants' Japanese proficiency. For reasons to be discussed in Section 6.4.4, I chose 15 out of 42 as the minimal score to select advanced learners. The background information of all participants is summarized in Table 11.

Table 11. Participants' background information in Experiment 3 (means, ranges and SDs)

Group	n	Age	Onset age of Japanese	Months in Japan	Japanese test score
Intermediate	34	19.91 (19-22; 0.93)	18.05 (17-20; 0.65)	1.09 (0-13; 2.86)	11.82 (5-14; 2.33)
Advanced	35	21.20 (19-24; 1.11)	18.17 (17-20; 0.66)	1.46 (0-12; 3.56)	17.86 (15-25; 2.43)
Native	28	n/a	n/a	n/a	n/a
Total	98				

The L2 participants' age ranged from 19 to 24 and no one had any experience of living outside China before entering the university. Some participants studied Japanese as exchange students in Japan after they entered their university, and their stay was maximally one year.

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[36] A total of 116 L2 participants were recruited but only 81 of them were able to finish all 3 tasks of this experiment. Some participants did not show up in our second meeting because of their schedule. In addition, a total of 31 L1 Japanese participants were recruited. 18 of them also participated in Experiment 2, which was done 2 months before Experiment 3.

6.6.2 Design and materials

A Japanese version of a picture-matching truth value judgment task (TVJT) was first created, based on which an equivalent Chinese TVJT was also created. Each Japanese sentence in the Japanese TVJT was closely translated into Chinese in the Chinese TVJT.

Just like Experiment 2, four Disney characters, *Mickey*, *Minnie*, *Donald* and *Daisy*, were used in the materials. Participants were informed that all Disney characters liked to put their face photos on their belongings. That is to say, the face photo indicates the owner of the object. For example, in (159a), there is a face photo of *Mickey* on the hat, which means it belongs to *Mickey*.

(159) a.   b.

For each experimental stimulus, the participants saw a picture like (159a) and (159b) and a sentence on a computer screen. The Japanese and Chinese sentences presented with the pictures in (159a) and (159b) are shown in (160a) and (160b):

(160a) Daisy$_j$-ga   Mickey$_k$-ga   arat-ta   jibun$_{j/*k}$-no booshi-o   yogoshi-ta.
         Daisy-NOM Mickey-NOM   wash-PST self-GEN   hat-ACC   stain-PST
         'Daisy$_j$ stained self's$_{j/*k}$ hat that Mickey$_k$ washed.'

(160b) Daisy$_j$ nongzang-le Mickey$_k$ xi   de   ziji$_{j/k}$-de maozi.
         Daisy stain-LE   Mickey   wash DE   self-DE   hat
         'Daisy$_j$ stained self$_{j/k}$'s hat that Mickey$_k$ washed.'

Participants were asked to judge whether the sentence and the picture matched by selecting one of two choices: 'match' or 'mismatch' in respective languages. Importantly, in order for (160a) and (160b) to match (159a), *jibun-no booshi* 'self's hat' in (160a) and *ziji de maozi* 'self's hat' in (160b) must be interpreted as *Mickey's hat*. In other words,

the antecedent of the anaphor must be the RC subject. On the other hand, (159b) indicates that the hat belongs to *Daisy*. Thus, in order for (160a) and (160b) to match it, *jibun-no booshi* 'self's hat' in (160a) and *ziji de maozi* 'self's hat' in (160b) must be interpreted as *Daisy's hat*. That is, the antecedent of the anaphor must be the matrix subject.

To sum up, the intended antecedent of the anaphor is either the matrix subject or the RC subject, depending on the picture. This factor (*Antecedent Position*) results in two critical conditions: (i) a picture is such that the anaphor is intended to refer to the matrix subject (*Jibun*/*Ziji*-Matrix) and (ii) a picture is such that the anaphor *jibun* is intended to refer to the RC subject (*Jibun*/*Ziji*-RC).

Based on previous literature and the results of Experiment 2 discussed in Chatper 5, the L1 speakers' results are expected to be different between the Japanese and Chinese TVJTs. First, in Chapter 5, the results of Experiment 2 suggested that the anaphor *jibun* 'self' within the head NP of Japanese RCs cannot be co-indexed with the RC subject. Therefore, in Experiment 3, a similar result is predicted for the L1 Japanese participants: the items of *Jibun*-RC would be rejected while those of *Jibun*-Matrix would be accepted. In contrast, according to Aoun and Li (2003), the anaphor *ziji* 'self' within the head NP of Chinese RCs with a gap should be able to be co-indexed with either the RC subject or the matrix subject. Therefore, we predict that the items of both *Ziji*-Matrix and *Ziji*-RC would be accepted by the L1 Chinese participants.

A total of 24 sentences of different lexicalizations were created. 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 2 lists so that there were 24 critical items in each list, each of which contained only one condition from the same lexicalization.

In addition to the critical items, two types of fillers (Type 1 and Type 2 fillers) were created: the Type 1 fillers involved 24 items and the Type 2 fillers involved 12 items. First, each of the Type 1 fillers had a ditransitive verb and an anaphor embedded inside the direct object NP. The two conditions for one item are shown below:

(161) a.   b.

The Japanese and Chinese sentences paired with the pictures are shown in (162a) and (162b):

(162a) Mickey$_j$-ga   Daisy$_k$-ni   jibun$_{j/*k}$-no   hon-o   watashi-ta.
      Mickey-NOM   Daisy-DAT   self-GEN   book-ACC   hand over-PST
      'Mickey$_j$ handed over self's$_{j/*k}$ book to Daisy$_k$.'

(162b) Mickey$_j$ di   gei Daisy$_k$ le   ziji$_{j/*k}$-de   shu
      Mickey   hand over to Daisy   LE   self-GEN   book
      'Mickey$_j$ handed over self$_{j/*k}$ book to Daisy$_k$.'

Since both *jibun* and *ziji* are subject-oriented, the anaphors in both (162a) and (162b) can refer only to the subject NP *Mickey*, not the dative NP *Daisy*. There were two conditions for the Type 1 fillers: a matching condition where a picture was such that the anaphor was intended to be bound by the subject NP (J(apanese)F(iller)1/C(hinese)F(iller)1-Subject) and a mismatching condition where a picture was such that the anaphor was intended to be bound by the indirect object NP (JF1/CF1-Dative). The Type 1 fillers were used to monitor (i) whether the L1 and L2 participants knew how to do the task, (ii) whether they paid enough attention to the experimental items, (iii) whether the L1 participants had the expected subject-orientation for *jibun* and *ziji*, and (iv) whether the L2 participants knew that *jibun* is subject-oriented. Based on the binominal distribution, out of 12 items, participants were expected to accept 9 items or more in JF1/CF1-Subject and accept 3 items or fewer in JF1/CF1-Dative.

In addition, there were 12 Type 2 fillers. For each of the Type 2 fillers, the anaphor had two possible interpretations. One item with its two conditions is shown below:

(163) a.   b.

The Japanese and Chinese sentences below the pictures are shown in (164a) and (164b):

(164a) Daisy$_j$-ga   Mickey$_k$-ga   jibun$_{j/k}$-no kaban-o huita-no-o   mi-ta.
       Daisy-NOM Mickey-NOM self-GEN   bag-ACC wipe-PST-NO-ACC see-PST
       'Daisy$_j$ saw Mickey$_k$ wipe self$_{j/k}$'s bag.'

(164b) Daisy$_j$ kanjian Mickey$_k$ ca-le   ziji$_{j/k}$-de   shubao.
       Daisy see   Mickey   wipe-LE   self-GEN   bag
       'Daisy saw Mickey wipe self's bag.'

In (164a) and (164b), both *jibun* and *ziji* can refer to either the matrix subject or the embedded subject. There were two conditions for the Type 2 fillers: (i) one condition where a picture was such that the anaphor was intended to refer to the matrix subject NP (JF2/CF2-Matrix) and (ii) one condition where the picture was such that the anaphor was intended to refer to the embedded subject NP (JF2/CF2-Embedded). Since both *jibun* and *ziji* can refer to either the matrix subject or the embedded subject, participants were expected to accept all items in both conditions. The Type 2 fillers were created to check whether the L1 Japanese and L1 Chinese participants knew that in a given sentence with ambiguous interpretations, as long as there was an interpretation that matched the picture, the item should be accepted. That is, the Type 2 fillers were used to monitor whether participants made judgments based on acceptability rather than preference. Based on the binominal distribution, out of 6 items, participants were expected to accept 5 items or more in both JF2/CF2-Matrix and JF2/CF2-Embedded. If they did so, we can rule out the possibility that they made judgments based on preference. Moreover, the Type 2 fillers in the Japanese TVJT were also used to monitor whether the L2 participants used an

irrelevant strategy to make judgments. Since the RC subject in *Jibun*-RC is also an embedded subject, if a participant consistently rejected the items of *Jibun*-RC and JF2-Embedded, she might have been using an irrelevant strategy to always reject the items where the anaphor *jibun* was intended to refer to the embedded subject. A complete list of stimuli can be found in Appendix C.

6.6.3 Procedure

All L2 participants were asked to complete three tasks: the Japanese proficiency test, the Japanese TVJT and the Chinese TVJT. The participants completed the Japanese proficiency test and the Chinese TVJT on the same day; they did the Japanese TVJT two weeks later. The Japanese proficiency test was done in paper-and-pencil format while the Chinese and Japanese TVJTs were done with a computer in a computer lab. Each participant was given the same type of list in Chinese and Japanese, which means the participants who had seen List 1 in the Chinese TVJT were given List 1 in the Japanese TVJT and those who had seen List 2 in the Chinese TVJT were given List 2 in the Japanese TVJT. This was done to make individuals' Chinese and Japanese data comparable.The total time for each L2 participant to finish all three tasks was about one hour and a half.

All L1 Japanese participants were asked to complete the computerized Japanese TVJT in a computer lab. The total time for them to finish the task was about 20 minutes. All L1 and L2 participants were given extra course credit after completing the experiment.

Before starting the actual experiment, all participants were asked to complete a background information survey, which inquired about the following information: (i) name, (ii) age, (iii) native language(s), (iv) any other language(s) that they can speak fluently, (v) any experience of living abroad and (vi) at what age they started learning Japanese. Then they were shown the four Disney characters, *Mickey*, *Minnie*, *Donald*, and *Daisy*, followed by four simple questions to confirm that they were familiar with the characters. Two examples were then presented, which were used to familiarize participants with the picture-matching TVJT. The sentences in the two examples were

structurally different from those in the critical items and fillers. One example is shown below:

(165)

The Japanese and Chinese sentences below the picture (165) are in (166a) and (166b):

(166a) Donald$_i$-ga   Minnie$_j$-no tonari-de jibun$_{i/*j}$-no dentaku-o   kowashi-ta.
       Donald-NOM Minnie-GEN next-at   self-GEN   calculator-ACC   break-PST
       'Donald broke his own calculator next to Minnie.'

(166b) Donald$_i$ zai Minnie$_j$-de   pangbian nonghuai-le   ziji$_{i/*j}$-de jisuanqi.
       Donald at Minnie-GEN next   break-PST   self-GEN calculator
       'Donald broke his own calculator next to Minnie.'

In order for (166a) and (166b) to match (165), *jibun-no dentaku* and *ziji de jisuanqi*, both meaning 'self's calculator,' should be interpreted as *Minnie's calculator*. However, in (166a) and (166b), since *jibun* and *ziji* are subject-oriented, the *calculator* should only be interpreted as *Donald's calculator*. Thus, participants were expected to choose 'mismatch.' In another example, they were expected to choose 'match.'

    After the demonstration of how to do the TVJT, the participants continued to see a set of examples, which was created to help them understand the rule that they should choose 'match' as long as there was one possible interpretation of the given sentence that matched the given picture. This is important because in TVJTs that involve anaphor binding like this experiment, participants may reject an interpretation that is acceptable

but less preferable (White et al., 1997). There were three examples, all of which share the same sentence in Japanese or Chinese. [37]

(167) a.   b.   c.

The Japanese and Chinese sentences, (168a) and (168b), were shown with each of the three pictures in (167):

(168a) Mickey$_j$-ga Daisy$_k$-ni Donald$_i$-ga jibun$_{j/*k/i}$-no hamigakiko-o tsukat-ta
Mickey-NOM Daisy-DAT Donald-NOM self-GEN toothpaste-ACC use-PST
to it-ta.
COMP say-PST
'Mickey$_j$ said to Daisy$_k$ that Donald$_i$ used self$_{j/*k/i}$'s toothpaste.'

(168b) Mickey$_j$ gei Daisy$_k$ shuo Donald$_i$ yong-le ziji$_{j/*k/i}$-de yagao.
Mickey to Daisy say Donald use-PST self-GEN toothpaste
'Mickey$_j$ told Daisy$_k$ that Donald$_i$ had already used self$_{j/*k/i}$'s toothpaste.'

In (168a) and (168b), three characters, *Mickey*, *Daisy* and *Donald*, are involved. The anaphors *jibun* and *ziji* can be co-indexed with either *Mickey* or *Donald*, but not *Daisy,* due to their subject-oriented property. Participants saw the three pictures (167a), (167b) and (167c) consecutively, each of which was combined with (168a)/(168b). First, (168a) was presented and the participants were asked to click on 'match' after understanding that *jibun-no hamigakiko* 'self's toothpaste' can be interpreted as *Mickey's toothpaste*. Next, (168b) was shown and the participants were asked to click on 'mismatch' after understanding that *jibun-no hamigakiko* 'self's toothpaste' cannot be interpreted as

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[37] This sentence is syntactically different from the Type 2 fillers because it involves a complementizer *to,* a verb *iu* 'to say,' and an additional dative NP.

Daisy's toothpaste. Last, (168c) was presented and the participants were asked to click on 'match' after understanding that *jibun-no hamigakiko* 'self's toothpaste' can be interpreted as *Donald's toothpaste*. During the demonstration of the three examples, no words such as 'ambiguity' or 'preference' were used. After seeing the examples, participants continued to practice four trials of the experimental items before being presented with the actual ones. No feedback or explicit instruction was given with the practice trials.

Three additional procedures were used to minimize potential difficulties that the L2 participants might experience with reading and understanding the sentences of the critical items in the Japanese TVJT. First, I confirmed with the L2 participants' Japanese instructors that all vocabulary items and structures used in the Japanese TVJT had been covered in class.[38] Second, the L2 participants were asked to inform the experimenter immediately if they encountered any unknown words or expressions in the task. Third, in order to ensure that each L2 participant could read and understand Japanese sentences with an embedded RC, such as those in the critical items of the Japanese TVJT, I asked each participant to orally translate the following two Japanese sentences, (169a) and (169b), into Chinese, which are structurally similar to those in the critical items:

(169a) Taro-ga   Hanako-ga   kat-ta   chocoreito-o   tabe-ta.
        Taro-NOM   Hanako-NOM   buy-PST   chocolate-ACC   eat-PST
        'Taro ate the chocolate that Hanako bought.'

(169b) Shizuko-ga   Makoto-ga   otoshi-ta   keitai-o   hirot-ta.
        Shizuko-NOM   Makoto-NOM   drop-PST   cellphone-ACC   pick up-PST
        'Shizuko picked up the cellphone that Makoto dropped.'

All L2 participants were able to translate the two Japanese sentences into Chinese, which suggests that they had no problem in understanding the sentences in the critical items of the Japanese TVJT.

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[38] According to the Japanese instructors that I consulted with, relative clauses were introduced in the 2nd semester of the 1st year in the 4-year Japanese-major program. The L2 participants were 2nd, 3rd and 4th year Japanese major students. Also, the experiments were administered in May and June of 2016, the 2nd semester of the academic year in Chinese universities.

In order to see whether the L2 participants made a distinction between Japanese and Chinese regarding the available interpretations of an anaphor within the head NP of RCs, their Japanese and Chinese data were compared and analyzed by two-way repeated ANOVA measures and pairwise comparisons. The L1 Japanese participants' data were analyzed by pairwise comparisons. In addition, all individual participants' judgments were examined, based on which we can identify how many individuals have knowledge of the constraint on *jibun* within the head NP of Japanese RCs.

6.6.4 Japanese Proficiency Test

The Japanese cloze test from Marsden (2004) was adopted to assess L2 participants' Japanese proficiency. This test was created by removing every 7th word from a passage in *Nihongo Journal* (2002), where participants were asked to fill in a total number of 42 blanks with appropriate words.[39] The L2 participants in this study were not informed that it was a proficiency test. A maximum of 30 minutes was given to complete the test. At the beginning of the test, three trials were used to demonstrate the types of missing words in the passage, which can be a particle like *ga*, a noun like *denwa* 'phone,' or a conjugated verb such as *itta* 'went.' The proficiency test can be found in Appendix D.

In Marsden's (2004) study, the exact-word measurement was used to rate participants' answers, which means participants had to fill in each blank with the exact word from the original text. In Marsden's study, 30 native speakers of Japanese took the test as native controls. The full score was 42 and their results are summarized in Table 12.

Table 12. Summary of Japanese natives' scores in the proficiency test of Marsden (2004)

Scores / Participants	Lowest score	Highest score	Group mean	Standard deviation
Japanese natives (n=30)	12	33	22.4	4.43

The lowest score was 12, which Marsden (2004) took as the minimal score to select advanced learners. In other words, the L2 participants who scored 12 or more were categorized as advanced learners in her study. However, by further examining the native

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[39] *Nihongo Journal* is a magazine designed for learners of Japanese.

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Japanese participants' scores, I found that the score of 12 was an outlier since it fell outside the lower inner fence (12.88) of the data set, as indicated by the lower white circle in the following boxplot:
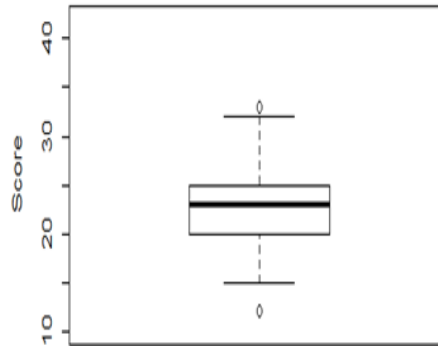

Figure 8. Distribution of the Japanese natives' proficiency test scores in Marsden (2004)

Thus, I took the second lowest score 15 as the minimal score to select advanced learners for this study. The L2 participants' proficiency scores are summarized in Table 13.

Table 13. Summary of the L2 participants' scores of the Japanese proficiency test

Scores ⟍ Participants	Lowest score	Highest score	Group mean	Standard deviation
L2 participants (n=69)	5	25	14.89	3.82

The L2 participants who scored 15 or higher in the test were categorized as advanced learners. Those who scored less than 15 were categorized as intermediate learners. There were 35 advanced learners and 34 intermediate learners.

6.7 Findings from Experiment 3

In this section, L1 Japanese participants' results are reported first, followed by L2 participants' results of the Chinese and Japanese TVJTs.

Before discussing the core findings, a few remarks about the participants' performance with the filler items are in order. Recall that the Type 1 fillers in Japanese and Chinese TVJTs were used to check (i) whether the L1 and L2 participants understood how to do the task, (ii) whether they paid enough attention to the experimental items, (iii)

whether the L1 participants had expected subject-orientation for *jibun* and *ziji*, and (iv) whether the L2 participants knew the Japanese anaphor *jibun* was subject-oriented. Based on the binominal distribution, out of 12 items, the participants were expected to accept 9 items or more in JF1/CF1-Subject and accept 3 items or fewer in JF1/CF1-Dative. It turned out that one L1 Japanese participant and three L2 Japanese participants failed to do so in the Japanese TVJT and five L2 participants failed to do so in the Chinese TVJT. Therefore, their data were removed before the statistical analysis.

Furthermore, the Type 2 fillers were created to check whether the L1 Japanese and L1 Chinese participants had understood the rule that in a given sentence with two possible interpretations, as long as there is an interpretation that matches the picture, the item should be accepted. For the L1 Chinese participants, they must obey the rule in the Chinese TVJT because in each critical item, the given sentence had two possible interpretations. Although the given pictures differed, all items should be accepted because there was always an interpretation that matched the picture. Therefore, the Type 2 fillers in the Chinese TVJT, which were all expected to be accepted (CF2-Matrix/CF2-Embedded), were used to monitor whether the L1 Chinese participants obeyed the rule. Since there were six items in each condition of the Type 2 fillers, based on the binominal distribution, participants should accept five or more items. The results reveal that three L1 Chinese participants failed to do so and their data were removed.

To summarize, the data from 28 L1 Japanese participants and 35 advanced and 34 intermediate L2 Japanese participants were left for further analysis.

6.7.1 Results of L1 Japanese participants

Data from 28 L1 Japanese participants were analyzed. Recall that there were two critical conditions: (i) *Jibun*-Matrix where the given picture indicates that the anaphor *jibun* should be co-indexed with the matrix subject and (ii) *Jibun*-RC where the given picture indicates that the anaphor *jibun* should be co-indexed with the RC subject. The mean frequencies of the participants' 'match' answers in the two conditions are shown in Figure 9.
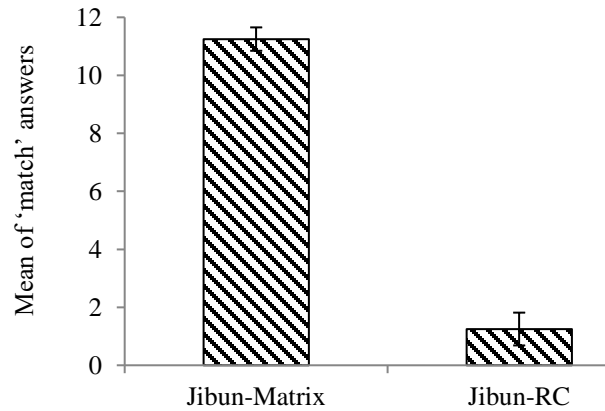
Figure 9. L1 Japanese participants' judgments of *Jibun*-Matrix and *Jibun*-RC in the Japanese TVJT

Figure 9 suggests that there was a clear difference in the mean frequencies of match answers between the *Jibun*-Matrix condition and the *Jibun*-RC condition. The mean frequency of the match answers for the *Jibun*-Matrix condition was 11.25/12 (SD = 1.11, SE = 0.21) and that of the *Jibun*-RC condition was 1.25/12 (SD = 1.55, SE = 0.29). Pairwise comparison tests were perfomed on both participant (t_1) and item (t_2).The results show a significant difference between the mean frequencies of the match answers for the two conditions in the participant analysis ($t_1(27) = 22.76, p < .01$) and the item analysis ($t_2(23) = 26.67, p < .01$).

The individual participants' judgments were also examined. Since there were 12 items in each condition, based on the binominal distribution, we can be sure that participants made consistent judgments if they accepted or rejected nine items or more out of 12. The results reveal that within the *Jibun*-Matrix condition, 27 out of the 28 (96.4%) participants accepted nine items or more and the remaining participant accepted eight items. On the other hand, within the *Jibun*-RC condition, 24 out of 28 (85.7%) participants rejected nine items or more and all participants rejected seven items or more. The details of individual participants' judgments are shown in Figure 10.
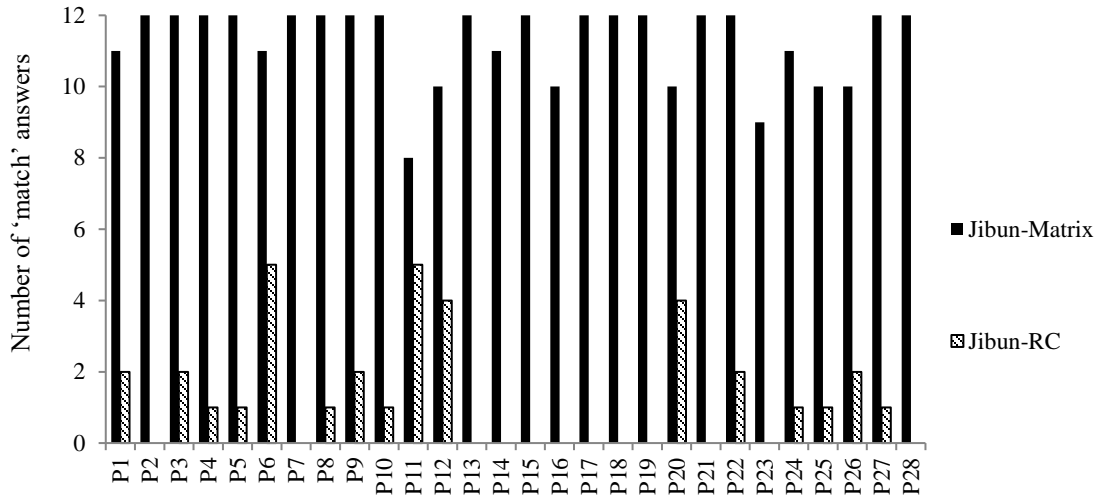
Figure 10. Individual L1 Japanese participants' judgments of *Jibun*-Matrix and *Jibun*-RC in the Japanese TVJT
('P1' to 'P28' represent individual L1 Japanese participants.)

Overall, the results with the L1 Japanese participants are in accord with those of Experiment 2 and confirm that the simplex anaphor *jibun* within the head NP of Japanese RCs cannot be co-indexed with the RC subject.

For the Type 1 fillers, there were two conditions: the face photo featured either the subject NP (JF1-Subject) or the indirect object NP (JF1-Dative). The mean frequency of the match answers for the JF1-Subject condition was 11.5 (SD = 0.69, SE = 0.13) and that for the JF1-Dative condition was 0.11 (SD = 0.32, SE = 0.06). An examination of the individual participants' judgments of the two conditions shows that all participants accepted 10 items or more in JF1-Matrix and rejected 11 items or more in JF1-Dative. Thus, the results confirmed that the anaphor *jibun* is subject-oriented.

For the Type 2 fillers, there were two conditions: the face photo featured either the matrix subject NP (JF2-Matrix) or the embedded subject NP (JF2-Embedded). Recall that the anaphor *jibun* can refer to either the matrix subject or the embedded subject in the given sentences. The L1 Japanese participants are expected to accept five or more out of six items in both JF2-Matrix and JF2-Embedded, if they understand the rule that items must be accepted if there is one possible interpretation that matches the picture. Therefore, if a participant accepted five items or more in each condition of the Type 2 fillers, we can rule out the possibility that she made judgments based on preference. The individual participants' judgments of the two conditions are shown in Figure 11.
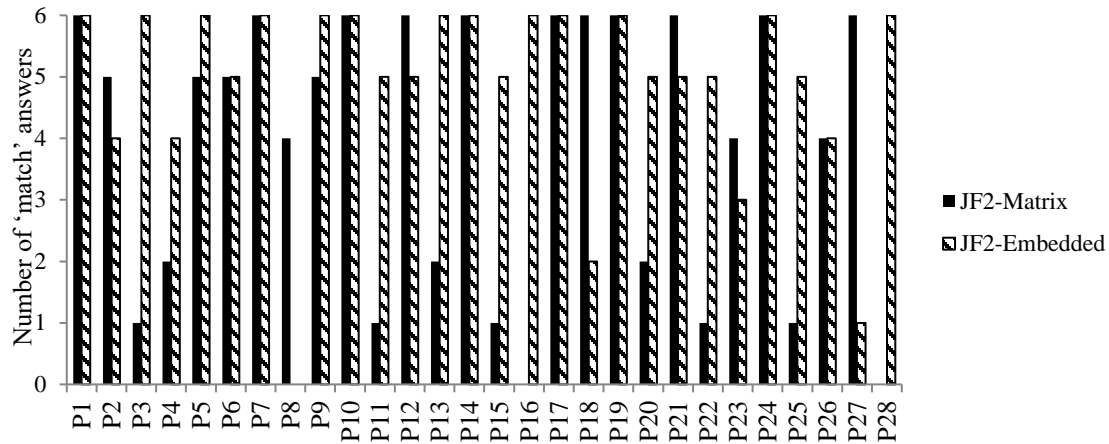
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Figure 11. Individual L1 Japanese participants' judgments of JF2-Matrix and JF2-Embedded in the Japanese TVJT
('P1' to 'P28' represent individual L1 Japanese participants.)

As shown in Figure 11, 12 participants accepted five or more out of six items in both JF2-Matrix and JF2-Embedded, based on which we can be sure that they did not make their judgments based on preference. In addition, their mean frequencies of 'match' answers in the two critical conditions were 11.5 and 1.3, respectively, which is in line with the group results in Experiments 2 and 3. Moreover, the individual participants' judgments show that all participants accepted nine items or more in *Jibun*-Matrix and 10 of them accepted three items or fewer in *Jibun*-RC (See Figure 10). Thus, the L1 Japanese participants' consistent rejection of the items of *Jibun*-RC cannot be attributed to the reason that the co-reference between the anaphor and the RC subject is possible but not preferred. Rather, the only possibility is that the co-reference between the anaphor and the RC subject is prohibited in Japanese.

6.7.2 Results of the Chinese TVJT with L1 Chinese learners of L2 Japanese

In this section, we will see the judgments in the Chinese TVJT from a total of 69 L1 Chinese learners of L2 Japanese.

There were two critical conditions: whether the face photo featured the matrix subject (*Ziji*-Matrix) or the RC subject (*Ziji*-RC). The mean frequencies of the L2 participants' 'match' answers are visually presented in Figure 12 below.
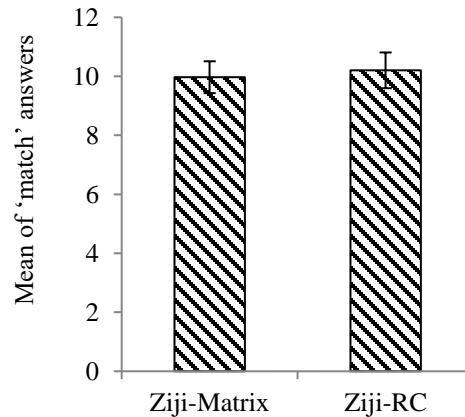
Figure 12. L1 Chinese L2 Japanese participants' judgments of the critical conditions in the Chinese TVJT

A visual inspection of Figure 12 suggests that the two means are not significantly different from each other. This is also what the statistical analysis of the results tells us. First of all, the mean frequency of the match answers for the *Ziji*-Matrix condition is 9.97/12 (SD = 2.29, SE = 0.28) and that of the *Ziji*-RC condition is 10.2/12 (SD = 2.57, SE = 0.31). Pairwise comparison was perfomed on both participant (t_1) and item (t_2). The results show that the mean difference between the *Ziji*-Matrix and *Ziji*-RC conditions is not significant for either participant ($t_1(68) = 0.51$, $p = .61$) or item ($t_2(23) = 1$, $p = .33$). These findings confirm Aoun and Li's (2003) claim that the anaphor *ziji* within the head NP of Chinese RCs can be co-indexed with either the matrix subject or the RC subject.

An examination of the individual participants' judgments shows that 60 participants accepted nine items or more in the *Ziji*-RC condition, which suggests that they consistently allowed the co-indexation between *ziji* and the RC subject. However, six participants accepted four to eight items, which indicates that they were indecisive but nevertheless did not consistently accept the items of the *Ziji*-RC condition. Finally, three other participants accepted three items or fewer, which suggests that they consistently rejected the co-reference between *ziji* and the RC subject. I will discuss the implications of these differences among the L1 Chinese participants in Section 6.7.4.

As for the Type 1 fillers, there were two conditions: whether the face photo featured the subject NP (CF1-Subject) or the indirect object NP (CF1-Dative). The mean frequency of the 'match' answers for the CF1-Subject condition was 11.39 (SD = 0.65,

SE = 0.08) and that for the CF1-Dative condition was 1.54 (SD = 1.13, SE = 0.14). This confirms that *ziji* is a subject-oriented anaphor.

Moreover, as discussed at the beginning of 6.7, the Type 2 fillers were used to check whether the participants had understood how to deal with a sentence with two possible interpretations: as long as there is one possible interpretation that matches the picture, the item should be accepted. Three participants failed the test and their data were removed.

To summarize, the L1 data in the Japanese and Chinese TVJTs confirm the claims in previous literature: while the anaphor *jibun* within the head NP of Japanese RCs cannot be co-indexed with the RC subject, the anaphor *ziji* within the head NP of Chinese RCs can. The data are summarized in Table 14 and Figure 13.

Table 14. The L1 participants' means, SDs and SEs of the critical conditions in the Japanese and Chinese TVJTs

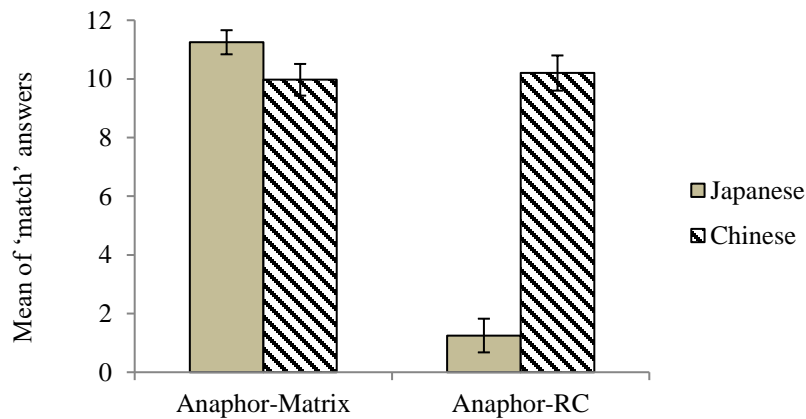| Conditions	Mean(SD)	SE
Jibun-Matrix	11.25 (1.11)	0.21
Ziji-Matrix	9.97 (2.29)	0.28
Jibun-RC	1.25 (1.55)	0.29
Ziji-RC	10.20 (2.57)	0.31

Figure 13. The L1 participants' mean frequencies of 'match' answers in the critical conditions in the Japanese and Chinese TVJTs

6.7.3 Results of the Japanese TVJT with L1 Chinese learners of L2 Japanese

In this section, the results of the Japanese TVJT with the L1 Chinese learners are reported and analyzed. First, the results of the learners all together, regardless of their Japanese proficiency, will be presented, followed by their results by proficiency.

Again, there were the same two factors: (i) *Language Type* (Japanese or Chinese) and (ii) *Antecedent Position* (whether the intended antecedent is the matrix subject or the RC subject). First, the mean frequencies of the L2 participants' 'match' answers in the critical conditions of the Japanese and Chinese TVJTs are shown in Figure 14.
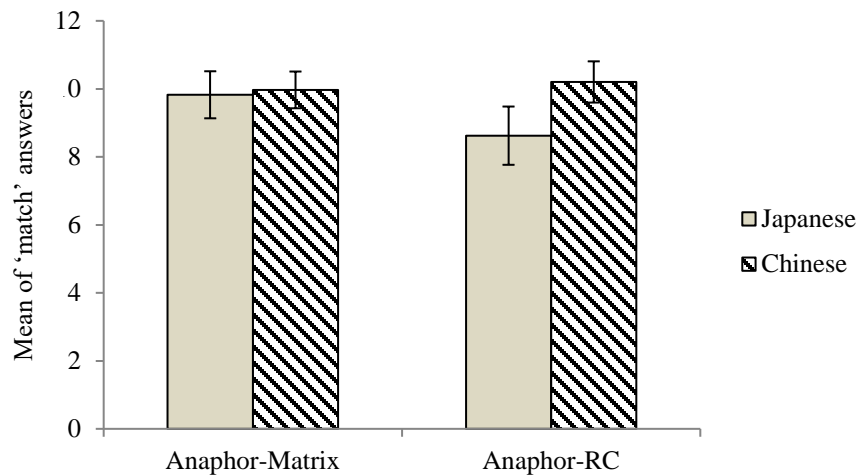
Figure 14. L2ers' judgments of the critical conditions in the Japanese and Chinese TVJTs

The mean frequency of match answers for the *Jibun*-Matrix condition is 9.83/12 (SD = 2.94, SE = 0.35) while that of the *Jibun*-RC condition is 8.62/12 (SD = 3.63, SE = 0.44). The figure also shows the mean frequency of match answers for the *Ziji*-Matrix condition (9.97/12) and the *Ziji*-RC condition (10.1/12) discussed in 6.7.2.

A visual inspection of the means suggests that the mean frequencies of match answers for the matrix conditions are not significantly different between the Japanese and the Chinese experiments, while there appears to be a significant difference between the mean frequencies of match answers for the RC subject conditions in the Japanese and Chinese experiments. Two-way repeated measures ANOVA and pairwise comparisons were perfomed on both participant (F_1 and t_1) and item (F_2 and t_2).

First, two-way repeated measures ANOVA reveal a significant interaction between the two factors in both participant ($F_1(1, 68) = 5.44$, $p = .02$) and item ($F_2(1, 23) = 74.64$, $p < .01$). Pairwise comparisons show that the mean difference between the *Jibun*-Matrix condition and the *Ziji*-Matrix condition is not significant in either participant ($t_1 = 0.43$, $p = .67$) or item ($t_2 = 0.09$, $p = .93$). But the mean of the *Jibun*-RC condition is significantly lower than that of the *Ziji*-RC condition in both participant ($t_1(68) = 3.35$, $p < .01$) and item ($t_2(23) = 7.33$, $p < .01$), suggesting that the L2 participants as a group did make a distinction between Chinese and Japanese in terms of the interpretation of the anaphor within the head NP of RCs. An RC subject as an antecedent of *jibun* was rejected significantly more frequently than an RC subject as an antecedent of *ziji*.

As for the Type 1 fillers with ditransitive verbs and *jibun* inside the direct object, the mean frequency of the 'match' answers for the JF1-Subject condition was 11.6 (SD = 0.77, SE = 0.09) and that for the JF1-Dative condition was 0.58 (SD = 0.96, SE = 0.12). The results clearly suggest that the L2 participants have the knowledge that the anaphor *jibun* is subject-oriented.

As for the Type 2 fillers with two complex sentences with two potential antecedents (subjects) for *jibun*, the mean frequency of the 'match' answers for the JF2-Matrix condition was 4.57 (SD = 1.71, SE = 0.21) and that for the JF2-Embedded condition was 5.46 (SD = 1.01, SE = 0.12). Recall that one reason for including the Type 2 fillers in the Japanese TVJT was to monitor whether the L2 participants applied an irrelevant strategy to reject the items where the anaphor *jibun* is intended to be co-indexed with an embedded subject. If a participant consistently rejected the items of *Jibun*-RC, I checked her judgment of the Type 2 fillers. In what follows, I will discuss the analysis of the same data with the participants divided into two groups based on their Japanese proficiency.

6.7.4 Results of the Japanese TVJT with intermediate and advanced learners

As discussed earlier in 6.6.4, 35 L2 participants were categorized as advanced, and 34 as intermediate. Table 15 and Figure 15 summarize the match judgments in the Japanese and Chinese TVJTs from the two groups of learners, as well as the judgments in the Japanese TVJT from the L1 Japanese participants.

Table 15. A summary of the L2ers' and L1 Japanese participants' match judgments of the critical conditions in the Japanese and Chinese TVJTs

Groups	*Jibun*-Matrix	*Jibun*-RC	*Ziji*-Matrix	*Ziji*-RC
L2 intermediate	10.09 (2.48)	9.88 (3.02)	10.03 (2.46)	10.35 (2.53)
L2 advanced	9.57 (3.34)	7.4 (3.8)	9.91 (2.16)	10.06 (2.63)
L1 Japanese	11.25 (1.11)	1.25 (1.55)	N/A	N/A
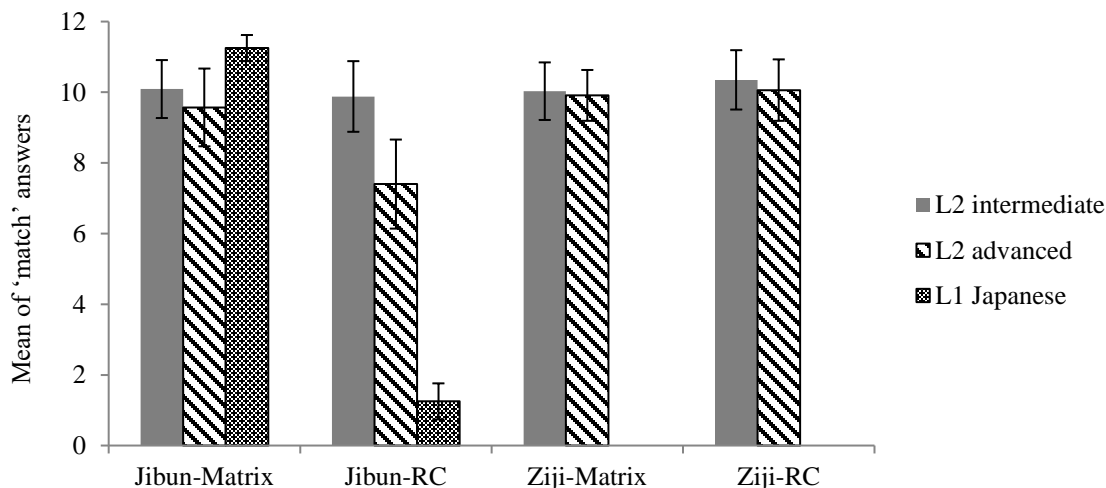
Figure 15. L2ers and L1 Japanese participants' mean frequencies of 'match' answers in the critical conditions of the Japanese and Chinese TVJTs

Table 15 provides the means and SDs of the *Jibun*-Matrix and *Jibun*-RC conditions from the L1 Japanese participants and L2 learners, as well as the means and SDs of *Ziji*-Matrix and *Jibun*-RC conditions from the L2 learners. Figure 15 shows the mean frequencies of match answers in the four critical conditions of the Japanese and Chinese experiments. A visual inspection of the intermediate learners' judgments suggests that their mean frequencies of match answers in the four conditions do not seem to be significantly different from each other. In contrast, a visual inspection of the advanced learners' judgments indicates that their mean frequency of match answers in the *Jibun*-RC condition seems to be significantly lower than the mean frequencies in the other three conditions.

In the following two subsections, the results from the intermediate and advanced learners are statistically analyzed and reported.

6.7.4.1 Results of the Japanese TVJT with intermediate learners

First, let us analyze the data from the intermediate learners. As shown in Figure 16, the matrix subject and the RC subject seem to be equally favored by the intermediate learners, regardless of the language.
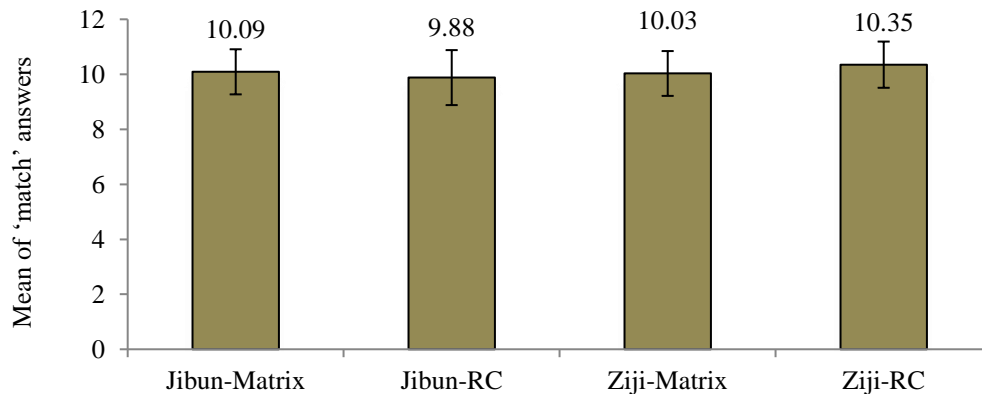

Figure 16. Intermediate L2ers' mean frequencies of 'match' answers in the critical conditions of the Japanese and Chinese TVJTs

Two-way repeated measures ANOVA show that there is no significant interaction between language type and antecedent position in participant ($F_1(1, 33) = 0.68$, $p = .42$) but there is a significant interaction in item ($F_2(1, 23) = 7.33$, $p = .01$). Pair-wise comparisons reveal that the mean of the *Jibun*-Matrix condition is not significantly different from that of the *Jibun*-RC condition in either participant ($t_1 = 0.31$, $p = .76$) or item ($t_2 = 0.84$, $p = .41$). In addition, the mean of the *Ziji*-Matrix condition is not significantly different from that of the *Ziji*-RC condition in either participant ($t_1 = 0.51$, $p = .61$) or item ($t_2 = 1.73$, $p = .1$).

The findings from the statistical analysis suggest that the intermediate learners did not make a distinction between *jibun* and *ziji* in terms of their interpretation with respect to head NP of RCs. In their interlanguage L2 Japanese grammar, *jibun* can be co-indexed with either the matrix subject or the RC subject. This strongly implies that we are observing transfer effects from the learners' L1 Chinese. To be specific, the intermediate learners seemed to have applied their Chinese syntactic knowledge to raise the head NP in Japanese RCs so that the anaphor *jibun* within the head NP can be co-indexed with either the matrix subject or the RC subject.

In addition, the individual intermediate learners' judgments of the *Jibun*-RC condition and the *Ziji*-RC condition were also examined. If a learner consistently rejected the items of the *Jibun*-RC condition but consistently accepted the items of the *Ziji*-RC condition, we can ensure that her Japanese knowledge is not derived from her L1 Chinese. The individual intermediate learners' judgments of *Jibun*-RC and *Ziji*-RC are shown in Figure 17.
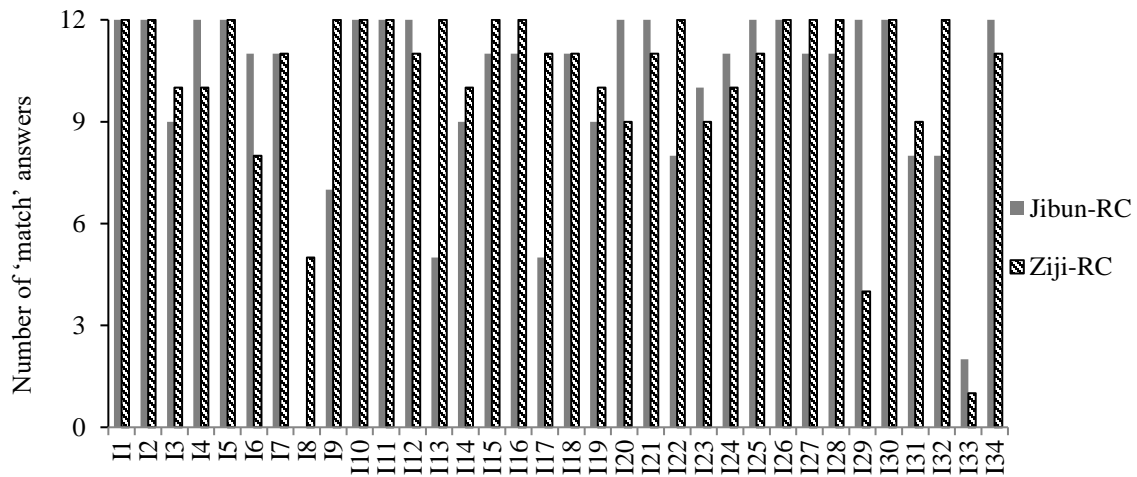

Figure 17. Individual intermediate L2ers' judgments of *Jibun*-RC and *Ziji*-RC ('I1' to 'I34' represent individual intermediate learners.)

A total of 26 out of 34 (76.47%) participants accepted nine items or more in the *Jibun*-RC condition, which indicates that they consistently allowed the co-reference between *jibun* and the RC subject, while six participants (17.65%) were less decisive: they accepted four to eight items in the *Jibun*-RC condition. Two other learners, *I8* and *I33* in Figure 17, accepted three items or less in the *Jibun*-RC condition, which means that they consistently rejected the co-indexation between *jibun* and the RC subject, behaving like the L1 Japanese participants. Additionally, an examination of their judgments in the *Jibun*-Matrix condition shows that both *I8* and *I33* accepted all 12 items, which indicates that the co-indexation between *jibun* and the matrix subject is available to them. Now, let us look at what these two participants did in the Chinese TVJT. First, *I33* only accepted one item in the *Ziji*-RC condition, which indicates that she even rejected the co-indexation between *ziji* and the RC subject in Chinese RCs. Hence, her judgment of the

Jibun-RC condition might be derived from her judgment of the *ziji*-RC condition. If so, we cannot interpret her performance in the Japanese experiment as evidence that she has successfully acquired the target Japanese knowledge. Second, *I8* accepted five out of twelve items in the *ziji*-RC condition. However, an analysis of her judgments on the Type 2 fillers in the Japanese TVJT shows that she might have used an irrelevant strategy to make judgments, as she rejected five out of six items in the JF2-Embedded condition.[40] Thus, this participant might have always rejected the items where *jibun* is intended to refer to an embedded subject. It is therefore not clear whether she has acquired the target Japanese knowledge.[41]

6.7.4.2 Results of the Japanese TVJT with advanced learners

Let us now examine the 35 advanced learners' data from the Japanese TVJT. A visual inspection of Figure 18 suggests that the RC subject in Japanese RCs is less favored than that in Chinese RCs.
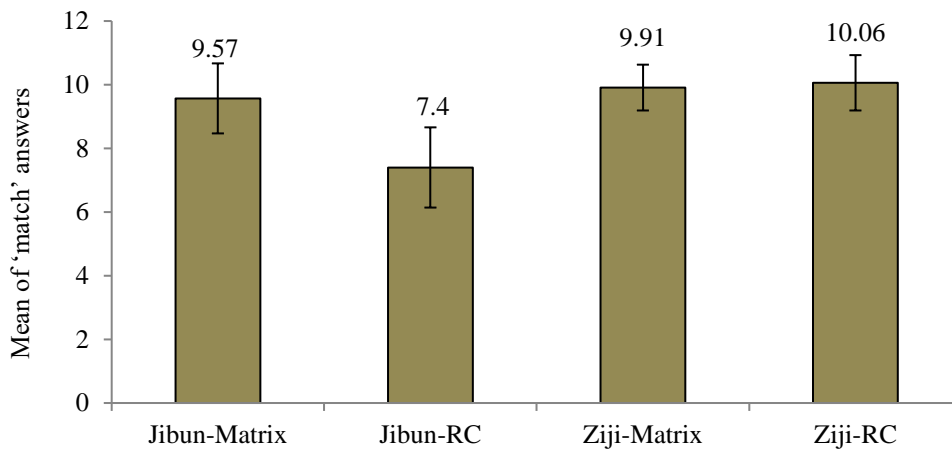

Figure 18. Advanced L2ers' mean frequencies of 'match' answers in the critical conditions of the Japanese and Chinese TVJTs

[40] The Type 2 fillers in the Japanese TVJT seemed to be difficult to L2 learners, as only a few of them were able to consistently accept 5 out of 6 items in both conditions. Thus, I did not use them to screen out the L2 participants who did not follow the rule that items should be accepted as long as there is one possible interpretation. Their judgments on these filers are examined only when they behave like L1 Japanese participants, that is, by accepting 3 or fewer items in the *Jibun*-RC condition.

[41] It is also possible that this participant has acquired the target knowledge but failed to understand that the sentences in the Type 2 fillers have two possible interpretations.

Two-way repeated measures ANOVA show a significant interaction between the language type and the antecedent position in participant ($F_1(1, 34) = 5.07$, $p = .03$) and item ($F_2(1, 23) = 42.38$, $p < .01$). Given the significant interaction, the effects of the language type within each of the two conditions of the antecedent position are examined. Pairwise comparisons reveal significant effects of the language type within the RC subject conditions in both participant ($t_1 = 11.97$, $p < .01$) and item ($t_2 = 7.66$, $p < .01$). That is to say, there is a significant mean difference between the *Jibun*-RC condition and the *Ziji*-RC condition. However, there are no significant effects of the language type within the matrix subject condition in either participant ($t_1 = 0.4$, $p = .53$) or item ($t_2 = 1.37$, $p = .19$). In other words, there is no significant mean difference between the *Jibun*-Matrix condition and the *Ziji*-Matrix condition. We next turn to examining effects of the antecedent position within each language. Pairwise comparisons show significant effects of the antecedent position in the Japanese experiment in participant ($t_1 = 4.9$, $p = .03$) and item ($t_2 = 4.34$, $p < .01$). By contrast, there are no such effects in the Chinese experiment in participant ($t_1 = 0.05$, $p = .83$) or item ($t_2 = 0.253$, $p = .8$). That is, the mean difference is significant between the *Jibun*-Matrix condition and the *Jibun*-RC condition but not between the *Ziji*-Matrix condition and the *Ziji*-RC condition.

These results suggest that the advanced learners as a group have knowledge that *jibun* is more restricted than *ziji* in terms of the position of potential antecedents. Having said that, the advanced learners' judgments of the *Jibun*-RC condition (M= 7.4, SD= 3.8, SE=0.64) are still quite different from that of the L1 Japanese participants' (M= 1.25, SD=1.55, SE=0.29), which means that as a group, their acquisition of the target syntactic knowledge, that the head NP of Japanese RCs is base-generated externally, is far from being complete.

The individual advanced learners' judgments of the *Jibun*-RC condition and the *Ziji*-RC condition are shown in Figure 19.
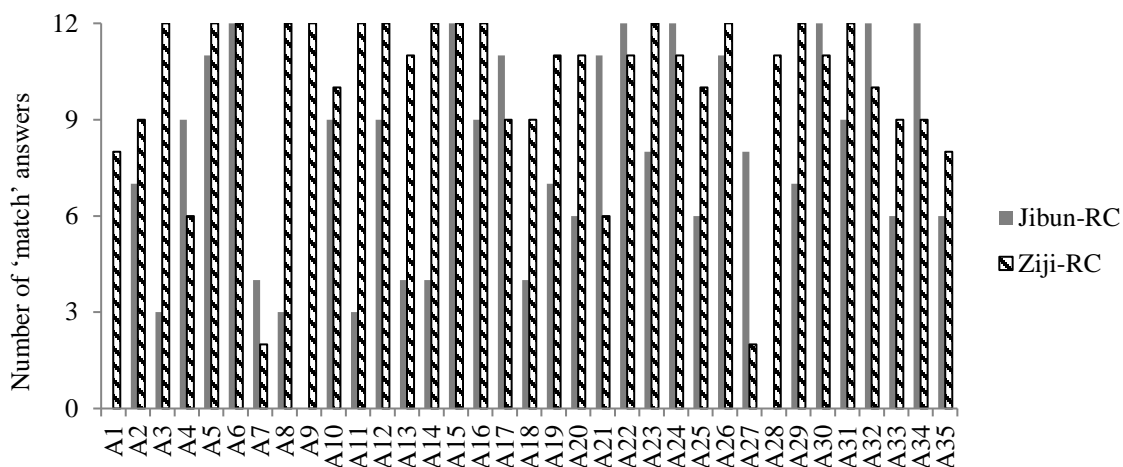
Figure 19. Individual advanced L2ers' judgments of *Jibun*-RC and *Ziji*-RC
(A1' to 'A34' represent individual advanced learners.)

An examination of the individual advanced learners' judgments shows that six
participants (17.1%: *A1*, *A3*, *A8*, *A9*, *A11*, and *A28*) accepted three items or fewer in the
Jibun-RC condition, which means they consistently rejected the co-reference between
jibun and the RC subject. This indicates that they have the native-like knowledge that the
anaphor *jibun* within the head NP of Japanese RCs cannot be co-indexed with the RC
subject. An examination of their judgments in the *Jibun*-Matrix condition shows that all
of them accepted 12 items, which suggests that the co-reference between *jibun* and the
matrix subject is possible to them. Further, five of these six participants (*A3*, *A8*, *A9*, *A11*
and *A28*) accepted nine items or more in the *Ziji*-RC condition of the Chinese TVJT,
suggesting that they consistently allowed the anaphor *ziji* to refer to the RC subject in
their L1 grammar. Thus, considering the five participants' judgments of the *Jibun*-RC
condition and the *Ziji*-RC condition, we can infer that their native-like judgment with the
Jibun-RC condition cannot be derived from their L1. However, one participant (H1)
accepted only eight out of the 12 items in the *Ziji*-RC condition. Although her acceptance
of the co-indexation between *ziji* and the RC subject was not quite as consistent, she did
not consistently reject it either. Since she rejected all items of the *Jibun*-RC condition, it
is not unreasonable to consider her to have acquired the target Japanese knowledge as
well.

In addition, as discussed in 6.6.2, the Type 2 fillers in the Japanese TVJT were used
to monitor whether the L2 participants used an irrelevant strategy to reject the items

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where *jibun* is intended to refer to the embedded subject. Thus, the judgments on the Type 2 fillers from the six advanced learners who consistently rejected the items of *Jibun*-RC are examined. The results are shown in Figure 20.
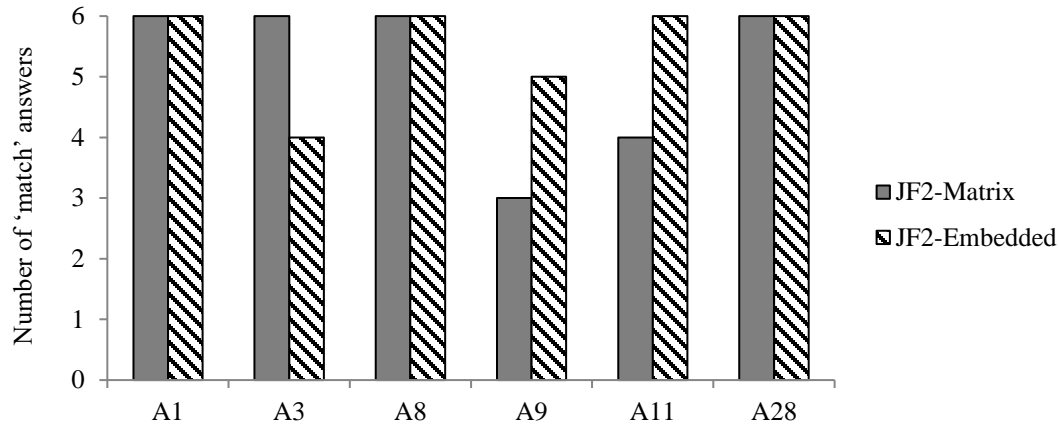

Figure 20. Selected advanced L2ers' judgments on the Type 2 fillers in the Japanese TVJT

The result shows that four of the six learners accepted all six items of JF2-Embedded. One of them (A9) accepted five items and another (A3) accepted four items. This result indicates that the six learners did not use an irrelevant strategy.

In brief, by investigating the individual advanced learners' judgments, we can infer that six out of thirty-five (17.1%) learners have successfully acquired the syntactic Japanese knowledge that the head NP of Japanese RCs is base-generated external to the RC.

To summarize, the analysis of the intermediate learners' results suggests that they do not have the target syntactic knowledge that the head NP of Japanese RCs is base-generated externally. Rather, they rely on their L1 Chinese syntactic knowledge to use the head-raising strategy for Japanese RCs. An investigation of the individual learners' judgments showed that two of them accepted three items or fewer in the *Jibun*-RC condition, behaving like L1 Japanese speakers. However, a further examination of their judgments of the *Ziji*-RC condition and the Type 2 fillers with the Embedded condition suggests that their native-like judgments of the *Jibun*-RC condition may not be taken as

evidence for the acquisition of target knowledge. Thus, none of the intermediate learners seemed to have surely acquired the target syntactic knowledge in Japanese.

By contrast, the analysis of the advanced learners' judgments suggest that they as a group have the knowledge that *jibun* is more restrictive than *ziji* with respect to the position of their potential antecedents. A further investigation of the individual learners' judgments showed that six of them consistently rejected the items of the *Jibun*-RC condition. At the same time, they did not consistently reject the items of the *Ziji*-RC condition and the Type fillers with the Embedded condition, based on which we can infer that they have acquired the native-like interpretation of *jibun* within the head NP of Japanese RCs. It further implies that they have successfully acquired the syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC. In the next section, the implications of the experimental results are discussed.

6.8 Discussion and implications

The findings from Experiment 3 have several implications for what has been claimed in previous literature.

First, the contrast between the L1 Japanese and L1 Chinese data supports what previous literature claims about the co-indexation between the anaphor within the head NP of RCs and the RC subject: such co-indexation is prohibited in Japanese (e.g., Hasegawa, 1988; Hoji, 1985; Murasugi, 2000) but is allowed in Chinese (Aoun & Li, 2003; Huang et al., 2009). This difference is difficult, if not impossible, to explain if we assume the head NP of RCs is derived in the same way in Japanese and Chinese. Thus, the L1 data of this study supports the analysis that the head NP of RCs is base-generated external to the RC in Japanese but is raised out of the RC in Chinese.

Second, the results with the L1 Chinese intermediate learners of Japanese suggest that they used the head-raising strategy, which is based on their L1 Chinese knowledge, to interpret Japanese RCs, as evidenced by their consistent acceptance of the items where the anaphor *jibun* is intended to be co-indexed with the RC subject. The raising of the head NP implies that a DP is involved in their syntactic representation of Japanese RCs, under the assumption that the strong uninterpretable feature of a D triggers the raising of the head NP. This is predicted by the Full Transfer/Full Access Hypothesis (Schwartz &

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Sprouse, 1994, 1996), which claims that the L1 grammar in its entirety is transferred to the L2 grammar in the initial state of the L2 acquisition.

In contrast, the results with the L1 Chinese advanced learners of Japanese suggest that six of them have successfully acquired the target knowledge that the head NP of Japanese RCs is base-generated externally, as evidenced by their consistent rejection of the items where the anaphor *jibun* is intended to refer to the RC subject. Recall that the knowledge of the constraint with *jibun* is underdetermined in nature. That is, it is cannot be directly derived from input, learners' L1 Chinese or explicit instruction in Japanese language classrooms. This finding strongly implies that those L1 Chinese learners were able to acquire the target syntactic knowledge of Japanese RCs. Specifically, those L1 Chinese learners were able to restructure their L2 grammar and adopt the head-base-generation strategy to derive Japanese RCs. Thus, we can infer that L1 Chinese learners can reset the uninterpretable feature of D that triggers raising of the head NP in their interlanguage grammar. If this is the case, it further implies that the uninterpretable feature is accessible to adult L2 learners, and this in turn supports the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996): all aspects of UG, including the functional domain, are available to adult L2 learners. The same finding argues against 'partial access to UG' accounts such as the Interpretability Hypothesis (Tsimpli & Dimitrakopoulou, 2007), which claims that uninterpretable features cannot be accessed by L2 learners after a critical period, and only the uninterpretable features that are instantiated in the L1 are available.

In the following subsections, I discuss implications of the findings from Experiment 3 with respect to: (i) acceptability and preference in making judgments in the Japanese TVJT, (ii) L1 transfer effects among the L2 participants, (iii) the association between Japanese proficiency and acquisition of the target syntactic knowledge, and (iv) possible ways in which L2 participants might have acquired the syntactic knowledge in Japanese.

6.8.1 Acceptability vs. Preference in making judgments in the TVJT

As discussed in 5.5, one remaining question for the results of Experiment 2 is that the L1 Japanese participants might have relied on their preference to reject the items of the *Jibun*-RC condition and the *Jishin*-RC condition, where the anaphor *jibun/jibun-jishin* is

intended to refer to the RC subject. This is because the co-indexation between the anaphor and the RC subject might be acceptable but less preferable than the co-reference between the anaphor and the matrix subject. The issue of 'acceptability vs. preference' has been considered as a potential problem for truth value judgment tasks that involve anaphor binding (White et al., 1997).

In order to address this issue, in Experiment 3, a set of examples, as shown in (150), was added to illustrate the following rule: a given sentence may have two possible interpretations; as long as there is one interpretation that matches the picture, the item should be accepted. Also, I included 12 fillers (Type 2 fillers) where the anaphor *jibun* has two possible interpretations. If the participants understand the rule well, they should accept five or more out of six items in each condition of the Type 2 fillers. Thus, an examination of their judgments of the Type 2 fillers can inform us how many participants gave judgments based on acceptability rather than preference. The data show that 12 L1 Japanese participants for Experiment 3 accepted five or more out of six items in each condition, based on which we can rule out the possibility that they gave judgments based on their preference. A further examination of their judgments of the two critical conditions in Experiment 3 reveals that these 12 participants consistently accepted the items of the *Jibun*-Matrix condition and consistently rejected the items of the *Jibun*-RC condition, which is compatible with the group results in Experiments 2 and 3. The finding with L1 Japanese participants from Experiment 3 strengthens the argument that the co-indexation between the anaphor and the RC subject is prohibited in Japanese RCs.

6.8.2 L1 transfer effects

The results of the statistical analysis of the data from the L1 Chinese intermediate learners of Japanese suggest that the Japanese anaphor *jibun* is interpreted as an equivalent of Chinese anaphor *ziji*, as the mean frequency of 'match' answers does not significantly differ between the *Jibun*-RC condition and the *Ziji*-RC condition. In addition, the statistical analysis of the results with the L1 Chinese advanced learners of Japanese suggests that they have the knowledge that *jibun* is more restricted than *ziji* with respect to the position of possible antecedents. That is, the advanced learners rejected an RC subject as an antecedent of *jibun* more frequenctly than an RC subject as an

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antecedent of *ziji*. This contrast between the intermediate learners and the advanced learners is predicted by Schwartz and Sprouse's (1994, 1996) Full Transfer/Full Access Hypothesis in L2 acquisition, which is comprised of the following two important parts: (i) the initial state of L2 acquisition is characterized by the full transfer of the L1 grammar into the L2 interlanguage; (ii) all aspects of UG can be used to restructure the interlanguage grammar, which is fully constrained by UG.

First, since the intermediate learners accepted the co-reference between the anaphor and the RC subject in both Japanese and Chinese, it is very likely that their L1 knowledge is the source knowledge that fully transfers into their Japanese grammar.

Second, a detailed investigation of the individual advanced learners' judgments in the Japanese and Chinese TVJTs suggests that six advanced learners have native-like knowledge that the anaphor *jibun* cannot be co-indexed with the RC subject. Since such knowledge cannot be directly derived from input, classroom instruction or the learners' L1, it strongly implies that they have successfully acquired the implicit syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC.

However, some outstanding issues must be addressed before we can firmly conclude that our findings support Full Transfer/Full Access Hypothesis in L2 acquisition. First, we need additional evidence to argue that the intermediate learners' non-native judgments in the Japanese TVJT were indeed transferred from their L1 Chinese. As stated in Schwartz and Sprouse (2000), in order to identify the role of L1 transfer, we should compare the developmental paths of learners whose L1s are typologically different with regard to a specific target language phenomenon. In future studies, I will collect data from L2 Japanese learners whose L1 is similar to Japanese in terms of the interpretation of the anaphor within the head NP of RCs. If those learners, regardless of their Japanese proficiency level, never allow the co-reference between the *jibun* and the RC subject, the L1 transfer effects from the intermediate learners in this study would further be supported.

Second, although the advanced learners as a group are found to have knowledge that the interpretation of *jibun* is more restricted than that of *ziji*, their mean judgments of *Jibun*-RC (M = 7.4, SD = 3.8, SE = 0.64) are still quite different from the L1 Japanese speakers' judgments (M = 1.25, SD = 1.55, SE = 0.3). Nevertheless, the emerging

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knowledge of the difference between *jibun* and *ziji* still suggests that the syntactic knowledge in Japanese is acquirable. Indeed, in order to argue that L2 learners are able to acquire some underdetermined knowledge, we do not have to show that they can have the same target knowledge as native speakers, as long as they can show complicated knowledge that cannot be directly inferred from input or their L1 (e.g., Schwartz & Sprouse, 2000).

Finally, there is a question of why there are only six L2 participants who seem to have acquired the target Japanese knowledge. In the next section, I will discuss the role of Japanese proficiency in the acquisition of the target syntactic knowledge.

6.8.3 Japanese proficiency

The role of the L2 participants' Japanese proficiency appears to be crucial in the acquisition of the target syntactic knowledge, as we have seen that there is a difference between the intermediate learners and the advanced learners in their interpretation of the anaphor *jibun* within the head NP of Japanese RCs.

However, high Japanese proficiency alone does not guarantee acquisition of the target knowledge. The scatterplot in Figure 21 presents the association between Japanese proficiency score and the number of 'match' answers in the *Jibun*-RC condition among all L2 participants in Experiment 3:
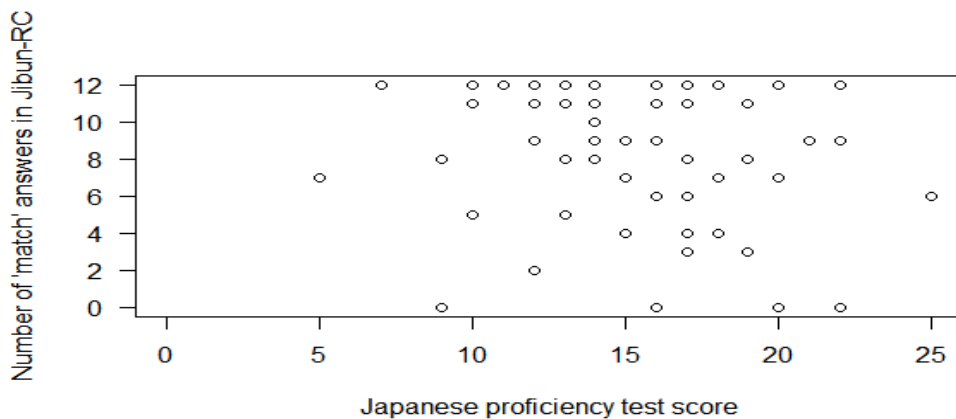

Figure 21. Association between the Japanese proficiency test score and the number of 'match' answers in *Jibun*-RC among L2 participants in Experiment 3

The correlation coefficient between the Japanese proficiency score and the frequency of 'match' answers in the *Jibun*-RC condition is .44 and its square, coefficient of determination, is 0.19, which means only 19% of the variance in the frequency of 'match' answers in the *Jibun*-RC condition can be predicted by the Japanese proficiency score. Although six advanced learners were found to have successfully acquired the native-like knowledge of the interpretation of *jibun*, there were still 16 (45.7%) out of 35 advanced learners who accepted nine items or more of the *Jibun*-RC condition, which indicates that they consistently accepted the items where the anaphor *jibun* is intended to be co-indexed with the RC subject. Thus, the L1 effects seemed to persist among these advanced learners.

Moreover, the data of the intermediate learners suggests that no one in this group has acquired the target syntactic knowledge. Therefore, based on the data from the intermediate and advanced learners, we can infer that the acquisition of the target syntactic knowledge entails high Japanese proficiency but not vice versa. In other words, high Japanese proficiency alone is insufficient for ensuring the acquisition of the syntactic knowledge.

In the following subsection, I discuss how the syntactic knowledge in question can possibly be acquired via the L2 input, which brings us to a possible explanation of how the six advanced learners were able to fully acquire the underdetermined knowledge of the constraint that the anaphor *jibun* within the head NP of Japanese RCs cannot be co-indexed with the RC subject.

6.8.4 Learnability of the target syntactic knowledge

The results of Experiment 3 suggest that six advanced learners have successfully acquired the syntactic knowledge that the head NP of Japanese RCs is base-generated externally. However, there are still 16 advanced learners who appear to continue to use their Chinese knowledge to interpret Japanese RCs, as evidenced by their consistent acceptance of the co-indexation between *jibun* and the RC subject. So, the question is why some learners can acquire the knowledge while others cannot, even though their Japanese proficiency levels are similar.

One possible account for the variation among the advanced learners is that the target syntactic knowledge was triggered by some positive evidence in the input in the case of the six advanced learners who appear to have acquired it. For the 16 advanced learners who were still using their L1 knowledge for Japanese RCs, even though their Japanese proficiency was high, they might not have encountered the relevant triggers in the input that can inform them of the head derivation in Japanese RCs.

Let us first review how the head NP is derived in Chinese and Japanese RCs. For Chinese RCs, Aoun and Li (2003) propose that in RCs that do not involve an island, the head NP can be either raised out of the RC or base-generated external to the RC, depending on what is inside the RC: the head NP is raised when there is a gap but is base-generated when there is an RP.

As for Japanese RCs, the results of Experiment 2 supported the analysis that the head NP of Japanese RCs is base-generated external to the RC. Those strategies to derive the head NP in Chinese and Japanese RCs are summarized below:

Table 16. Strategies to derive the head NP in Chinese and Japanese RCs

Type of RCs	Strategies in Chinese	Strategies in Japanese
RCs with a gap that do not involve an island	Raised	Base-generated
RCs with an RP that do not involve an island	Base-generated	Base-generated

As shown in Table 16, there is one clear difference between Chinese and Japanese: in RCs with a gap that do not involve an island, the head NP is raised in Chinese, but the head NP is base-generated in similar RCs in Japanese. The question is whether there is any positive evidence in Japanese input that can lead L1 Chinese learners to restructure their interlanguage grammar, i.e., to change from the head-raising strategy to the head-base-generation strategy for Japanese RCs with a gap.

There are several reasons to think that the six advanced learners may have acquired the target syntactic knowledge from other linguistic evidence.

First, many researchers claim that grammar development is driven by parsing failure (e.g., Berwick & Weinberg, 1984; Gibson & Wexler, 1994), which means that if the current (interlanguage) grammar fails to accommodate the input, restructuring can be

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triggered. However, if the target language input can be successfully parsed by the interlanguage grammar, restructuring would not occur.

As discussed in Chapter 3, RCs in Chinese and Japanese are superficially similar in that they are pre-nominal. If L1 Chinese learners use the head-raising strategy to derive the head NP for Japanese RCs, there would be no parsing failure in general. (170a) and (170b) are examples in Chinese and Japanese, both of which should be successfully parsed with the head-raising strategy.

(170a) [nanren mai-le t_i] de   [shu]$_i$
       man   buy-PST   DE   man
       'the man who bought a book'

(170b) [otoko-ga t_i kat-ta]   [hon]$_i$
        man-NOM   buy-PST   book
        'the book that the man bought'

Thus, Japanese RCs in the input do not indicate to L1 Chinese learners whether the head NP is derived by head-raising strategy or the head-base-generation strategy.

However, it turns out that not all Japanese RCs can be parsed with the head-raising strategy. In other words, there exists potential positive evidence suggesting that the head NP of Japanese RCs can only be base-generated external to the RC, not raised out of the RC. For example:

(171) Ashita   John$_j$-ga   [pro$_{j/k/h}$ kyoo e_i tsukuru] [Mary$_k$-no keiki]$_i$-o   taberu.
       tomorrow John-NOM   today   make   Mary-GEN cake-ACC   eat
       (i) 'Tomorrow John$_j$ will eat Mary's cake that he$_j$ is making today.'
       (ii) 'Tomorrow John will eat Mary$_k$'s cake that she$_k$ is making today.'
       (iii) 'Tomorrow John will eat Mary's cake that someone$_h$ is making today.'

(171) has at least three possible interpretations, as in (i)-(iii). For (i), it is *John* who is co-referential with the *pro* subject inside the RC, i.e., the person who is going to make a cake for *Mary* today. For (ii), the *pro* is co-indexed with *Mary*, i.e., it is *Mary* who is going to make a cake for herself. For (iii), the *pro* refers to someone else rather than *John* or *Mary*. What is crucial here is that the interpretation (ii) is available in (171), which is incompatible with the head-raising analysis. If the head NP *Mary-no keiki* 'Mary's cake'

is raised from within the RC, it would reconstruct into the RC and be interpreted within the RC at LF. Then the R-expression *Mary* within the head NP would be bound by the *pro* at the embedded subject position. It is expected to result in a Condition C violation (Chomsky, 1981b), as shown in (172), where the R-expression *Mary* cannot be bound by a *pro* at the embedded subject position.

(172) John-ga [pro$_{i*}$ Mary$_i$-no keiki-o tabe-ta] to it-ta.
       John-NOM   Mary-GEN cake-ACC eat-PST COMP say-PST
       'John said Mary ate her cake.'

Thus, interpretation (ii) in (171) can only be accounted for by the analysis that the head NP is base-generated external to the RC, under which the R-expression *Mary* remains free.

    Now let us see how the interpretation (ii) in (171) can be a trigger that leads L1 Chinese learners of L2 Japanese to restructure their interlanguage grammar. As indicated by the results of Experiment 3, L1 Chinese learners initially use the head-raising strategy to parse Japanese RCs. However, when they encounter a sentence like (171) uttered by a native Japanese speaker in a situation where the only available interpretation is (ii), their L2 grammar would fail to parse the sentence to get the intended meaning. This is because, as demonstrated above, the head-raising analysis of sentences like (171) wrongly predicts a Condition C violation. Indeed, the interpretation in (ii) is not available in the Chinese equivalents of the Japanese examples like (171), i.e., (172):

(172) Mingtian John$_j$ hui chi [pro$_{j/*k/h}$ jintian zuo t$_i$ de] [Mary$_k$-de dangao]$_i$.
       Tomorrow John will eat   today make DE Mary-GEN cake
       (i)   'Tomorrow John$_j$ will eat Mary's cake that he$_j$ is making today.'
       (ii)* 'Tomorrow John will eat Mary$_k$'s cake that she$_k$ is making today.'
       (iii) 'Tomorrow John will eat Mary's cake that someone$_h$ is making today.'

Thus, Japanese sentences like (171) with (ii) as their intended interpretation can be triggers for L1 Chinese learners to 'unlearn' the head-raising strategy and project a base-generated head NP in Japanese RCs.

    Moreover, it seems safe to assume that this type of sentence with the intended meaning (ii) is very rare in the input, which explains why there were only six advanced

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learners who have successfully learned the head-base-generation derivation in Japanese RCs. If such positive evidence is necessary for L1 Chinese learners to unlearn the head-raising strategy and restructure their interlanguage grammar to project a base-generated head NP for Japanese RCs, the rarity of this positive evidence in the input explains why many advanced learners have failed to do so. Although their Japanese proficiency is high, they might not have encountered relevant examples of RCs like (171), in the input that can lead them to restructure their L2 grammar. In future studies, I will explore L1 Chinese learners' acquisition of the following two pieces of Japanese knowledge: (i) the knowledge of the possible co-indexation between the embedded subject *pro* and the R-expression inside the head NP of Japanese RCs and (ii) the knowledge of the prohibited co-indexation between the RC subject and the anaphor *jibun* within the head NP of RCs. If there is a correlation between them, i.e., they appear at the same time among L2 learners, it would support my proposal that L1 Chinese learners of Japanese can acquire the implicit syntactic knowledge that the head NP is base-generated in Japanese RCs based on evidence such as (171).

6.9 Conclusion

This chapter investigated whether L1 Chinese learners of L2 Japanese can acquire the target syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC. To that end, I conducted Experiment 3, a truth value judgment experiment, to test whether L1 Chinese learners of L2 Japanese can acquire knowledge of the constraint that the anaphor *jibun* 'self' within the head NP of Japanese RCs cannot be co-indexed with the RC subject. This knowledge is underdetermined by input, classroom instruction and learners' L1. Therefore, if learners are found to have it, it would strongly imply that they have acquired the syntactic knowledge that the head NP of Japanese RCs is base-generated externally.

The results of the experiment suggest that intermediate learners did not make a distinction between *jibun* and *ziji* in terms of their available interpretations within the head NP of RCs, which implies that they used their L1 knowledge to interpret Japanese RCs with a gap. By contrast, some of the advanced learners had the knowledge that *jibun* is more restricted than *ziji* in terms of the position of its antecedent, as they rejected RC

subject antecedents of *jibun* significantly more frequently than RC subject antecedents of *ziji*. Moreover, an examination of the individual advanced speakers' judgments revealed that six advanced learners had the native-like knowledge that *jibun* within the head NP of Japanese RCs cannot be co-indexed with the RC subject, which indicates that they projected a base-generated head NP for Japanese RCs. Thus, the analysis of both group and individual data suggests that L1 Chinese learners of L2 Japanese are able to acquire the syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC. According to previous literature, in Japanese, the RC is left adjoined to the head NP and there is no functional category DP involved in the representation of RCs (Fukui & Takano, 2000; Murasugi, 2000). In contrast, in Chinese, there is a DP involved in RCs and, due to the strong uninterpretable feature of D, the head NP is initially raised to [Spec, CP], followed by movement of the remaining clause to [Spec, DP] (Saito et al.,2008; Simpson, 2002). Since L1 Chinese learners of L2 Japanese can change from the head-raising strategy to the head-base-generation strategy for Japanese RCs, under the analysis of the head-raising strategy above, the uninterpretable feature of D that triggers the raising of the head NP must have been revised. This conclusion in turn supports the 'full access to UG' approach but argues against the 'partial access to UG' approach.

To account for how the target syntactic knowledge in Japanese is acquired by L1 Chinese learners, I put forward an argument that there exists potential positive evidence in the input that can lead to the reconstruction of the L2 grammar of Japanese RCs, i.e., RCs whose head NP cannot be interpreted inside RC. By considering the data from both the intermediate and advanced learners in Experiment 3, we can infer that L1 Chinese learners initially project a raised head NP on the basis of their Chinese knowledge. Later when they encounter triggers indicating that the head NP of Japanese RCs is base-generated, they can revise their initial hypothesis and project a base-generated head NP.

If my analysis of the acquisition of Japanese RCs by the L1 Chinese advanced speakers is on the right track, it suggests that when two languages have a superficially similar syntactic structure that involves different underlying syntactic operations involving uninterpretable features, such syntactic difference between the two langauges can be acquired by adult L2 learners. It further implies that the functional domain of UG

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can be accessed and taken advantage of by adult L2 learners to restructure their L2 grammar.

CHAPTER 7. GENERAL DISCUSSION AND CONCLUSION

Chinese and Japanese RCs are superficially similar, but it is still controversial whether their head NPs are derived in the same way. In Chinese RCs, it has been generally agreed that the head NP is raised out of the RC (Aoun & Li, 2003; Huang et al., 2009; Simpson, 2002). Moreover, Aoun and Li (2003) claim that when there is a gap, the head NP is raised out of the RC, whereas when there is an RP, the head NP is base-generated external to the RC. However, among previous theoretical and experimental studies on the acceptability of the RP inside Chinese RCs, it is controversial whether an RP can occur in the subject and object positions of the RC (e.g., Gu, 2001; Yuan & Zhao, 2005). As for Japanese RCs with a gap, one camp of studies argues that the head NP is raised out of the RC (e.g., Hoshi, 2004; Kitao, 2009), while another camp of studies argues that the head NP is base-generated external to the RC (e.g., Fukui & Takano, 2000; Murasugi, 2000).

In this dissertation, I first conducted Experiment 1, an acceptability judgment experiment, to address whether the RP can be grammatically licensed in the subject and object positions of Chinese RCs. The results show that the RP and the gap are not significantly different with respect to their mean ratings at the embedded object position, which suggests that both the raising and base-generation strategies are available to derive the head NP from that position. However, the mean rating of the RP is significantly lower than that of the gap in all other positions, which indicates that the raising strategy is generally preferred over the base-generation strategy to derive the head NP from the subject and object positions of Chinese RCs.

Second, I conducted Experiment 2, a picture-matching truth value judgment experiment, to investigate the derivation of the head NP in Japanese RCs with a gap. The experiment used one important diagnostic to test how the head NP is derived in RCs, i.e., whether an anaphor within the head NP can be co-indexed with the RC subject. In previous studies, one camp of researchers claims that the anaphor *jibun* 'self' cannot refer to the RC subject (e.g., Hoji, 1985), arguing for the analysis that the head NP of Japanese RCs is base-generated external to the RC. In contrast, other researchers claims that both the simplex anaphor *jibun* 'self' and the complex anaphor *jibun-jishin* 'self-self' can be co-indexed with the RC subject (e.g., Hoshi, 2004), which argues for the analysis that the head NP of Japanese RCs is raised out of the RC. By conducting a truth value judgment task that involves both *jibun* and *jibun-jishin*, I found that neither *jibun* nor

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jibun-jishin within the head NP of Japanese RCs can be co-indexed with the RC subject, which strongly implies that the head NP of Japanese RCs is base-generated external to the RC.

Thus, for Chinese and Japanese RCs that involve a gap, the head NP is derived in different ways: in Chinese, the head NP is raised out of the RC while in Japanese, the head NP is base-generated external to the RC.

My next question is whether L1 Chinese learners of L2 Japanese can acquire the syntactic knowledge that the head NP can only be base-generated externally in Japanese RCs. Since Chinese and Japanese RCs are superficially similar, this question can be further generalized to the following two questions that I brought up at the beginning of this dissertation:

(173a) when two languages have a superficially similar syntactic structure that arguably involves different syntactic operations, can L2 learners acquire this difference?

(173b) if successful acquisition of such a difference does occur, in what ways does that inform us about the nature of L2 acquisition of syntax?

To explore the question of whether L1 Chinese learners can acquire the target syntactic knowledge of Japanese RCs, I conducted Experiment 3, a truth value judgment experiment, to examine how L1 Chinese learners interpret the anaphor *jibun* 'self' within the head NP of Japanese RCs. The experimental results suggest that the intermediate learners rely on their L1 knowledge to interpret the anaphor, which further implies that they use the head-raising strategy to derive Japanese RCs. In addition, the advanced learners as a group seem to make a distinction between Chinese and Japanese RCs with respect to the interpretation of the anaphor inside the head NP, as they accepted the RC subject as the antecedent of the anaphor *jibun* significantly less frequently than the RC subject as the antecedent of the anaphor *ziji*. Moreover, six advanced learners consistently rejected the co-reference between *jibun* and the RC subject, which implies that they have successfully acquired the target syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC. Thus, the answer to (173a) is 'yes,' as L1 Chinese learners of L2 Japanese can acquire the underlying syntactic difference between Chinese and Japanese RCs, even though the RCs in the two languages are superficially similar.

Under the analysis that in Chinese RCs, the raising of the head NP is triggered by the strong

uninterpretable feature of D while in Japanese RCs, the RC is left-adjoined to head NP, my experimental findings have two important implications for the L2 research. First, L1 Chinese leaners initially project a raised head NP for Japanese RCs, which indicates that a functional category DP must be involved in their representation of Japanese RCs. This is compatible with the full transfer proposal from the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996): the L1 grammar in its entirety is transferred to the L2 grammar in the initial state. Second, L1 Chinese learners are able to restructure their interlanguage grammar to project a base-generated head NP for Japanese RCs. Such restructuring must involve revising the strong uninterpretable feature of D that triggers the movement of the head NP, based on which we can infer that adult L2 learners are able to access uninterpretable features, which is an answer to (173b). It supports the full access proposal from the Full Transfer/Full Access Hypothesis that all aspects of UG, including the functional domain, can be accessed and taken advantage of by L2 learners to restructure their L2 grammar. It argues against the 'partial access to UG' accounts, which claim that functional/uninterpretable features are not accessible in adult L2 acquisition.

In the following subsections, I summarize the findings of Experiments 1, 2 and 3 and their implications.

7.1 Summary of the findings of Experiment 1 and their implications

In Experiment 1, I conducted an acceptability judgment experiment to examine whether the RP *ta* 'him' can be grammatically licensed in the subject and object positions of Chinese RCs. The results suggest that the RP is generally less preferable than the gap with one exception: the RP is as acceptable as the gap in the doubly embedded object position, as there is no significant mean rating difference between the RP and the gap in that position. Thus, I concluded that the RP is grammatical in the object position of Chinese RCs because, if it is not, it should never be as acceptable as the gap, no matter how many levels it is embedded inside the RC. Under Aoun and Li's (2003) proposal that both the raising and base-generation strategies are available to derive the head NP in Chinese RCs (when there is a gap, the head NP is raised out of the RC whereas when there is an RP, the head NP is base-generated external to the RC), we can conclude that the base-generation strategy can be applied to deriving the head NP from the object position of Chinese RCs.

One question for future studies is whether L1 English learners of Chinese can acquire the knowledge that the RP is grammatical in the object position of Chinese RCs. This is important for the following three reasons. First, there have been many studies showing that the RP is prohibited within English RCs (e.g., Ferreira & Swets, 2005; Keffala & Goodall, 2011). Second, although the RP has been found to be grammatical at the object position of Chinese RCs, it seems to be extremely rare in the input. With an elicited production task, Su (2004) found that Chinese-speaking adults never produced the RP in either subject or object positions of Chinese RCs. Third, based on my consultation with several Chinese language instructors, whether an RP can occur in the object position of Chinese RCs is never taught in Chinese language classes. Thus, there is no input or explicit instruction showing that the RP *ta* is acceptable in the object position of Chinese RCs. If L1 English learners of L2 Chinese are able to acquire the native-like knowledge that the RP is grammatical in the object position of Chinese RCs, we can infer that the learners can develop underdetermined grammatical knowledge.

7.2 Summary of the findings of Experiment 2 and their implications

Experiment 2 approached the issue of whether the simplex anaphor *jibun* 'self' and the complex anaphor *jibun-jishin* 'self-self' within the head NP of Japanese RCs can be co-indexed with the RC subject. The results suggest that neither *jibun* nor *jibun-jishin* can be co-indexed with the RC subject, as evidenced by native Japanese participants' consistent rejection of the items where the anaphor is intended to be co-indexed with the RC subject. Thus, the head NP of Japanese RCs should not be interpreted inside the RC at LF, which implies that it can only be base-generated external to the RC, arguing against the head-raising analysis for Japanese RCs. The finding also suggests that the morphological make-up of the anaphor does not affect its ability to take the RC subject as its antecedent, supporting the head-base-generation analysis of Japanese RCs.

One question open for future studies is whether the complex anaphors *kare-jishin* 'himself' and *kanojo-jishin* 'herself' within the head NP of Japanese RCs can be co-indexed with the RC subject. Ishii (1991) provided the following example to argue that the head NP can reconstruct within the RC:

(174) Mary-wa   [John$_i$-ga e$_j$ taipushi-ta] [kare-jishin$_i$-no ronbun-o]$_j$ motteki-ta.
      Mary-TOP   John-NOM   type-PST   himself-GEN   paper-ACC   bring-PST
      'Mary brought himself$_i$'s paper that John$_i$ typed.'   (Ishii, 1991, p. 29)

Ishii claims that the anaphor *kare-jishin* 'himself' in (174) can be bound by the RC subject *John*, which suggests that the head NP can be interpreted within the RC at LF. Thus, syntactic movement must be involved. However, in (174), the RC subject *John* is the only candidate for the anaphor *kare-jishin* 'himself.' Even if the head NP does not reconstruct within the RC, *kare-jishin* might be co-indexed with the RC subject *John* through its logophoric property. In future studies, I plan to conduct a truth value judgment task that involves sentences like (175), where the complex anaphor is semantically compatible with both the matrix subject and the RC subject:

(175) Mickey$_j$-ga [Donald$_k$-ga e$_i$ taipushi-ta] [kare-jishin$_{j/k}$-noronbun-o]$_i$ motteki-ta.
      Mickey-NOM Donald-NOM type-PST   himself-GEN   paper-ACC   bring-PST
      'Mickey$_j$ brought himself$_{j/k}$'s paper that Donald$_k$ typed.'

Based on my consultation with several native speakers of Japanese, the judgments on whether *kare-jishin* can refer to the RC subject *Donald* in (175) vary. Therefore, a truth value judgment task, similar to Experiment 2, is necessary.

7.3 Summary of the findings of Experiment 3 and their implications

Experiment 3 was conducted to examine whether L1 Chinese learners of L2 Japanese are able to acquire the underlying syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC. To that end, the experiment investigated whether L1 Chinese learners have knowledge of the constraint that the anaphor *jibun* within the head NP cannot be co-indexed with the RC subject. This knowledge is underdetermined because it cannot be directly derived from input, classroom instruction or the learners' L1 Chinese. In my experiment, the L2 participants were divided into an intermediate learner group and an advanced learner group, depending on their Japanese proficiency. The results suggest that the intermediate learners use the raising strategy to derive the head NP of Japanese RCs, as evidenced by their consistent acceptance of items where the anaphor *jibun* is intended to be co-indexed with the RC subject. This is predicted by the full transfer proposal that L2 learners initially transfer the whole of their L1 knowledge to the L2 grammar (e.g., Schwartz & Sprouse, 1994, 1996). By contrast, the results from the

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advanced learners suggest that they make a distinction between Chinese and Japanese RCs with respect to the interpretation of an anaphor inside the head NP. That is, they accepted the RC subject as the antecedent of the Japanese anaphor *jibun* significantly less frequently than the RC subject as the antecedent of the Chinese anaphor *ziji*. Moreover, an examination of the individual learners' data reveal that six advanced learners consistently rejected the items where *jibun* is intended to be co-indexed with the RC subject, behaving like the L1 Japanese participants. This implies that they have successfully acquired the underlying syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC. This finding has important implications for whether UG is fully accessible to adult L2 learners. According to previous literature, in Japanese RCs, the RC is left-adjoined to the head NP without involving a functional category DP, whereas in Chinese RCs, the head NP is initially raised to [Spec, CP] due to the strong uninterpretable feature of D, which is followed by movement of the remaining clause to [Spec, DP]. Based on the results of Experiment 3, L1 Chinese learners should initially project a raised head NP for Japanese RCs, which suggests that a functional DP is involved in the L2 representation of Japanese RCs and the D triggers the raising of the head NP. As their Japanese proficiency develops, some of the learners are able to restructure their interlanguage grammar and project a base-generated head NP for Japanese RCs. This indicates that the strong uninterpretable feature of the D must have been accessed and revised. Thus, these findings support the claim from the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996) that all aspects of UG are available in adult L2 acquisition, and argue against 'partial access to UG' accounts such as the Interpretability Hypothesis (Tsimpli & Dimitrakopoulou, 2007).

There are some remaining issues, however. First, as we have seen, there are only six advanced learners who seem to have successfully acquired the target syntactic knowledge. This may be because most participants' Japanese proficiency was not high enough. In future work, I plan to run the same experiment with learners with higher Japanese proficiency. Second, as I suggested in Chapter 6, there is possible positive evidence in the input that leads L1 Chinese learners to acquire the syntactic knowledge that the head NP of Japanese RCs must be base-generated external to the RC:

(176) ashita   John_j-ga   [pro_{j/k/h} kyoo e_i tsukuru] [Mary_k-no keiki]_i-o   taberu.
      tomorrow John-NOM   today   make   Mary-GEN cake-ACC   eat
      (i) 'Tomorrow John_j will eat Mary's cake that he_j is making today.'
      (ii) 'Tomorrow John will eat Mary_k's cake that she_k is making today.'
      (iii) 'Tomorrow John will eat Mary's cake that someone_h is making today.'

The available interpretation (ii) in (176) can be positive evidence for L1 Chinese learners to acquire the syntactic knowledge that the head NP of Japanese RCs is base-generated externally. In future research, I plan to explore whether L1 Chinese learners have the knowledge that the interpretation (ii) in (176) is possible in Japanese and whether such knowledge co-occurs with (or at least precedes) the target knowledge of the anaphor binding constraint. If there is a correlation in the emergence of the two pieces of knowledge or an implicational relation of (ii) necessarily being acquired first, it would support the argument that sentences like (176) lead L1 Chinese learners to acquire the syntactic knowledge that the head NP of Japanese RCs is base-generated externally.

7.4 Concluding Remarks

This dissertation aimed to explore whether L1 Chinese learners of L2 Japanese can acquire the underlying syntactic knowledge that the head NP of Japanese RCs is base-generated external to the RC, in order to address the following two general questions in the context of L2 acquisition:

(177a) when two languages have a superficially similar syntactic structure that arguably
       involves different syntactic operations, can L2 learners acquire this difference?

(177b) if successful acquisition of such difference does occur, in what ways does that inform us
       about the nature of L2 acquisition of syntax?

Before delving into the two L2 questions above, I first addressed two controversial issues relating to head derivation in Chinese and Japanese RCs. First, whether an RP can be grammatically licensed in the subject and object positions of Chinese RCs is controversial in previous studies. Second, it is debated whether the head NP of Japanese RCs with a gap is base-generated external to or raised out of the RC. One major reason is that researchers in previous studies have different intuitions on whether the anaphor within the head NP can be co-indexed

with the RC subject. Therefore, the first half of the dissertation was devoted to addressing the following two issues: (i) whether the RP is grammatical at the subject and object positions of Chinese RCs, and (ii) whether the anaphor within the head NP of Japanese RCs can be co-indexed with the RC subject. The first issue was examined with an acceptability judgment experiment. The results suggest that the RP can be grammatically licensed at the object position of Chinese RCs, which implies that the base-generation strategy, along with the raising strategy, is available to derive the head NP from the object position of Chinese RCs. The second issue was approached with a picture-matching truth value judgment experiment. The results show that neither the simplex anaphor *jibun* nor the complex anaphor *jibun-jishin* can be co-indexed with the RC subject, which supports the proposal that the head NP is base-generated externally in Japanese RCs with a gap.

After getting a clearer picture of how the head NP of RCs is derived in Chinese and Japanese, in the second half of the dissertation, I investigated whether L1 Chinese learners of Japanese can acquire the underlying syntactic knowledge that the head NP of Japanese RCs is base-generated externally. The results suggest that learners initially use the head-raising strategy to derive Japanese RCs. However, they are able to restructure their interlanguage grammar and project a base-generated head NP for Japanese RCs. These findings support the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996) and simultaneously argue against 'partial access to UG' accounts (e.g., Smith & Tsimpli, 1995; Tsimpli & Dimitrakopoulou, 2007).

Appendix A. Test stimuli and results of Experiment 1

A. Critical items

Number	Lexical items			With a gap	With an RP
1	袭击 attack	Subject	Singly embedded	那里有袭击了店员的那个罪犯。 The criminal that attacked the cashier is there.	那里有他袭击了店员的那个罪犯。 The criminal that (he) attacked the cashier is there.
			Doubly embedded	那里有警察断定袭击了店员的那个罪犯。 The criminal that the policeman asserted attacked the cashier is there.	那里有警察断定他袭击了店员的那个罪犯。 The criminal that the policeman asserted (he) attacked the cashier is there.
		Object	Singly embedded	那里有罪犯袭击了的那个店员。 The cashier that the criminal attacked is there.	那里有罪犯袭击了他的那个店员。 The cashier that the criminal attacked (him) is there.
			Doubly embedded	那里有警察断定罪犯袭击了的那个店员。 The cashier that the policeman asserted the criminal attacked is there.	那里有警察断定罪犯袭击了他的那个店员。 The cashier that the policeman asserted the criminal attacked (him) is there.
2	辞退 fire	Subject	Singly embedded	那里有辞退了员工的那个经理。 The manager that fired the staff is there.	那里有他辞退了员工的那个经理。 The manager that (he) fired the staff is there.
			Doubly embedded	那里有秘书看到辞退了员工的那个经理。 The manager that the secretary saw fired the staff is there.	那里有秘书看到他辞退了员工的那个经理。 The manager that the secretary saw (he) fired the staff is there.
		Object	Singly embedded	那里有经理辞退了的那个员工。 The worker that the manager fired	那里有经理辞退了他的那个员工。 The worker that the manager fired (him) is

				is there.	there.
			Doubly embedded	那里有秘书看到经理辞退了的那个员工。 The staff that the secretary saw the manager fired is there.	那里有秘书看到经理辞退了他的那个员工。 The staff that the secretary saw the manager fired (him) is there.
3	训斥 blame	Subject	Singly embedded	那里有训斥了工人的那个科长。 The section head that blamed the worker is there.	那里有他训斥了工人的那个科长。 The section head that (he) blamed the worker is there.
			Doubly embedded	那里有保安看见训斥了工人的那个科长。 The section head that the security guard saw blamed the worker is there.	那里有保安看见他训斥了工人的那个科长。 The section head that the security guard saw (he) blamed the worker is there.
		Object	Singly embedded	那里有科长训斥了的那个工人。 The worker that the section head blamed is there.	那里有科长训斥了他的那个工人。 The worker that the section head blamed (him) is there.
			Doubly embedded	那里有保安看到科长训斥了的那个工人。 The worker that the security guard saw the section head blamed is there.	那里有保安看到科长训斥了他的那个工人。 The worker that the security guard saw the section head blamed (him) is there.
4	指导 supervise	Subject	Singly embedded	那里有指导了新教师的那个副校长。 The vice headmaster that supervised the new teacher is there.	那里有他指导了新教师的那个副校长。 The vice headmaster that (he) supervised the new teacher is there.
			Doubly embedded	那里有学生听说指导了新教师的那个副校长。 The vice headmaster that students heard	那里有学生听说他指导了新教师的那个副校长。 The vice headmaster that students heard (he) supervised the new

				supervised the new teacher is there.	teacher is there.
		Object	Singly embedded	那里有副校长指导了的那个新教师。 The new teacher that the vice headmaster supervised is there.	那里有副校长指导了他的那个新教师。 The new teacher that the vice headmaster supervised (him) is there.
			Doubly embedded	那里有学生听说副校长指导了的那个新教师。 The new teacher that students heard the vice headmaster supervised is there.	那里有学生听说副校长指导了他的那个新教师。 The new teacher that students heard the vice headmaster supervised (him) is there.
5	抢劫 rob	Subject	Singly embedded	那里有抢劫了路人的那个土匪。 The bandit that robbed the pedestrian is there.	那里有他抢劫了路人的那个土匪。 The bandit that (he) robbed the pedestrian is there.
			Doubly embedded	那里有城管看见抢劫了路人的那个土匪。 The bandit that the policeman saw robbed the pedestrian is there.	那里有城管看见他抢劫了路人的那个土匪。 The bandit that the policeman saw (he) robbed the pedestrian is there.
		Object	Singly embedded	那里有土匪抢劫了的那个路人。 The pedestrian that the bandit robbed is there.	那里有土匪抢劫了他的那个路人。 The pedestrian that the bandit robbed (him) is there.
			Doubly embedded	那里有城管看见土匪抢劫了的那个路人。 The pedestrian that the policeman saw the bandit robbed is there.	那里有城管看见土匪抢劫了他的那个路人。 The pedestrian that the policeman saw the bandit robbed is there.

6	接待 serve	Subject	Singly embedded	那里有接待了外宾的那个厨师。 The cook that served the foreign guest is there.	那里有他接待了外宾的那个厨师。 The cook that (he) served the foreign guest is there.
			Doubly embedded	那里有服务员确定接待了外宾的那个厨师。 The cook that the waiter believed served the foreign guest is there.	那里有服务员确定他接待了外宾的那个厨师。 The cook that the waiter believed (he) served the foreign guest is there.
		Object	Singly embedded	那里有厨师接待了的那个外宾。 The foreign guest that the cook served is there.	那里有厨师接待了他的那个外宾。 The foreign guest that the cook served (him) is there.
			Doubly embedded	那里有服务员确定厨师接待了的那个外宾。 The foreign guest that the waiter believed the cook served is there,	那里有服务员确定厨师接待了他的那个外宾。 The foreign guest that the waiter believed the cook served (him) is there,
7	拘捕 arrest	Subject	Singly embedded	那里有拘捕了出纳员的那个检察官。 The prosecutor that arrested the cashier is there.	那里有他拘捕了出纳员的那个检察官。 The prosecutor that (he) arrested the cashier is there.
			Doubly embedded	那里有法官确定拘捕了出纳员的那个检察官。 The prosecutor that the lawyer asserted arrested the cashier is there.	那里有法官确定他拘捕了出纳员的那个检察官。 The prosecutor that the lawyer asserted (he) arrested the cashier is there.
		Object	Singly embedded	那里有检察官拘捕了的那个出纳员。 The cashier that the prosecutor arrested is there.	那里有检察官拘捕了他的那个出纳员。 The cashier that the prosecutor arrested (him) is there.
			Doubly embedded	那里有法官确定检察官拘捕了的	那里有法官确定检察官拘捕了他的那个出

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				那个出纳员。 The cashier that the lawyer asserted the prosecutor arrested is there.	纳员。 The cashier that the lawyer asserted the prosecutor arrested (him) is there.
8	培训 train	Subject	Singly embedded	那里有培训了实习生的那个主管。 The manager that trained the intern is there.	那里有他培训了实习生的那个主管。 The manager that (he) trained the intern is there.
			Doubly embedded	那里有老板看见培训了实习生的那个主管。 The manager that the boss saw trained the intern is there.	那里有老板看见他培训了实习生的那个主管。 The manager that the boss saw (he) trained the intern is there.
		Object	Singly embedded	那里有主管培训了的那个实习生。 The intern that the manager trained is there.	那里有主管培训了他的那个实习生。 The intern that the manager trained (him) is there.
			Doubly embedded	那里有老板看到主管培训了的那个实习生。 The intern that the boss saw the manager trained is there.	那里有老板看到主管培训了他的那个实习生。 The intern that the boss saw the manager trained (him) is there.
9	找到 find	Subject	Singly embedded	那里有找到了小男孩的那个巡逻员。 The patrol that found the little boy is there.	那里有他找到了小男孩的那个巡逻员。 The patrol that (he) found the little boy is there.
			Doubly embedded	那里有保安看见找到了小男孩的那个巡逻员。 The patrol that the security guard saw found the little boy is there.	那里有保安看见他找到了小男孩的那个巡逻员。 The patrol that the security guard saw (he) found the little boy is there.
		Object	Singly embedded	那里有巡逻员找到了的那个小男孩。	那里有巡逻员找到了他的那个小男孩。 The little boy that the

				The little boy that the patrol found is there.	patrol found (him) is there.
			Doubly embedded	那里有保安看见巡逻员找到了的那个小男孩。 The little boy that the security guard saw the patrol found is there.	那里有保安看见巡逻员找到了他的那个小男孩。 The little boy that the security guard saw the patrol found (him) is there.
10	捉住 catch	Subject	Singly embedded	那里有捉住了小偷的那个大学生。 The college student that caught the thief is there.	那里有他捉住了小偷的那个大学生。 The college student that (he) caught the thief is there.
			Doubly embedded	那里有交警看见捉住了小偷的那个大学生。 The college student that the policeman saw caught the thief is there.	那里有交警看见他捉住了小偷的那个大学生。 The college student that the policeman saw (he) caught the thief is there.
		Object	Singly embedded	那里有大学生捉住了的那个小偷。 The thief that the college student caught is there.	那里有大学生捉住了他的那个小偷。 The thief that the college student caught (him) is there.
			Doubly embedded	那里有交警看见大学生捉住了的那个小偷。 The thief that the policeman saw the college student caught is there.	那里有交警看见大学生捉住了他的那个小偷。 The thief that the policeman saw the college student caught (him) is there.
11	提拔 promote	Subject	Singly embedded	那里有提拔了实习生的那个部门经理。 The department manager that promoted the intern is there.	那里有他提拔了实习生的那个部门经理。 The department manager that (he) promoted the intern is there.
			Doubly embedded	那里有秘书说提拔了实习生的那	那里有秘书说他提拔了实习生的那个部门

				个部门经理。 The department manager that the secretary said promoted the intern is there.	经理。 The department manager that the secretary said (he) promoted the intern is there.
		Object	Singly embedded	那里有部门经理提拔了的那个实习生。 The intern that the department manager promoted is there.	那里有部门经理提拔了他的那个实习生。 The intern that the department manager promoted (him) is there.
			Doubly embedded	那里有秘书说部门经理提拔了的那个实习生。 The intern that the secretary said the department manager promoted is there.	那里有秘书说部门经理提拔了他的那个实习生。 The intern that the secretary said the department manager promoted (him) is there.
12	打 beat	Subject	Singly embedded	那里有打了班主任的那个学生家长。 The student parent that beat the head teacher is there.	那里有他打了班主任的那个学生家长。 The student parent that (he) beat the head teacher is there.
			Doubly embedded	那里有校长确定打了班主任的那个学生家长。 The student parent that the headmaster confirmed beat the head teacher is there.	那里有校长确定他打了班主任的那个学生家长。 The student parent that the headmaster confirmed (he) beat the head teacher is there.
		Object	Singly embedded	那里有学生家长打了的那个班主任。 The head teacher that the student parent beat is there.	那里有学生家长打了的他那个班主任。 The head teacher that the student parent beat (him) is there.
			Doubly embedded	那里有校长确定学生家长打了的	那里有校长确定学生家长打了他的那个班

				那个班主任。 The head teacher that the headmaster confirmed the student parent beat is there.	主任。 The head teacher that the headmaster confirmed the student parent beat (him) is there.
13	制止 stop	Subject	Singly embedded	那里有制止了小贩的那个警察。 The policeman that stopped the vendor is there.	那里有他制止了小贩的那个警察。 The policeman that (he) stopped the vender is there.
			Doubly embedded	那里有市长看到制止了小贩的那个警察。 The policeman that the mayor saw stopped the vendor is there.	那里有市长看到他制止了小贩的那个警察。 The policeman that the mayor saw (he) stopped the vendor is there.
		Object	Singly embedded	那里有警察制止了的那个小贩。 The vendor that the policeman stopped is there.	那里有警察制止了他的那个小贩。 The vendor that the policeman stopped (him) is there.
			Doubly embedded	那里有市长看到警察制止了的那个小贩。 The vendor that the mayor saw the policeman stopped is there.	那里有市长看到警察制止了他的那个小贩。 The vendor that the mayor saw the policeman stopped is there.
14	绑架 kidnap	Subject	Singly embedded	那里有绑架了富豪的那个强盗。 The burglar that kidnapped the rich man is there.	那里有他绑架了富豪的那个强盗。 The burglar that (he) kidnapped the rich man is there.
			Doubly embedded	那里有警察确定绑架了富豪的那个强盗。 The burglar that the policeman confirmed kidnapped the rich man is there.	那里有警察确定他绑架了富豪的那个强盗。 The burglar that the policeman confirmed (he) kidnapped the rich man is there.
		Object	Singly embedded	那里有强盗绑架了的那个富豪。 The rich man that the burglar	那里有强盗绑架了他的那个富豪。 The rich man that the burglar kidnapped

				kidnapped is there.	(him) is there.
			Doubly embedded	那里有警察确定强盗绑架了的那个富豪。 The rich man that the policeman confirmed the burglar kidnapped is there.	那里有警察确定强盗绑架了他的那个富豪。 The rich man that the policeman confirmed the burglar kidnapped (him) is there.
15	贿赂 bribe	Subject	Singly embedded	那里有贿赂了省长的那个企业家。 The entrepreneur that bribed the governor is there.	那里有他贿赂了省长的那个企业家。 The entrepreneur that (he) bribed the governor is there.
			Doubly embedded	那里有检察官确定贿赂了省长的那个企业家。 The entrepreneur that the prosecutor confirmed bribed the governor is there.	那里有检察官确定他贿赂了省长的那个企业家。 The entrepreneur that the prosecutor confirmed (he) bribed the governor is there.
		Object	Singly embedded	那里有企业家贿赂了的那个省长。 The governor that the entrepreneur bribed is there.	那里有企业家贿赂了他的那个省长。 The governor that the entrepreneur bribed (him) is there.
			Doubly embedded	那里有检察官确定企业家贿赂了的那个省长。 The governor that the prosecutor confirmed the entrepreneur bribed is there.	那里有检察官确定企业家贿赂了他的那个省长。 The governor that the prosecutor confirmed the entrepreneur bribed (him) is there.
16	招待 treat	Subject	Singly embedded	那里有招待了公务员的那个局长。 The department director that treated the civil servant is there.	那里有他招待了公务员的那个局长。 The department director that (he) treated the civil servant is there.
			Doubly embedded	那里有秘书说招	那里有秘书说他招待

				待了公务员的那个局长。 The department director that the secretary said treated the civil servant is there.	了公务员的那个局长。 The department director that the secretary said (he) treated the civil servant is there.
		Object	Singly embedded	那里有局长招待了的那个公务员。 The civil servant that the department director treated is there.	那里有局长招待了他的那个公务员。 The civil servant that he department director treated (him) is there.
			Doubly embedded	那里有秘书说局长招待了的那个公务员。 The civil servant that the secretary said department director treated is there.	那里有秘书说局长招待了他的那个公务员。 The civil servant that the secretary said department director treated (him) is there.

B. Fillers

Type	Sentence
Type 1	那个学生，老师刚才发现了看的漫画。 The student, the teacher just found the manga that (he) read.
Type1	那个秘书，清洁工刚才找到了丢了的文件。 The secretary, the janitor just found the file that (he) lost.
Type1	那个嫌疑犯，巡警刚才发现了烧掉的财物。 The criminal, the policeman just found the money that (he) burned.
Type1	那个护士，医生刚才检查了购买的水杯。 The nurse, the doctor just examined the water bottle that (she) bought.
Type1	那个教授，学生刚才订购了他写的著作。 The professor, the student just ordered the book that (he) wrote.
Type1	那个工人，主管刚才试用了他制作的模具。 The worker, the manager just tried the tool that (he) made.
Type1	那个理发师，顾客刚才用了他推荐的洗发水。 The barber, the customer just used the shampoo that (he) recommended.
Type1	那个客户，经理刚才拿到了他填的问卷表。 The customer, the manager just received the questionnaire that(he) filled out.
Type2	女孩喂了他牵的狗的那个男孩在那里。 The boy whose dog (that he was taking along) was fed by the girl is there.
Type2	女校长否决了他申请的科研项目的那个教授在那里。 The professor whose research project (that he applied for) was rejected by the female chancellor is there.
Type2	女教授修改了他做的数学模型的那个同学在那里。 The student whose math model (that he created) was revised by the female professor is there.
Type2	女飞行员收到了他发送的警报的那个雷达站员在那里。 The radar station staff whose message (that he sent out) was received by the female pilot is there.
Type2	女市长采用了他撰写的演讲稿的那个秘书在那里。 The secretary whose speech script (that he wrote) was adopted by the female mayor is there.
Type2	女店长收购了他捕捞的大闸蟹的那个渔夫在那里。 The fisherman whose crab (that he caught) was bought by the female shop owner.
Type2	女警察检查了他携带的烟酒的那个生意人在那里。 The businessman whose cigarettes and alcohol (that he has) were examined by the policewoman is there.
Type2	女总统吃了他制作的泡菜的那个厨师在那里。 The cook whose pickles (that he made) were eaten by the female president is there.

C. Instruction and practice items

Type	sentence
Instruction Item1	这被抱怨经常的服务员。 The server that is often complained about.
Instruction Item2	学的人越来越多的计算机知识已经非常普及了。 The computer knowledge that more and more people are learning is very prevalent.
Instruction Item3	他的妈妈长得非常漂亮。 His mother looks very beautiful.
Practice Item1	她读一直文章很仔细。 She always reads essays carefully.
Practice Item2	吃的牛肉越来越多的土耳其人只能依赖进口。 The Turkish people that eat more and more beef have to rely on imports.
Practice Item3	这是最新款的吸尘器。 This is the newest vacuum cleaner.
Practice Item4	我出去倒水一下。 I am going out to get water.
Practice Item5	张红被李强在房间打了她。 Zhanghong was beaten by Liqiang at home.
Practice Item6	桌子被张强打断了三条腿。 Three legs of the table were destroyed by Liqiang
Practice Item7	苹果是我最喜欢吃的水果。 The apple is my favorite fruit.
Practice Item8	老虎四只被狮子三只攻击了。 Four tigers were attacked by three lions.
Practice Item9	这里有四匹大象和六条狮子。 Here are four elephants and six lions.

D. Results (participants' mean scores in each condition)

Participants' ID	SGS	SRS	SGE	SRE	OGS	ORS	OGE	ORE
P1	4	4	6	4.5	5	3.5	5	4
P2	7	5.5	4.5	5.5	7	5.5	6.5	5.5
P3	5.5	3	4	3	3	1.5	4.5	4
P4	4.5	2	4.5	2	2.5	3	1.5	1
P5	5.5	3	5.5	3	5	3.5	2.5	4.5
P6	5.5	4.5	5.5	4	4	3.5	5	4.5
P7	7	6	6	5	6.5	4	7	6
P8	5.5	5	6	1	5.5	6	6	5
P9	7	3.5	6.5	6	7	2	6.5	4
P10	5	4	4	3.5	5	3.5	3.5	4.5
P11	7	2.5	7	4	4	4	6.5	1
P12	7	4.5	4.5	4	5.5	5	3.5	3
P13	6.5	3	4	3	6	4.5	3.5	5
P14	5.5	5.5	2.5	1.5	5	1.5	3.5	2
P15	6	4.5	4.5	5.5	5.5	5.5	6	5
P16	6	3.5	4	2.5	4	2.5	2.5	2.5
P17	6	2	1	1.5	4.5	2	4.5	4
P18	6	2.5	2	1.5	3	2	4	1
P19	5.5	5.5	6.5	5.5	6	4.5	5.5	5
P20	7	6	5.5	4.5	6	6.5	5.5	5.5
P21	6.5	1.5	5.5	3	7	4.5	4.5	3
P22	7	6	7	5	7	6	5	5
P23	6	2	3	2.5	6	4.5	6	4.5
P24	6.5	1	4	4	5	3	1	4
P25	4.5	2.5	3	3.5	6	4	4	3.5
P26	2.5	2	1.5	2	3	3	2	3
P27	6	4.5	5	5.5	6.5	4	4	5.5
P28	4	4	3	2	3.5	3.5	3	2
P29	6	3.5	4.5	2	5.5	4	2.5	3
P30	5.5	2.5	2.5	2.5	5	3	3.5	3
P31	7	3.5	5.5	4.5	7	5.5	6.5	5.5
P32	5	3.5	4	4	4.5	4	5	3.5

Appendix B. Test stimuli and results of Experiment 2

I. Critical items (c is a literal translation in English)

(1)

a. ミッキーがデイジーがふんだ自分の写真を修復した。

b. ミッキーがデイジーがふんだ自分自身の写真を修復した。

c. Mickey fixed self's photo that Daisy stepped on.

(2)

a. デイジーがミッキーが壊した自分のパソコンを修理した。

b. デイジーがミッキーが壊した自分自身のパソコンを修理した。

c. Daisy repaired self's computer that Mickey broke.

(3)
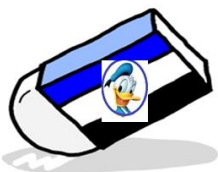
a. ドナルドがミニーが落とした自分の消しゴムを拾った。

b. ドナルドがミニーが落とした自分自身の消しゴムを拾った。

c. Donald picked up self's eraser that Minnie dropped.

(4)

a.ミニーがドナルドが買った自分のビールをひやした。

b.ミニーがドナルドが買った自分自身のビールをひやした。

c. Minnie cooled self's beer that Donald bought.

(5)

a.ミッキーがデイジーが買った自分の家を掃除した。

b.ミッキーがデイジーが買った自分自身の家を掃除した。

c. Mickey cleaned self's home that Daisy bought.

(6)

a.ミニーがドナルドが作った自分の弁当を温めた。

b.ミニーがドナルドが作った自分自身の弁当を温めた。

c. Minnie heated self's bento that Donald made.

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(7)

a.デイジーがミッキーが汚した自分の帽子を洗った。

b.デイジーがミッキーが汚した自分自身の帽子を洗った。

c. Daisy washed self's hat that Mickey stained.

(8)

a. ドナルドがミニーが使った自分の日焼け止めを捨てた。

b. ドナルドがミニーが使った自分自身の日焼け止めを捨てた。

c. Donald threw away self's sunscreen that Minnie used.

(9)

a.ミッキーがデイジーが買った自分のスーツケースをチェックした。

b.ミッキーがデイジーが買った自分自身のスーツケースをチェックした。

c. Mickey checked self's suitcase that Daisy bought.

(10)

a.ミニーがドナルドが消した自分のテレビを拭いた。

b.ミニーがドナルドが消した自分自身のテレビを拭いた。

c. Minnie wiped self's TV that Donald turned off.

(11)
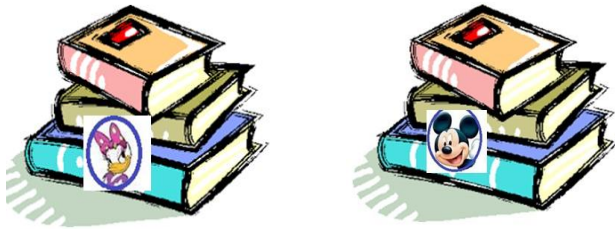
a.デイジーがミッキーが借りた自分の本を整えた。

b.デイジーがミッキーが借りた自分自身の本を整えた。

c. Daisy organized self's books that Mickey borrowed.

(12)

a. ドナルドがミニーが使った自分のパソコンを点検した。

b. ドナルドがミニーが使った自分自身のパソコンを点検した。

c. Donald checked self's computer that Minnie used.

(13)

a. ミッキーがデイジーが印刷した自分の論文を直した。

b. ミッキーがデイジーが印刷した自分自身の論文を直した。

c. Mickey revised self's thesis that Daisy printed out.

(14)

a. デイジーがミッキーが降ろした自分の荷物を運んだ。

b. デイジーがミッキーが降ろした自分自身の荷物を運んだ。

c. Daisy carried self's luggage that Mickey unloaded.

(15)

a. ミニーがドナルドが買った自分のアパートを掃除した。

b. ミニーがドナルドが買った自分自身のアパートを掃除した。

c. Minnie cleaned self's apartment that Donald bought.

(16)
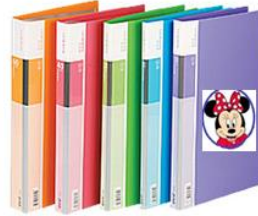
a. ドナルドがミニーが書いた自分の資料を訂正した。

b. ドナルドがミニーが書いた自分自身の資料を訂正した。

c. Donald edited self's materials that Minnie wrote.

(17)

a. ミッキーがデイジーが汚した自分の宝石を磨いた。

b. ミッキーがデイジーが汚した自分自身の宝石を磨いた。

c. Mickey cleaned self's jade that Daisy stained.

(18)

a. ドナルドがミニーがやぶった自分のテーブルかけを縫った。

b. ドナルドがミニーがやぶった自分自身のテーブルかけを縫った。

c. Donald sewed self's table cloth that Minnie tore apart.

(19)

a. デイジーがミッキーがなくした自分の財布を見つけた。

b. デイジーがミッキーがなくした自分自身の財布を見つけた。

c. Daisy found self's wallet that Mickey lost.

(20)

a. ミニーがドナルドが汚した自分の靴下を洗った。

b. ミニーがドナルドが汚した自分自身の靴下を洗った。

c. Minnie washed self's socks that Donald stained.

(21)

a. ドナルドがミニーが買った自分のノートを使った。

b. ドナルドがミニーが買った自分自身のノートを使った。

c. Donald used self's notebook that Minnie bought.

(22)

a. ミニーがドナルドが洗った自分の服を汚した。

b. ミニーがドナルドが洗った自分自身の服を汚した。

c. Minnie stained self's clothes that Donald washed.

(23)
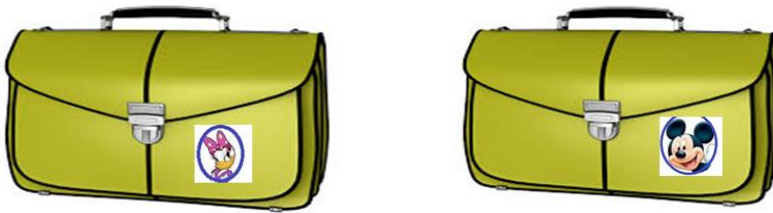
a. デイジーがミッキーが縫った自分のかばんを汚した。

b. デイジーがミッキーが縫った自分自身のかばんを汚した。

c. Daisy stained self's bag that Mickey sewed.

(24)

a. ミッキーがデイジーが建てた自分の別荘を掃除した。

b. ミッキーがデイジーが建てた自分自身の別荘を掃除した。

c. Mickey cleaned self's villa that Daisy built.

(25)

a. ドナルドがミニーがおいた自分の花瓶を壊した。

b. ドナルドがミニーがおいた自分自身の花瓶を壊した。

c. Donald broke self's vase that Minnie left.

(26)

a. ミニーがドナルドが作った自分の収納ボックスをなくした。

b. ミニーがドナルドが作った自分自身の収納ボックスをなくした。

c. Minnie lost self's storage box that Donald made.

(27)

a. デイジーがミッキーが直した自分のプリンターを使った。

b. デイジーがミッキーが直した自分自身のプリンターを使った。

c. Daisy used self's printer that Mickey fixed.

(28)
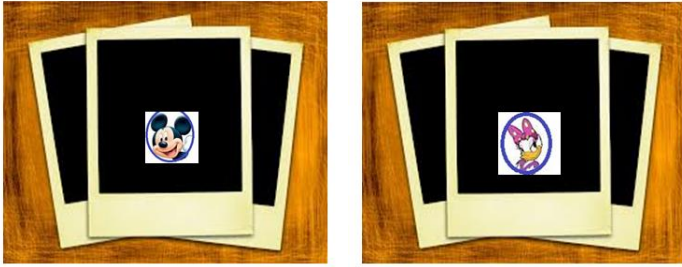
a. ミッキーがデイジーが印刷した自分の写真を保存した。

b. ミッキーがデイジーが印刷した自分自身の写真を保存した。

c. Mickey saved self's photos that Daisy printed.

(29)
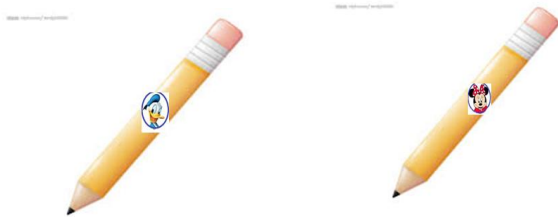
a. ドナルドがミニーが削った自分の鉛筆を使った。

b. ドナルドがミニーが削った自分自身の鉛筆を使った。

c. Donald used self's pencil that Minnie sharpened.

(30)

a. ミニーがドナルドが設計した自分の飛行機を操縦した。

b. ミニーがドナルドが設計した自分自身の飛行機を操縦した。

c. Minnie piloted the airplane that Donald designed.

(31)
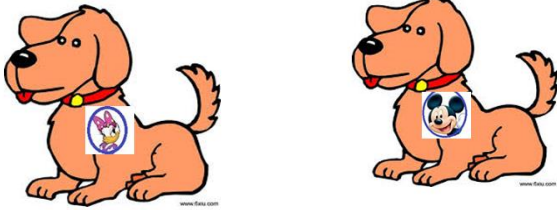
a. デイジーがミッキーが飼った自分の犬を売った。

b. デイジーがミッキーが飼った自分自身の犬を売った。

c. Daisy sold self's dog that Mickey raised.

(32)

a. ミッキーがデイジーが買った自分の扇風機をつけた。

b. ミッキーがデイジーが買った自分自身の扇風機をつけた。

c. Mickey turned on self's fan that Daisy bought.

(33)

a. ドナルドがミニーが買った自分のパソコンを壊した。

b. ドナルドがミニーが買った自分自身のパソコンを壊した。

c. Donald broke self's computer that Minnie bought.

(34)

a. ミニーがドナルドが注文した自分のキャリーバッグを拭いた。

b. ミニーがドナルドが注文した自分自身のキャリーバッグを拭いた。

c. Minnie wiped self's roller bag that Donald ordered.

(35)
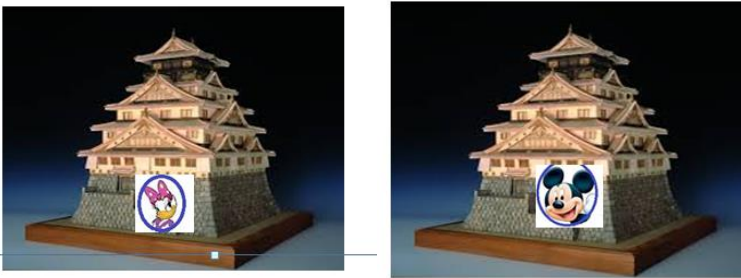
a. デイジーがミッキーが作った自分の城を飾った。

b. デイジーがミッキーが作った自分自身の城を飾った。

c. Daisy decorated self's castle that Mickey made.

(36)

a. ミッキーがデイジーが焼いた自分のケーキを食べた。

b. ミッキーがデイジーが焼いた自分自身のケーキを食べた。

c. Mickey ate self's cake that Daisy baked.

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(37)

a. ドナルドがミニーが作成した自分の手帳をなくした。

b. ドナルドがミニーが作成した自分自身の手帳をなくした。

c. Donald lost self's planner that Minnie made.

(38)

a. ミニーがドナルドが醸造した自分のワインを飲んだ。

b. ミニーがドナルドが醸造した自分自身のワインを飲んだ。

c. Minnie drank self's wine that Donald made.

(39)
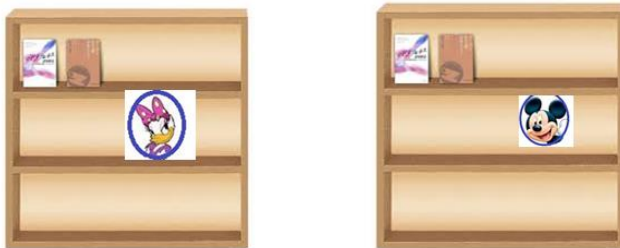
a. デイジーがミッキーが作った自分の本棚を使った。

b. デイジーがミッキーが作った自分自身の本棚を使った。

c. Daisy used self's book shelf that Mickey made.

(40)

a. ミッキーがデイジーが修理した自分の車を運転した。

b. ミッキーがデイジーが修理した自分自身の車を運転した。

c. Mickey drove self's car that Daisy repaired.

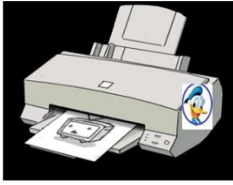II. Type 1 fillers (c is a literal translation in English)

(1)

a.ミッキーがデイジーに自分の本を貸した。

b.ミッキーがデイジーに自分自身の本を貸した。

c. Mickey lent Daisy self's book.

(2)

a. デイジーがミッキーに自分の荷物を渡した。

b. デイジーがミッキーに自分自身の荷物を渡した。
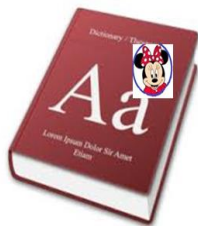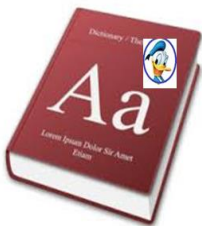
c. Daisy handed over Mickey self's luggage.

(3)
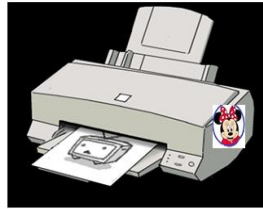
a. ドナルドがミニーに自分のプリンターを貸した。

b. ドナルドがミニーに自分自身のプリンターを貸した。

c. Donald lent Minnie self's printer.

(4)

a. デイジーがミッキーに自分の電卓をあげた。

b. デイジーがミッキーに自分自身の電卓をあげた。

c. Daisy gave Mickey self's calculator.

(5)
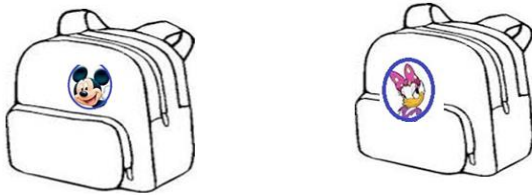

a. ドナルドがミニーに自分の辞書を送った。

b. ドナルドがミニーに自分自身の辞書を送った。
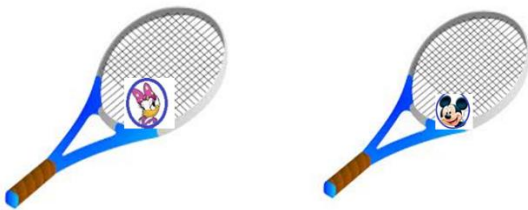
c. Donald sent Minnie self's dictionary.

(6)

a. ミニーがドナルドに自分の携帯を貸した。

b. ミニーがドナルドに自分自身の携帯を貸した。

c. Minnie lent Donald self's cellphone.

(7)

a. ミッキーがデイジーに自分のかばんを渡した。

b. ミッキーがデイジーに自分自身のかばんを渡した。

c. Mickey handed over Daisy self's bag.

(8)

a. デイジーがミッキーに自分のラケットをあげた。

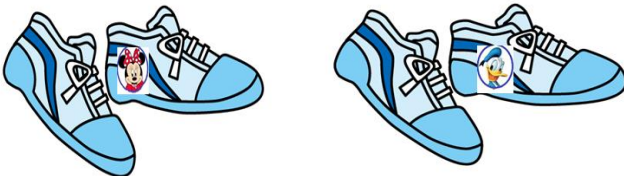b. デイジーがミッキーに自分自身のラケットをあげた。

c. Daisy gave Mickey self's racket.

(9)

a. ミニーがドナルドに自分の鏡を渡した。

b. ミニーがドナルドに自分自身の鏡を渡した。

c. Minnie handed over Donald self's mirror.

(10)

a. ミッキーがデイジーに自分のボールを貸した。

b. ミッキーがデイジーに自分自身のボールを貸した。

c. Mickey lent Daisy self's bowl.

(11)

a. ミニーがドナルドに自分の靴を渡した。

b. ミニーがドナルドに自分自身の靴を渡した。

c. Minnie handed over Donald self's shoes.

(12)

a. ミッキーがデイジーに自分の冷蔵庫を貸した。

b. ミッキーがデイジーに自分自身の冷蔵庫を貸した。

c. Mickey lent Daisy self's refrigerator.

(13)

a. ドナルドがミニーに自分の計画書を手渡した。

b. ドナルドがミニーに自分自身の計画書を手渡した。

c. Donald handed over Minnie self's planner.

(14)

a. ミニーがドナルドに自分の手袋をあげた。
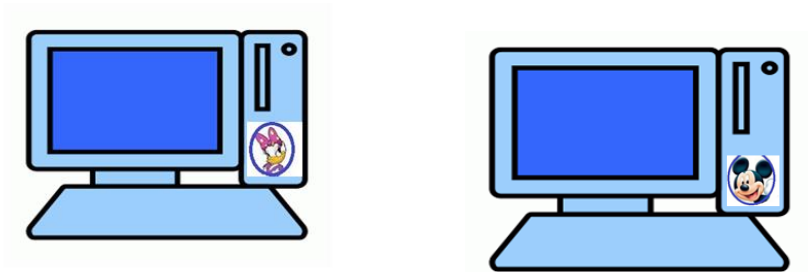
b. ミニーがドナルドに自分自身の手袋をあげた。

c. Minnie gave Donald self's gloves.

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(15)

a. ミッキーがデイジーに自分の本棚を届けた。

b. ミッキーがデイジーに自分自身の本棚を届けた。

c. Mickey delivered to Daisy self's book shelf.

(16)

a. デイジーがミッキーに自分のパソコンを渡した。

b. デイジーがミッキーに自分自身のパソコンを渡した。

c. Daisy handed over Mickey self's computer.

(17)

a. デイジーがミッキーに自分の携帯をあげた。

b. デイジーがミッキーに自分自身の携帯をあげた。

c. Daisy gave Mickey self's cellphone.

(18)

a. ドナルドがミニーに自分の電気ポットを渡した。

b. ドナルドがミニーに自分自身の電気ポットを渡した。

c. Donald handed over Minnie self's boiler.

(19)

a. ミニーがドナルドに自分のキャリーバッグを送った。

b. ミニーがドナルドに自分自身のキャリーバッグを送った。

c. Minnie sent Donald self's roller bag.

(20)

a. ミッキーがデイジーに自分の自転車を貸した。

b. ミッキーがデイジーに自分自身の自転車を貸した。

c. Mickey lent Daisy self's bike.

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III. Type 2 fillers (c is a literal translation in English)

(1)

a. ミニーがドナルドに自分の手袋を捨てたと言った。

b. ミニーがドナルドに自分自身の手袋を捨てたと言った。

c. Minnie said to Donald that she threw away self's gloves.

(2)
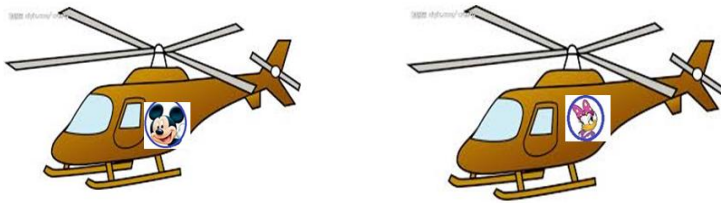
a. ミッキーがデイジーに自分のヘリコプターを買ったと言った。

b. ミッキーがデイジーに自分自身のヘリコプターを買ったと言った。

c. Mickey said to Daisy that he bought self's helicopter.

(3)

a. ドナルドがミニーに自分の絵を燃やしたと言った。

b. ドナルドがミニーに自分自身の絵を燃やしたと言った。

c. Donald said to Minnie that he burned self's picture.

(4)

a. デイジーがミッキーに自分のかばんをなくしたと言った。

b. デイジーがミッキーに自分自身のかばんをなくしたと言った。

c. Daisy said to Mickey that she lost self's bag.

(5)

a. ドナルドがミニーに自分のコップを洗ったと言った。

b. ドナルドがミニーに自分自身のコップを洗ったと言った。

c. Donald said to Minnie that he washed self's cup.

(6)

a. デイジーがミッキーに自分の家を建てたと言った。

b. デイジーがミッキーに自分自身の家を建てたと言った。

c. Daisy said to Mickey that she built self's house.

(7)

a. ドナルドがミニーに自分の車を運転したと言った。

b. ドナルドがミニーに自分自身の車を運転したと言った。

c. Donald said to Minnie that he drove self's car.

(8)

a. ミニーがドナルドに自分の部屋を掃除したと言った。

b. ミニーがドナルドに自分自身の部屋を掃除したと言った。

c. Minnie said to Donald that she cleaned self's room.

(9)

a. ミッキーがデイジーに自分のCDを聞いたと言った。

b. ミッキーがデイジーに自分自身のCDを聞いたと言った。

c. Mickey said to Daisy that he listened to self's CD.

(10)

a. デイジーがミッキーに自分の別荘を買ったと言った。

b. デイジーがミッキーに自分自身の別荘を買ったと言った。

c. Daisy said to Mickey that she bought self's villa.

(11)

a. ドナルドがミニーに自分の机を直したと言った。

b. ドナルドがミニーに自分自身の机を直したと言った。

c. Donald said to Minnie that he fixed self's table.

(12)

a. ミニーがドナルドに自分のテレビを壊したと言った。

b. ミニーがドナルドに自分自身のテレビを壊したと言った。

c. Minnie said to Donald that she broke self's TV.

(13)

a. ミッキーがデイジーに自分のラジオを捨てたと言った。

b. ミッキーがデイジーに自分自身のラジオを捨てたと言った。

c. Mickey said to Daisy that he threw away self's radio.

(14)

a. デイジーがミッキーに自分のペンを買ったと言った。

b. デイジーがミッキーに自分自身のペンを買ったと言った。

c. Daisy said to Mickey that she bought self's pen.

(15)

a. ドナルドがミニーに自分のケーキを食べたと言った。

b. ドナルドがミニーに自分自身のケーキを食べたと言った。

c. Donald said to Minnie that he ate self's cake.

(16)
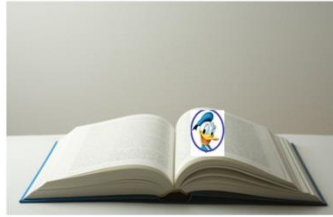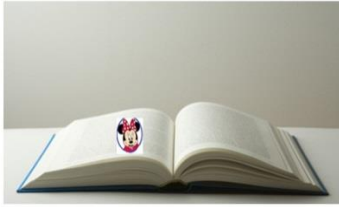
a. ミニーがドナルドに自分の本を読んだと言った。

b. ミニーがドナルドに自分自身の本を読んだと言った。

c. Minnie said to Donald that she read self's book.

(17)

a. ミッキーがデイジーに自分の猫を責めたと言った。

b. ミッキーがデイジーに自分自身の猫を責めたと言った。

c. Mickey said to Daisy that he blamed self's cat.

(18)

a. デイジーがミッキーに自分の庭を掃除したと言った。

b. デイジーがミッキーに自分自身の庭を掃除したと言った。

c. Daisy said to Mickey that she cleaned self's backyard.

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(19)

a. ドナルドがミニーに自分の香水をなくしたと言った。

b. ドナルドがミニーに自分自身の香水をなくしたと言った。

c. Donald said to Minnie that he lost self's perfume.

(20)

a. ミニーがドナルドに自分の水筒を壊したと言った。

b. ミニーがドナルドに自分自身の水筒を壊したと言った。

c. Minnie said to Donald that she broke self's water bottle.

IV. Results

Participants' ID	Simplex-Matrix	Simplex-RC	Complex-Matrix	Complex-RC	F1-M	F1-D	F2-M	F2-D
P1	10	1	9	2	10	1	10	0
P2	10	0	7	5	10	0	10	0
P3	10	1	9	1	10	0	10	0
P4	7	0	9	1	9	2	10	0
P5	10	0	6	3	10	0	10	0
P6	10	1	10	0	10	3	10	0
P7	10	0	10	1	10	1	10	0
P8	10	0	10	0	10	0	10	0
P9	10	0	10	0	10	0	10	0
P10	9	0	10	1	9	0	10	0
P11	8	3	7	2	10	0	10	0
P12	10	0	10	0	10	0	10	0
P13	10	0	9	0	10	0	10	0
P14	10	1	10	1	10	0	10	0
P15	10	0	10	0	10	0	10	0
P16	10	0	8	1	10	0	10	0
P17	9	0	10	0	10	0	10	0
P18	10	0	10	0	10	0	10	0
P19	7	1	9	1	9	0	10	0
P20	10	0	10	0	10	0	10	0
P21	10	0	10	0	10	0	10	0
P22	10	0	10	0	10	0	10	0
P23	10	0	10	1	10	0	10	0

P24	9	1	9	0	10	2	9	2
P25	10	1	10	0	10	0	10	0
P26	10	2	9	0	10	0	10	1
P27	10	1	10	1	10	0	10	0
P28	10	0	10	0	10	0	10	0
P29	10	1	10	3	9	0	10	1
P30	10	1	10	0	10	0	10	0

Appendix C. Test stimuli and results of Experiment 3

I. Critical items (a is in Japanese, b is in Chinese and c is a literal translation in English)

(1)

a. ミッキーがデイジーがふんだ自分の写真を修復した。

b. 米奇踩了黛西修补的自己的照片。

c. Mickey stepped on self's picture that Daisy fixed.

(2)

a. デイジーがミッキーが修理した自分のパソコンを壊した。

b. 黛西摔坏了米奇修理的自己的电脑。

c. Daisy broke self's computer that Mickey repaired.

(3)

a. ドナルドがミニーが買った自分の消しゴムをなくした。

b. 唐老鸭弄丢了米妮买的自己的橡皮擦。

c. Donald lost self's eraser that Minnie bought.

(4)

a. ミニーがドナルドが醸造したワインをひやした。

b. 米妮冷藏了唐老鸭酿造的自己的红酒。

c. Minnie cooled self's wine that Donald made.

(5)

a. ミッキーがデイジーが買った自分の家を訪ねた。

b. 米奇参观了黛丝鸭买的自己的房子。

c. Mickey visited self's house that Daisy bought.

(6)

a. ミニーがドナルドが作った自分の弁当を見た。

b. 米妮见到了唐老鸭做的自己的便当。

c. Minnie saw self's bento that Donald made.

(7)
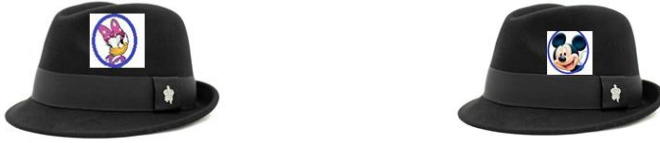
a. デイジーがミッキーが洗った自分の帽子を汚した。

b. 黛丝鸭弄脏了米奇洗的自己的帽子。

c. Daisy stained self's hat that Mickey washed.

(8)

a. ドナルドがミニーが買った自分の日焼け止めを試した。

b. 唐老鸭试了米妮买的自己的防晒霜。

c. Donald tried self's sunscreen that Minnie bought.

 (9)

a. ミッキーがデイジーが選んだ自分のスーツケースをチェックした。

b. 米奇检查了黛丝鸭挑选的自己的箱子。

c. Mickey examined self's suitcase that Daisy selected.

(10)

a. ミニーがドナルドが拭いた自分のテレビを消した。

b. 米妮关了唐老鸭擦拭的自己的电视机。

c. Minnie turned off self's TV that Donald wiped.

(11)
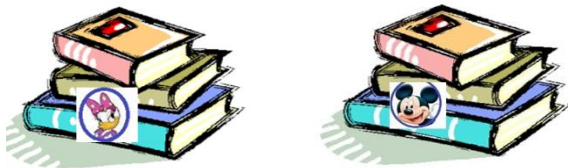
a. デイジーがミッキーが整えた自分の本を読んだ。

b. 黛丝鸭读了米奇整理的自己的图书。

c. Daisy read self's books that Mickey put away.

(12)

a. ドナルドがミニーが直した自分のパソコンを蹴った。

b. 唐老鸭踢了米妮修好的自己的电脑。

c. Donald kicked self's computer that Minnie fixed.

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(13)

a. ドナルドがミニーが買った自分のノートを見た。

b. 唐老鸭看见了米妮买的自己的笔记本。

c. Donald saw self's notebook that Minnie bought.

(14)

a. ミニーがドナルドが洗った自分の服を汚した。

b. 米妮弄脏了唐老鸭洗的自己的衣服。

c. Minnie stained self's clothes that Donald washed.

(15)

a. デイジーがミッキーが縫った自分のかばんをなくした。

b. 黛西弄丢了米奇缝制的自己的包。

c. Daisy lost self's bag that Mickey sewed.

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(16)

a. ミッキーがデイジーが建てた自分の別荘を掃除した。

b. 米奇清扫了黛丝鸭修的自己的别墅。

c. Mickey cleaned self's villa that Daisy built.

(17)

a. ドナルドがミニーが買った自分の花瓶を壊した。

b. 唐老鸭摔碎了米妮买的自己的花瓶。

c. Donald broke self's vase that Minnie bought.

(18)

a. ミニーがドナルドが作った自分の収納ボックスを捨てた。

b. 米妮扔了唐老鸭制作的自己的储物箱。

c. Minnie threw away self's storage box that Donald made.

(19)
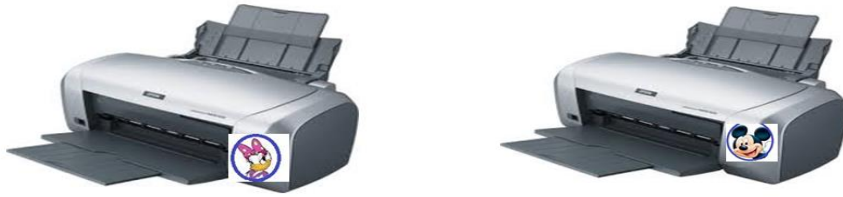
a. デイジーがミッキーが直した自分のプリンターを触った。

b. 黛丝鸭摸了米奇修理的自己的打印机。

c. Daisy touched self's printer that Mickey repaired.

(20)
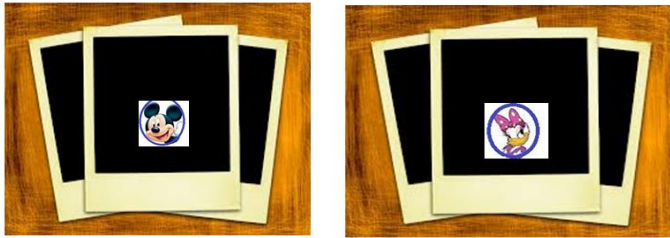
a. ミッキーがデイジーが印刷した自分の写真を見た。

b. 米奇看了黛丝鸭冲洗的自己的照片。

c. Mickey saw self's photo that Daisy printed.

(21)
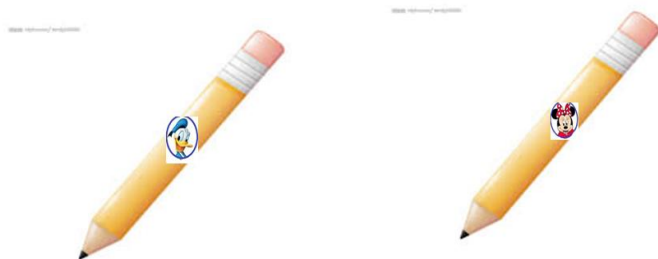
a. ドナルドがミニーが削った自分の鉛筆を見た。

b. 唐老鸭见到了米妮削的自己的铅笔。

c. Donald saw self's pencil that Minnie sharpened.

(22)

a. ミニーがドナルドが設計した自分の飛行機に乗った。

b. 米妮坐了唐老鸭设计的自己的飞机。

c. Minnie took self's airplane that Donald designed.

(23)
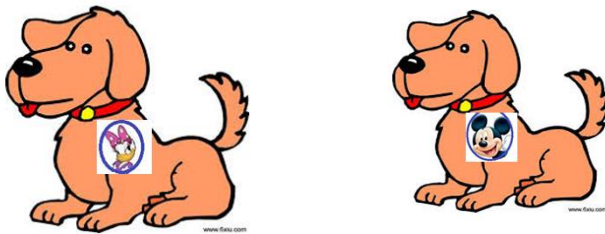
a. デイジーがミッキーが飼った自分の犬を叱った。

b. 黛西骂了米奇饲养的自己的小狗。

c. Daisy blamed self's dog that Mickey raised.

(24)

a. ミッキーがデイジーが買った自分の扇風機をつけた。

b. 米奇打开了黛丝鸭买的自己的风扇。

c. Mickey turned on self's fan that Daisy bought.

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II. Type 1 fillers (a is Japanese, b is Chinese and c is a literal translation in English)

(1)

a. ミッキーがデイジーに自分の本を貸した。

b. 米奇借给黛丝鸭了自己的书。

c. Mickey lent Daisy self's book.

(2)

a. デイジーがミッキーに自分の荷物を渡した。

b. 黛丝鸭递给米奇了自己的行李。

c. Daisy handed over Mickey self's luggage.

(3)
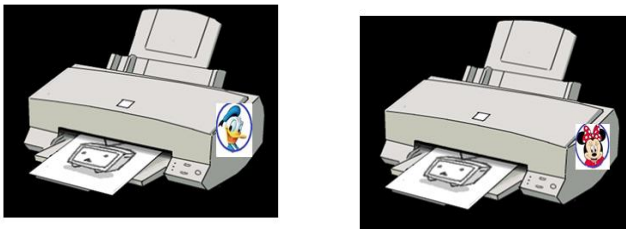
a. ドナルドがミニーに自分のプリンターを貸した。

b. 唐老鸭借给米妮了自己的打印机。

c. Donald lent Minnie self's printer.

(4)

a. デイジーがミッキーに自分の電卓をあげた。

b. 黛丝鸭送给米奇了自己的计算器。

c. Daisy gave Mickey self's calculator.

(5)

a. ドナルドがミニーに自分の辞書を送った。

b. 唐老鸭寄给米妮了自己的字典。

c. Donald sent Minnie self's dictionary.

(6)

a. ミニーがドナルドに自分の携帯を貸した。

b. 米妮租给唐老鸭了自己的手机。

c. Minnie lent Donald self's cellphone.

(7)
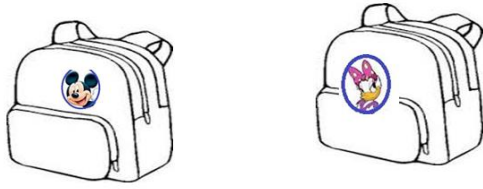
a. ミッキーがデイジーに自分のかばんを渡した。

b. 米奇交给黛丝鸭了自己的书包。

c. Mickey handed over Daisy self's bag.

(8)
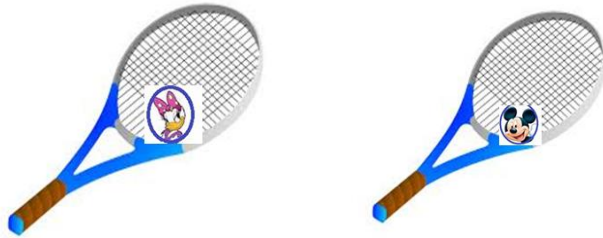
a. デイジーがミッキーに自分のラケットをあげた。

b. 黛丝鸭送给米奇了自己的球拍。

c. Daisy gave Mickey self's racket.

(9)

a. ミニーがドナルドに自分の鏡を渡した。

b. 米妮递给唐老鸭了自己的镜子。

c. Minnie handed over Donald self's mirror.

(10)

a. ミッキーがデイジーに自分のボールを貸した。

b. 米奇借给黛丝鸭了自己的盆子。

c. Mickey lent Daisy self's bowl.

(11)

a. ミニーがドナルドに自分の靴を渡した。

b. 米妮递给唐老鸭了自己的鞋子。

c. Minnie handed over Donald self's shoes.

(12)

a. ミッキーがデイジーに自分の冷蔵庫を貸した。

b. 米奇借给黛丝鸭了自己的冰箱。

c. Mickey lent Daisy self's refrigerator.

(13)

a. ドナルドがミニーに自分の計画書を手渡した。

b. 唐老鸭递给米妮了自己的计划书。

c. Donald handed over Minnie self's planner.

(14)

a. ミニーがドナルドに自分の手袋をあげた。

b. 米妮送给唐老鸭了自己的手套。

c. Minnie gave Donald self's gloves.

(15)

a. ミッキーがデイジーに自分の本棚を届けた。

b. 米奇送给黛丝鸭了自己的书架。

c. Mickey gave Daisy self's book shelf.

(16)
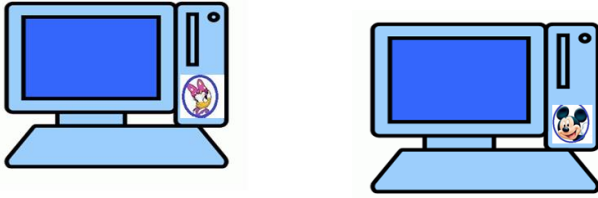
a. デイジーがミッキーに自分のパソコンを渡した。

b. 黛丝鸭递给米奇了自己的电脑。

c. Daisy handed over Mickey self's computer.

(17)

a. デイジーがミッキーに自分の携帯をあげた。

b. 黛丝鸭送给米奇了自己的手机。

c. Daisy gave Mickey self's cellphone.

(18)

a. ドナルドがミニーに自分の電気ポットを渡した。

b. 唐老鸭交给米妮了自己的电热水壶。

c. Donald handed over Minnie self's boiler.

(19)

a. ミニーがドナルドに自分のキャリーバッグを送った。

b. 米奇送给唐老鸭了自己的手提箱。

c. Mickey gave Donald self's roller bag.

(20)

a. ミッキーがデイジーに自分の自転車を貸した。

b. 米奇借给黛丝鸭了自己的自行车。

c. Mickey lent Daisy self's bike.

(21)

a. ミニーがドナルドに自分の手袋を見せた。

b. 米妮给唐老鸭看了自己的手套。

c. Minnie showed Donald self's gloves.

(22)
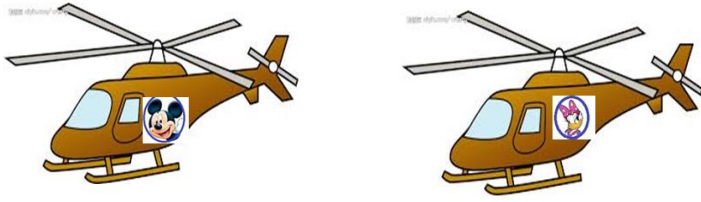
a. ミッキーがデイジーに自分のヘリコプターを見せた。

b. 米奇给黛丝鸭看了自己的直升机。

c. Mickey showed Daisy self's helicopter.

(23)

a. ドナルドがミニーに自分の絵を見せた。

b. 唐老鸭给米妮展示了自己的画。

c. Donald showed Minnie self's picture.

(24)

a. デイジーがミッキーに自分のかばんを見せた。

b. 黛丝鸭给米奇看了自己的书包。

c. Daisy showed Mickey self's bag.

III. Type 2 fillers (a is Japanese, b is Chinese and c is a literal translation in English)

(1)

a. ミッキーがデイジーが自分のボールを洗ったのを見た。

b. 米奇看到黛丝鸭洗了自己的盆子。

c. Mickey saw that Daisy washed self's bowl.

(2)

a. デイジーガミッキーが自分のかばんを拭いたのを見た。

b. 黛丝鸭看到米奇擦拭了自己的书包。

c. Daisy saw that Mickey cleaned self's bag.

(3)

a. ドナルドがミニーが自分のコップを洗ったのを見た。

b. 唐老鸭看到米妮清洁自己的杯子。

c. Donald saw that Minnie washed self's cup.

(4)
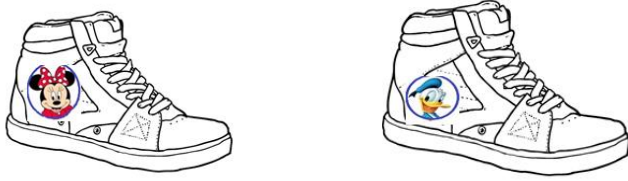
a. ミニーがドナルドが自分の靴を縫ったのを見た。

b. 米妮看到唐老鸭缝补自己的鞋子。

c. Minnie saw that Donald sewed self's shoes.

(5)

a. ミッキーがデイジーが自分の冷蔵庫を修理したのを見た。

b. 米奇看到黛丝鸭修好了自己的冰箱。

c. Mickey saw that Daisy fixed self's refrigerator.

(6)

a. デイジーがミッキーが自分の家を建てたのを見た。

b. 黛丝鸭看到米奇修了自己的房子。

c. Daisy saw that Mickey repaired self's house.

(7)

a.ドナルドがミニーが自分の計画書を作ったのを見た。

b. 唐老鸭看到米妮制作了自己的计划书。

c. Donald saw that Minnie made self's planner.

(8)

a. ミニーがドナルドが自分の手袋を編んだのを見た。

b. 米妮看到唐老鸭编织了自己的手套。

c. Minnie saw that Donald made self's gloves.

(9)

a. ミッキーがデイジーが自分の本棚を整えたのを見た。

b. 米奇看到黛丝鸭收拾自己的书架。

c. Mickey saw that Daisy organized self's book shelf.

(10)

a. デイジーがミッキーが自分の宝石を磨いたのを見た。

b. 黛丝鸭看到米奇磨了自己的宝石。

c. Dasiy saw Mickey cleaned self's jewelry.

(11)

a. ドナルドがミニーが自分のテーブルかけを縫ったのを見た。

b. 唐老鸭看到米妮缝了自己的桌布。

c. Donald saw that Minnie sewed self's table cloth.

(12)

a. ミニーがドナルドが自分の車を拭いたのを見た。

b. 米妮看到唐老鸭擦了自己的汽车。

c. Minnie saw that Donald wiped self's car.

IV. L1 Japanese participants' data of the Japanese Truth Value Judgment Task

Participants' ID	*Jibun*-Matrix	*Jibun*-RC	JF1-Subject	JF1-Dative	JF2-Matrix	JF2-Embedded
JP1	11	2	12	0	6	6
JP2	12	0	11	0	5	4
JP3	12	2	10	0	1	6
JP4	12	1	11	0	2	4
JP5	12	1	10	1	5	6
JP6	11	5	10	0	5	5
JP7	12	0	12	0	6	6
JP8	12	1	12	0	4	0
JP9	12	2	11	0	5	6
JP10	12	1	12	0	6	6
JP11	8	5	11	0	1	5
JP12	10	4	11	1	6	5
JP13	12	0	11	0	2	6
JP14	11	0	12	0	6	6
JP15	12	0	12	0	1	5
JP16	10	0	12	0	0	6
JP17	12	0	12	0	6	6
JP18	12	0	12	0	6	2
JP19	12	0	12	0	6	6
JP20	10	4	12	0	2	5
JP21	12	0	12	0	6	5
JP22	12	2	12	0	1	5
JP23	9	0	12	0	4	3
JP24	11	1	12	0	6	6
JP25	10	1	12	0	1	5
JP26	10	2	11	1	4	4
JP27	12	1	11	0	6	1
JP28	12	0	12	0	0	6

V. L2 intermediate learners' data of the Japanese Truth Value Judgment Task and proficiency test

Participants' ID	*Jibun-* Matrix	*Jibun-* RC	JF1- Subject	JF1- Dative	JF2- Matrix	JF2- Embedded	Proficiency score
CIP1	8	12	8	0	5	5	14
CIP2	12	12	12	1	6	6	11
CIP3	12	9	11	1	6	5	14
CIP4	12	12	11	1	6	6	13
CIP5	12	12	12	1	6	6	14
CIP6	12	11	12	1	5	6	12
CIP7	2	11	11	0	1	6	14
CIP8	12	0	12	0	5	1	9
CIP9	8	7	10	3	3	3	5
CIP10	12	12	12	0	6	6	12
CIP11	8	12	11	0	5	6	7
CIP12	12	12	12	0	6	6	13
CIP13	11	5	11	0	5	6	10
CIP14	9	9	12	0	3	6	12
CIP15	8	11	12	2	4	6	14
CIP16	11	11	12	0	6	5	14
CIP17	12	5	12	2	6	6	13
CIP18	11	11	12	0	5	6	12
CIP19	11	9	11	0	5	4	12
CIP20	12	12	12	0	6	6	7
CIP21	11	12	12	0	5	6	13
CIP22	5	8	12	2	3	3	9
CIP23	7	10	12	1	4	5	14
CIP24	10	11	12	1	5	5	14
CIP25	12	12	12	2	6	6	10
CIP26	10	12	12	3	5	6	10
CIP27	9	11	12	2	1	4	10
CIP28	10	11	12	3	5	6	13
CIP29	12	12	12	0	6	6	12
CIP30	11	12	12	0	6	6	12
CIP31	5	8	12	0	1	5	14
CIP32	10	8	12	3	4	6	13
CIP33	12	2	12	0	6	6	12
CIP34	12	12	12	0	0	6	14

VI. L2 intermediate learners' data of the Chinese Truth Value Judgment Task

Participants' ID	*Ziji*-Matrix	*Ziji*-RC	CF1-Subject	CF1-Dative	CF2-Matrix	CF2-Embedded
CIP1	8	12	10	1	6	6
CIP2	11	12	11	6	6	6
CIP3	10	10	11	2	6	6
CIP4	8	10	12	1	6	6
CIP5	12	12	12	0	6	6
CIP6	11	8	10	0	5	5
CIP7	2	11	10	0	5	6
CIP8	9	5	10	3	5	6
CIP9	7	12	11	2	6	6
CIP10	12	12	10	0	6	6
CIP11	7	12	12	2	6	6
CIP12	12	11	12	0	6	6
CIP13	7	12	12	5	6	6
CIP14	7	10	11	2	5	6
CIP15	5	12	11	1	5	6
CIP16	12	12	11	2	6	5
CIP17	10	11	11	5	6	6
CIP18	11	11	12	4	5	6
CIP19	12	10	11	3	5	6
CIP20	12	9	11	5	6	5
CIP21	12	11	12	5	6	6
CIP22	12	12	12	6	6	6
CIP23	12	9	11	5	5	6
CIP24	10	10	11	1	6	6
CIP25	11	11	12	1	5	6
CIP26	12	12	12	6	6	6
CIP27	12	12	12	2	6	6
CIP28	10	12	12	2	5	6
CIP29	12	4	11	1	6	6
CIP30	12	12	12	0	6	6
CIP31	8	9	11	0	5	6
CIP32	12	12	12	0	6	6
CIP33	11	1	10	2	6	6
CIP34	10	11	12	2	6	6

VII. L2 advanced learners' data of the Japanese Truth Value Judgment Task and proficiency test

Participants' ID	*Jibun*-Matrix	*Jibun*-RC	JF1-Subject	JF1-Dative	JF2-Matrix	JF2-Embedded	Proficiency score
CAP1	12	0	12	0	6	6	22
CAP2	12	7	11	0	6	6	18
CAP3	12	3	12	1	6	4	19
CAP4	12	9	12	0	5	6	21
CAP5	4	11	10	0	3	6	19
CAP6	12	12	12	0	6	6	20
CAP7	10	4	12	0	6	6	17
CAP8	12	3	12	0	6	6	17
CAP9	12	0	10	0	3	5	20
CAP10	10	9	11	0	1	6	15
CAP11	12	3	11	0	4	6	17
CAP12	3	9	11	0	2	6	16
CAP13	5	4	10	0	4	3	15
CAP14	9	4	12	0	3	5	15
CAP15	11	12	10	0	5	6	22
CAP16	12	9	12	0	6	6	22
CAP17	10	11	10	4	5	4	17
CAP18	12	4	12	0	6	6	18
CAP19	11	7	12	0	5	5	20
CAP20	12	6	12	0	6	6	17
CAP21	8	11	12	1	5	6	16
CAP22	12	12	12	0	6	6	16
CAP23	9	8	12	1	4	6	19
CAP24	12	12	12	0	5	6	18
CAP25	8	6	12	1	4	4	25
CAP26	12	11	12	0	6	6	19
CAP27	6	8	12	0	5	6	17
CAP28	12	0	12	0	6	6	16
CAP29	9	7	12	0	3	4	15
CAP30	0	12	11	1	4	6	17
CAP31	6	9	12	0	4	6	16
CAP32	2	12	12	1	0	6	16
CAP33	11	6	12	1	6	4	16
CAP34	12	12	12	0	6	6	16
CAP35	11	6	12	0	0	6	16

VIII. L2 advanced learners' data of the Chinese Truth Value Judgment Task

Participants' ID	*Ziji*-Matrix	*Ziji*-RC	CF1-Subject	CF1-Dative	CF2-Matrix	CF2-Embedded
CAP1	11	8	12	0	6	6
CAP2	10	9	11	6	5	6
CAP3	12	12	11	2	6	6
CAP4	12	6	12	0	6	6
CAP5	8	12	11	1	6	6
CAP6	12	12	11	3	6	6
CAP7	12	2	12	0	5	6
CAP8	12	12	12	1	6	6
CAP9	11	12	11	1	6	6
CAP10	12	10	12	2	6	6
CAP11	12	12	12	0	6	6
CAP12	5	12	11	1	6	6
CAP13	12	11	11	1	6	6
CAP14	11	12	12	1	6	6
CAP15	5	12	11	2	6	6
CAP16	7	12	11	6	6	6
CAP17	9	9	12	1	6	6
CAP18	12	9	11	1	6	5
CAP19	8	11	12	3	5	6
CAP20	10	11	11	3	6	6
CAP21	11	6	12	4	5	6
CAP22	8	11	12	1	5	6
CAP23	8	12	11	0	5	6
CAP24	12	11	11	0	6	6
CAP25	11	10	11	2	5	5
CAP26	12	12	11	2	6	6
CAP27	10	2	12	1	5	6
CAP28	9	11	12	3	5	6
CAP29	9	12	12	0	5	5
CAP30	6	11	11	1	6	6
CAP31	7	12	12	1	5	6
CAP32	11	10	11	2	6	6
CAP33	8	9	12	1	5	6
CAP34	11	9	12	4	5	6
CAP35	11	8	12	0	5	6

Appendix D. Japanese Proficiency Test

以下のテキストの空白（_____）に適切な言葉を書いてください。
例：１．雪がたくさん降っている__から___、飛行機は飛ばないかもしれない。
２．新しい携帯__電話__は軽くて便利です。
３．窓を閉めろと言ったのに、田中君__は__開けたまま教室を出て__いった_。

<div align="center">「ルームシェア」</div>

マンションやアパートの一部屋を家族や兄弟とではなく、友人同士などで借りて、共同生活をすることを「ルームシェア」という。欧米では一般的だ（1）_____、日本でも最近、都市部の（2）_____の間で広まっている。「家賃が（3）_____できる」「楽しい」「安心」など、理由は（4）_____だが、海外留学などで経験（5）_____ルームシェアの利点を知る人（6）_____増え、他人と生活すること（7）_____の抵抗感がなくなってきて（8）_____ ___、という背景もあるよう（9）_____。

友だちと一緒に暮らす

Ｆさん（２７歳(さい)、女性）は中国で、香港(ホンコン)（10）_____の女性とルームシェアを経験(11)_____。現在も都内で大学時代（12）_____同級生の女性２人と２ＬＤＫ（13）_____部屋をルームシェアしている。家賃１２万（14）_____は３人で４万円ずつ（15）_____しているという。電気、水道、（16）_____、などの公共料金と食費（17）_____、三人共通の財布を用意（18）_____、毎月１人３万円ずつ入れ、（19）_____から支払う。

住み始めてからの（20）_____を聞いてみると、一番の（21）_____はやはり金銭面。都内で１人（22）_____住むには６万〜８万円かかる（23）_____、今はその半分。公共料金（24）_____は一人で負担するより（25）_____安くてすむ。一方、デメリットは、長電話（26）_____しにくいことだという。

インタネットで「シェアメート」を探す

（27）_____をインタネットを通して探す人（28）_____増えている。また、「一緒に暮らして（29）_____を覚えたい」という理由から、（30）_____に外国人を希望する日本人（31）_____多い。
「国際交流協会」は、シェアメート（32）_____探す人たちの情報交換の（33）_____を設けようと、昨年８月に（34）_____を立ち上げた（http://borderless-tokyo.com）。シェアメート募集の（35）_____には、日本人、外国人から多数（36）_____書き込みがある。ホームページの管理者、近藤誠二（37）_____によると、最近はアクセス（38）_____が多いときは１日に２００（39）_____になるという。だが、（40）_____一般には、大家さんの（41）_____が得られず、シェアを受け入れてくれる（42）_____は少ないそうだ。

Possible answers to the example items:

1. から/ので　　　2.電話　　　3.は; いった

Answers to the cloze test items:

1.　が	2. 若者	3. 節約	4. さまざま	5. して
6. が	7. へ	8. いる	9. だ	10. 出身
11. した	12. の	13. の	14. 円	15. 負担
16. 電話	17. は	18. して	19. そこ	20. 感想
21. メリット	22. で	23. が	24. など	25. ずっと
26. が	27. シェアメート	28. も	29. 外国語	30. 相手
31. も	32. を	33. 場	34. ホームページ	35. 掲示板
36. の	37. さん	38. 数	39. 近く	40. まだ
41. 理解	42. ところ			

LANGUAGE BACKGROUND QUESTIONNAIRE
语言背景调查(Chinese)/言語背景調査(Japanese)

1. Name（姓名/氏名):_____   2. Gender (性別/性別):_____

3. Birth date (出生日期/生年月日):_____

3. Name of your school (学校名称/学校名): _____

4. Which year are you in (年级/学年)?_____

5. Your native language (母语/母国語):_____

6. Can you speak any other languages besides your native language? (您可以说除了母语之外的其他语言吗?/母国語以外で流暢に話せる言語はありますか。)

YES NO (circle one) (可以 不行(选一个)/ はい　いいえ(一つ選んでください))

7. If your answer to 6 is 'YES,' please specify what languages you can speak besides your native language and at what age did you start learning them? Please provide details.

(如果您的答案是'可以'，请写出您能使用的外语名称以及你开始学习这些外语的年龄。/流暢に話せる外国語があれば、その言語の名前と習い始める年齢をご記入ください。)
_____
8. Have you ever lived abroad? (您有在国外居住的经历吗？/海外に住んだことありますか。)

YES　NO (circle one)(有　没有(选一个)/ はい　いいえ(一つ選んでください)

9. If your answer to 8 is 'YES,' please specify what country you have lived at and from what year to what year (e.g., USA, from 5 to 7). (如果您的答案是'有'，请写出您居住的国家名称以及从哪年到哪年居住的(比如:美国，5岁到7岁)。/日本以外の国に住んだ経験があれば、外国の国名と滞在した期間をご記入下さい。（例：「アメリカ、5歳から7歳まで」）

_____

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