

**INTERPRETATION AND PROCESSING OF
THE SYSTEM OF JAPANESE REFLEXIVES**

by

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Japanese reflexives have long been a focus in Japanese linguistics. Early work by Kuroda (1965), Kuno (1977), and recent work by Oshima (2002) and Nishigauchi (2014) drew attention to the number of syntactic, semantic, and discourse-related properties that are attributed to *zibun* and other Japanese reflexives (see Kuroda for c-command relations, Kuno for empathetic logophor, Oshima for *de se* interpretations, and Nishigauchi for point of view). Embedded in all the research is Chomsky's (1981, 1986) seminal work on Government and Binding, in which Binding Principle A states that anaphors must have a co-indexed and c-commanding antecedent noun phrase within their governing category. Later, the principles of movement at LF (Cole, Hermon, & Sung, 1990; Cole & Sung, 1994) successfully captured the ability for monomorphemic reflexives to bind with an antecedent 'outside' of their governing clause, if that clause was based on the original analysis of English. However, questions still remain as to who the correct potential antecedent of the reflexive is, especially when there are multiple grammatically possible antecedents in Japanese. Related to this issue is the question of how second language (L2) learners acquire the abstract properties of Japanese reflexives.

This dissertation investigates how native speakers (L1) of Japanese link reflexives to their antecedents through experimental research on specific sets of anaphoric pronouns – *zibun*, *zibun-zisin*, *kare-zisin*, and *kanozyo-zisin*. The dissertation also examines how L2 learners acquire these properties in Japanese. Although it is well known that co-reference with these reflexives can be

ambiguous (Aikawa, 2002), I analyze how L1 Japanese speakers successfully construct anaphoric relations among determiner phrases and resolve ambiguity through an analysis of case and the argument structure of the verb. The interaction between case and the predicate in reflexive-antecedent binding, to my knowledge, has not been thoroughly addressed in the literature to date, and this point is the innovative focus of my dissertation. Further, I expand the scope of reflexives to all reflexive forms in Japanese, and cross-linguistically analyze acquisition between typologically related (e.g., Korean) and unrelated (e.g., Chinese) languages.

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LIST OF ABBREVIATIONS

ACC	Accusative
CAUS	Causative
COMP	Complementizer
CONC	Conclusive
COND	Conditional
CRS	Current Relative State
COP	Copular
DAT	Dative
DECL	Declarative
GEN	Genitive
IMPF	Imperfective
INST	Instrumental
LOC	Locative
NOM	Nominative
PAST	Past
PROG	Progressive
PRES	Present
TOP	Topic
3SG	Third person singular

PREFACE

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1.0 INTRODUCTION

The theory of Principles and Parameters (Chomsky, 1981; 1986) posits that all languages have a set of universal constraints and abstract properties that are provided by some species-specific and language-specific endowment. One goal of linguistics in this paradigm is to uncover what is comprised in the cognitive capacity. Within this approach, an important aspect is the study of the typology of determiner phrases (DPs) and a native language (L1) speaker's ability to link reflexives to their correct antecedents. The ability for L1 speakers to correctly interpret anaphora and reflexivity is understood to be acquired through "innate principles and parameters that guide the child during acquisition of his or her target language" (Hirakawa, 1990, p. 60-61). That is, the parameters, which includes reciprocals and reflexives, that are set in the L1 by positive evidence allow L1 speakers to determine the constraints on grammaticality and interpretation of anaphors. Much of the research within this domain has been based on the Principles and Parameters framework, as it is now well known that the properties that govern anaphora and reflexivity vary across different languages. Thus, a formal theoretical approach as a foundation is necessary for analyses of syntactic phenomena that are non-adjacent and recognized to be covertly local in nature, as is the case with anaphora and reflexivity.

The Principles and Parameters approach has also been widely applied to second language (L2) acquisition of binding, with the main objective being whether L2 learners can reset their parameters appropriately to the target language. Within this objective, the research in L2 binding

has mainly involved one pair of languages (L1 or L2) permitting both local and long distance (LD) binding, and the other that only permits local binding (e.g., Hirakawa, 1990; Jiang, 2009; White, Bruhn-Garavito, Kawasaki, Pater, & Prévost, 1997). These studies focused on how the L1 plays a role in L2 binding, based on the notion that L1-L2 transfer effects usually surface when L2 binding properties differ from those in the L1 grammar. Such transfer effects have been confirmed in various studies in the field (e.g., Hirakawa, 1990; Kim, Montrul, & Yoon, 2009), but evidence also exists that advanced level learners were able to more accurately identify the correct antecedent of a reflexive in the L2 once syntactic properties of the reflexive were acquired (e.g., Thomas, 1995; Yoshimura, Nakayama, Sawasaki, Fujimori, & Kahraman, 2013). Other studies have also found evidence that contradicts certain proposals regarding grammatical prerequisites of binding in Japanese, such as binding *zibun* ('self' in Japanese) to an object (e.g., Oshima, 2006), which should be blocked based on the subject-hood condition ascribed to *zibun* and the principles of movement at logical form (LF) (Cole & Sung, 1994). The correct interpretation of the domain restrictions of Japanese reflexives, such as subject orientation and locality constraints, are crucial to how reflexives in Japanese bind with their correct antecedents.

Though the research on Japanese reflexives has a long history, most of the work has focused on *zibun*, and not as much on the other reflexives – *zibun-zisin* ('self-self'), *kare-zisin* ('he-self'), and *kanozyo-zisin* ('she-self'). A few studies are available that cross-linguistically analyze L1 and L2 processing of *zibun*, but very little research has investigated the entire reflexive paradigm in Japanese (exceptions include Katada, 1991; Kishida, 2011), and even less (or possibly none, at least to my knowledge) exists in L2 acquisition of *zibun-zisin*, *kare-zisin*, and *kanozyo-zisin*. Furthermore, the previous research has overlooked the possibility that case particles in Japanese play a role in co-reference interpretation when more than one antecedent is

grammatically possible, and how L1 speakers and L2 learners construct representations between DPs and reflexives before having access to the argument structure requirements of the verb as is the case in Japanese and other head-final languages. The interaction between case and the predicate in reflexive-antecedent binding is also one of the innovative foci of this dissertation. Through this analysis, I hypothesize that parsing in Japanese involves a mechanism called Case Information Access (CIA) Processing.

This dissertation closely examines how L1 speakers link the reflexives *zibun*, *zibun-zisin*, *kare-zisin*, and *kanozyo-zisin* (*kare/kanozyo-zisin* hereafter when both are mentioned) to their antecedents, and whether L2 learners of Japanese, whose L1s are Mandarin Chinese (Chinese hereafter) and Korean, are able to acquire the binding properties of Japanese. Within the L1 and L2 studies, I examine the influence of case and the predicate in binding accuracy, whether L1 speakers and L2 learners follow the proposed subject-hood conditions and locality constraints that are ascribed to certain Japanese reflexives, and how they process ambiguity. Therefore, this dissertation is divided into two sections: 1) interpretation of reflexives by L1 Japanese, and 2) L2 acquisition of Japanese reflexives. In order to investigate these topics, a truth-value judgment task was developed and conducted in both off-line and on-line formats. Whereas off-line tasks are useful in assessing the interpretation of sentences, on-line experimental techniques provide opportunities for more in depth analysis on how L1 speakers and L2 learners process ambiguity, such as identifying a critical word effect. In addition, a picture description task was conducted to analyze how L1 speakers and L2 learners used reflexives to describe certain situations in a free production format.

Each section will include a literature review, followed by an outline of the methodology, the data, and a discussion of the results. In the L1 Japanese section, beginning with Chapter 2,

the literature review will mainly focus on Japanese reflexives, the argument structure of the verb in Japanese, the relevance of case, and L1 sentence processing. First, more information about binding theory and Japanese reflexives will be presented. Next, the Japanese reflexive paradigm will be outlined. A large portion of this section will address the misconception that *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* share similar binding properties, which will be thoroughly detailed. Third, the argument structure of the verb and case in Japanese will be presented. The research on Japanese sentence processing will also be presented in this section, leading to the proposition of the CIA Processing hypothesis. A review of self-paced reading methodology is also presented here in relation to the studies conducted for the experiments. In Chapter 3, the research questions and methodologies of the experiments are outlined. The data and discussion of the results are in Chapters 4 and 5.

In the L2 Japanese section, beginning with Chapter 6, the literature review will focus on L2 acquisition of Japanese reflexives and L2 Japanese sentence processing. Chapter 7 will outline the research questions and review the methodologies of the experiments that were used in the L1 Japanese study. The data and discussion of the results follow in Chapters 8 and 9. Finally, Chapter 10 provides an overall discussion, conclusions, limitations, and the scope of future research.

2.0 L1 JAPANESE LITERATURE REVIEW

This chapter presents a literature review of the system of Japanese reflexives, the relevance of case and argument structure of the verb in incremental processing, and sentence processing of Japanese in the L1 context. First, a review of binding theory will be presented.

According to Binding Principle A,¹ anaphors must have a co-indexed and c-commanding antecedent noun phrase (e.g., Chomsky, 1981, 1986; Pollard & Sag, 1992) and the antecedent must be “within a certain range of syntactic structure, defined as the governing category” (Broselow & Finer, 1991, p. 49). One of the central issues of binding theory has been clearly defining the conditions through which an anaphor is bound to an antecedent. For example, consider the following sentences:

1. John_i believes himself_i.
2. John_i believes that Jim_k admires himself_{*i}.
3. John_i believes that Jim_k admires himself_k.

Sentence (1) is grammatical because ‘himself’ is bound in its binding domain and c-commanded by the DP governing ‘John.’ Sentence (2) is ungrammatical because ‘himself’ is co-indexed with ‘John,’ and although c-commanded by and co-indexed with ‘John,’ the DP ‘John’

¹ Binding Principle B states: a pronoun must be free in its binding domain; Binding Principle C states: an r-expressions must be free (Chomsky, 1986).

is not in the correct governing category in English, which is the embedded clause. However, (3) is grammatical as ‘himself’ is locally bound by ‘Jim.’ This locality constraint that is ascribed to anaphors in English (White, Bruhn-Garavito, Kawasaki, Pater, & Prévost 1997) is one of several central concepts of Binding Principles that have thus far been generally acknowledged in the field (see Culicover & Jackendoff, 1995; Jackendoff, 1992, for some issues).

However, the definition of governing categories can be language dependent, and it has been well established that reflexives can co-index with antecedents that are outside of what would be their governing category if governing categories were the same across all languages (e.g., Manzini & Wexler, 1987). For example, sentence (2) would be grammatical in Japanese as *zibun* can participate in LD binding. Note that it has been proposed that this sentence remains ungrammatical with *zibun-zisin* or *kare-zisin*, as these two reflexives cannot take an LD antecedent, properties of which will be elaborated in the following section.

Thus, certain binding conditions are not only different from the grammatical restrictions of English, but also within the Japanese language. Such differences have led to extensive research in the field, not only on Japanese but also on other typologically related (Korean) and unrelated (Chinese) East Asian languages.

2.1 THE SYSTEM OF JAPANESE REFLEXIVES

The system of Japanese reflexives involves multiple items and has a historical development based on contact with Chinese, English, and the influence of translation. While some terms have become archaic and rarely used, *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* are still frequently used today. This chapter begins with a brief overview of the development of Japanese reflexives.

Based on the reflexive classification system by Faltz (1977),² Noguchi (2015) organizes Japanese reflexives as the following in (4):³

4. a. Pronominal: *zibun*, *ziko*, *mizukara*, *onore*, *ware*
- b. Adjunct (emphatic): *zisin*
- c. Compound: *zibun-zisin*
- d. Head (body-part): *mi*, *karada*, *kokoro*, *kosi*, *atama*
- e. Affixal: *zi-*, *ziko-*

The forms that have *zi* (自) kanji (*zibun*, *zisin*, etc.) were originally borrowed from the Chinese language, while the other items (*mizukara*, *onore*, etc.) are native Japanese words. *Zi* on its own means ‘self,’ but is generally compounded with other kanji, such as *zibun* (自分), *ziko* (自己), and *zisin* (自身).⁴ Reflexive forms of Chinese origin began to make their way to Japan in

² Faltz proposed that cross-linguistically reflexives are marked either by the DP or by verbal affixation. DP-reflexives are also known as “head reflexives,” “adjunct reflexives,” or “pronominal reflexives.” Verbal reflexives consist of intransitive verbs, transitive verbs, or clitics. See Faltz (1977) for more detail on reflexive classifications.

³ The items in (d) are the only terms that do not have a direct translation of ‘self’: *mi* (oneself/one’s body), *karada* (body), *kokoro* (soul), *kosi* (waist), *atama* (head).

⁴ When *zi* is used alone, it is read by the *kunyomi* (native Japanese reading) of the kanji, *mizukara* (自 ら). Note that there are two ways to read kanji in Japanese: *on’yomi* is closer to the Chinese pronunciation of kanji characters, and *kun’yomi*.

the Late Middle Japanese period (1200-1600).⁵ The *Nihon Kokugo Daiziten* (known as the largest dictionary of Japanese) notes that *ziko* arrived in the early- to mid-13th century, followed by *zisin*, and then *zibun* during the mid-15th century (Noguchi, 2015). The original purpose of *zisin* was to be used as an emphatic (a function that still remains today), but *zibun* was not fully integrated into the language as a reflexive until the Meiji Period (1868-1912).⁶ Instead, *zibun* was originally used mostly as a pronominal or logophor from the 15th to 19th century to complement *ziko*, which was the widely used reflexive form during that time period. However, by the Meiji Period, *zibun* had become the standard reflexive form over the others that were dominant in the earlier Japanese periods.⁷

⁵ The Late Middle Japanese period was a transitional period for the Japanese language, as archaic terms were phasing out and the language was developing into the modern form (Shibatani, 1990).

⁶ An excerpt from “The Chronicle of Yoshitsune” (*Gikeiki*), which was written between the 14th and 15th century, exemplifies the usage of *-zisin* as an emphatic form, adapted from Noguchi (2015):

- a. Yoritomo-*zisin* susumi-sauraw-eba toogoku obotukanasi.
 Yoritomo-*self* go-forward-COND east province worry-CONC

“If Yoritomo himself goes forward, the east province will be unstable.”

⁷ As a note, one may question whether Faltz’s (1977) classification is applicable to the range of reflexives in Japanese. Noguchi (2015) mentions that while the Old and Early Middle Japanese periods may contradict each other (in fact, Old Japanese shows no reflexive system), later periods and present day examples show verbal forms replacing nominal forms, a generalization that follows Faltz’s analysis. Such is the case for compound forms developed in Modern

During the same period when *zibun* became the standard reflexive form, two additional terms – *kare* and *kanozyo* – re-emerged in the Japanese language as pronouns. While the term *kare* had existed in Japanese since the Nara Period (710-784 AD), it was originally used as a demonstrative rather than a pronoun. With the Meiji Restoration and the influx of Western languages into Japan, the Japanese language required terminology for the lexical items *he* and *she* that were prevalent in Indo-European languages. As a relatively newer pronoun compared to the others, some mention that these items, as well as the reflexive pronoun compound forms *kare/kanozyo-zisin*, are not frequently used in conversation (Akiyama, 2002; Shirahata, 2007). However, both forms frequently appear in many written forms, such as newspaper and periodical articles.⁸

Japanese, such as *ziko-handan* (lit. self-judgment) or *zi-satu* (lit. self-kill, or suicide) Consider the following examples for body parts (adapted from Noguchi, 2015) that both mean “Hanako is worrying,” as this exemplifies the shift from nominal (a) to verbal strategies (b):

- | | | | |
|----|------------|--------------|------------------|
| a. | Hanako-ga | kokoro-o | nayam-ase-teiru. |
| | Hanako-NOM | mind-ACC | worry-CAUS-IMPF |
| b. | Hanako-ga | nayan-deiru. | |
| | Hanako-NOM | worry-IMPF | |

⁸ Shirahata (2007) notes that Japanese children formally learn *kare*, *kanozyo*, and the plural forms by junior high school.

As the emphasis of this dissertation is on reflexive pronouns,⁹ I will focus on the following four reflexives: *zibun* ‘self,’ which is a simplex morpheme, *zibun-zisin* ‘self-self,’ which is a complex morpheme of ‘self’ and ‘self,’ and *kare-* and *kanozyo-zisin*, which is a compound of the pronominal *kare* ‘he’ or *kanozyo* ‘her’ and reflexive ‘self.’ The following examples in (5) shows these reflexives in a simplex sentence, adapted from Aikawa (2002):

5. “Taro blamed (him)*self*.”

a. Taro_i-wa *zibun*_i-o semeta.

Taro_i-TOP *self*_i-ACC blamed

b. Taro_i-wa *zibun-zisin*_i-o semeta.

Taro_i-TOP *self-self*_i-ACC blamed

c. Taro_i-wa *kare-zisin*_i-o semeta.¹⁰

Taro_i-TOP *he-self*_i-ACC blamed

All three sentences (5a, 5b, and 5c) translate to mean “Taro blamed himself,” where “himself” is correctly co-indexed with Taro as predicted by Binding Principle A; however,

⁹ Noguchi (2015) mentions that reflexive forms, such as *ziko-* and *zi-*, are able to prefix lexical items other than reflexive-marked predicate (e.g., *karada* ‘body’).

¹⁰ Note that *kanozyo-zisin* would be ungrammatical here because there would be a gender mismatch; the subject would have to be female, such as ‘Hanako.’ However, the ungrammatical interpretations of (6) and (7) may be acceptable in certain dialects, such as the Kansai dialect, which uses *zibun* as a first, second, and third person pronoun. This function of reflexives in Japanese is not explored here in the literature review, but may be revisited in the discussion if the experimental results show otherwise.

crucial to the overall analysis are the contrastive binding properties and constraints ascribed to each reflexive that are revealed in more complex structures. For example, consider the following multi-clausal sentences in (6) and mono-clausal sentences in (7):

6. “John said [that Mike criticized (him)*self*].”

a. John_i-wa [Mike_k-ga *zibun*_{i/k}-o hihansita-to] itta.

John_i-TOP Mike_k-NOM *self*_{i/k}-ACC criticized-COMP said

b. John_i-wa [Mike_k-ga *zibun-zisin*_{*i/k}-o hihansita-to] itta.

John_i-TOP Mike_k-NOM *self*_{*i/k}-ACC criticized-COMP said

c. John_i-wa [Mike_k-ga *kare-zisin*_{*i/k}-o hihansita-to] itta.

John_i-TOP Mike_k-NOM *self*_{*i/k}-ACC criticized-COMP said

7. “John showed Mike a photograph of (him)*self*.”¹¹

a. John_i-wa Mike_k-ni *zibun*_{i/*k}-no syasin-o misete-ageta.

John_i-TOP Mike_k-DAT *self*_{i/*k}-GEN photograph-ACC show-gave

b. John_i-wa Mike_k-ni *zibun-zisin*_{i/*k}-no syasin-o misete-ageta.

John_i-TOP Mike_k-DAT *self*_{i/*k}-GEN photograph-ACC show-gave

c. John_i-wa Mike_k-ni *kare-zisin*_{i/k}-no syasin-o misete-ageta.

John_i-TOP Mike_k-DAT *self*_{i/k}-GEN photograph-ACC show-gave

First, in sentence (6a), *zibun* can bind with either the local (embedded) or LD (matrix) subject, and without a definite contextual indication, this sentence is globally ambiguous in

¹¹ Although this sentence may seem unambiguous in English, as ‘John’ is the preferred antecedent of ‘himself,’ binding with ‘Mike’ is possible from contexts that designate ‘John’ as, for example, a photographer.

Japanese. However, in sentence (7a), *zibun* under formal syntactic rules can only bind with ‘John’ and not with ‘Mike,’ because the antecedent of *zibun* cannot refer to an object (Katada, 1991; White et al., 1997; but see Hara, 2001; Kitagawa, 1981; Oshima, 2006, for other object binding examples); i.e., *zibun* is a subject-oriented reflexive.

In turn, sentences (6b) and (6c) are unambiguous with *zibun-zisin* and *kare-zisin*, because, unlike *zibun*, these two reflexives cannot bind to an LD antecedent (Aikawa, 2002; Katada, 1988, 1991; Nakamura, 1987); i.e., they can only participate in local binding. Therefore, ‘Mike’ is the only possible antecedent of *zibun-zisin* and *kare-zisin* in (6b) and (6c). However, sentences (7b) and (7c) pose different constraints for *zibun-zisin* and *kare-zisin*. *Zibun-zisin* can only bind with the subject ‘John’ in (7b), but *kare-zisin* in (7c) can also refer to the object ‘Mike.’ This difference can be ascribed to the contrast between *zibun* and *kare*: *zibun* is a subject-oriented reflexive, while *kare* is not (Aikawa, 2002). Hence, *kare-zisin* can bind with an object as it does not contain a *zibun* component, but *zibun-zisin* cannot for the opposite reason. Further, *kare-zisin* is distinct from the other reflexives in which it contains phi-feature specifications [+3rd person, +singular, +male], while the other two reflexives do not.¹² Thus, while some sentences with anaphoric elements in Japanese are straightforward, the majority of them remain ambiguous. Table 1 summarizes some of the properties and constraints of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*:

¹² These specifications apply similarly to *kanozyo-zisin*, except for the [+female] feature.

Table 1. Properties of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*

<u>Ontological category</u>	<u><i>Zibun</i></u>	<u><i>Zibun-zisin</i></u>	<u><i>Kare/kanozyo-zisin</i></u>
C-command requirement	Yes	Yes	Yes
Local binding	Yes	Yes	Yes
LD binding	Yes	No	No
Subject orientation	Yes	Yes	No
Phi-feature specification	No	No	Yes

These constraints can also be characterized by binary ($\pm$) feature specifications as shown in Table 2, forming a hierarchical scale of ambiguity. If we mark ‘Yes’ with a plus and add the values, we notice that *zibun* is marked with the most plus-values, followed by *zibun-zisin* and *kare/kanozyo-zisin*. Thus, from this hierarchy, we can infer that *zibun* is maximally ambiguous out of the three types of reflexives, followed by *zibun-zisin*, and *kare/kanozyo-zisin*, which would be least ambiguous.

Table 2. Plus-specification scale of *zibun*, *zibun-zisin*, *kare/kanozyo-zisin*

<u>Ontological category</u>	<u><i>Zibun</i></u>	<u><i>Zibun-zisin</i></u>	<u><i>Kare/kanozyo-zisin</i></u>
Local binding	+	+	+
LD binding	+	-	-
Subject orientation	+	+	-
Ambiguity scale	3	2	1

This hierarchy corresponds well with how ambiguous these reflexives are naturally perceived. For example, *zibun* not only has syntactic constraints, but several semantic, pragmatic, and discourse related theories and properties, such as empathy and logophoricity

(e.g., see Hirose, 2002; Kameyama, 1984; Kuno, 1972, 1987; Kuno & Kaburaki, 1977; Nishigauchi, 2014; Oshima, 2004, 2006; Sells, 1987). For example, empathy is concerned with how a speaker identifies him/herself with a referent based on a given situation, and also the position of the speaker in relation to the other referent (Kuno & Kaburaki, 1977). Logophoricity requires the interlocutor to understand the “logophoric individual” should be someone other than the speaker based on the thoughts or feelings expressed in the content (Aikawa, 2002). The definitions of the function of empathic and logophoric *zibun* in Japanese often overlap with one another (see Oshima, 2007, for an explanation of the different uses of these properties); however, a more traditional view of logophoric reflexives is based three requirements: 1) binding is permitted with non-clause-bounded antecedents; 2) binding is permitted with the object of the clause; and 3) binding may require some discourse related understanding in order to identify the correct antecedent.¹³ Though these properties are often discussed exclusively with *zibun* and not as much on the other reflexives, *zibun-zisin* is also ambiguous as it can occur in the same syntactic environment with *zibun*. One main difference between *zibun* and *zibun-zisin* is the locality constraint ascribed to *zibun-zisin*, and how *-zisin* distinguishes itself from *zibun* (see Mihara & Hiraiwa, 2006, for *-zisin* as an intensifier).¹⁴ *Kare/kanozyo-zisin* seem to be the least

¹³ As a note, another approach to this is *de se* interpretation, for which “when a logophoric expression is used to refer to the secondary agent, a *de se* interpretation is induced, or in other words, it is implied that the ‘original’ utterance/attitude involved the notion of ‘I’” (Oshima, 2007, p. 29.). See Oshima, 2004, 2007, for more detail.

¹⁴ Kishida (2011), who refers to the emphatic form of *-zisin* as an ‘adnominal intensifier’ in her dissertation, explains that similar intensive forms are available in other languages. For example,

ambiguous in terms of who the antecedent is, and although it can refer to a subject or an object, phi-feature specifications provide valuable information to disambiguate such sentences.

Upon this preliminary overview of the binding properties of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, we understand that the current binding theory may not be adequate to predict what the antecedents of these reflexives in fact are without specific discourse contexts, given that all four reflexives, which are all subject to Binding Principle A, have slightly different binding constraints depending on clause structure. To clarify these binding differences, the principles of LF movement shows how certain reflexives can bind with an LD antecedent while others do not.

2.1.1 Movement at LF

Within the Principles and Parameters approach and based on early work by Lebeaux (1983), it has been proposed that all anaphors initially undergo movement from V to INFL (Cole, Hermon, & Sung, 1990), and move to a position that is c-commanded by a subject (Katada, 1991). Head-to-head movement (V to INFL) allows monomorphemic reflexives such as *zibun*, and others such as *caki* (in Korean) and *ziji* (in Chinese), to not only be able to bind with the LD antecedent, but also block object binding. The ability to move to an LD position is made possible by covert local movement based on the head movement analysis (Cole and Sung 1994). These proposals are illustrated in detail with Japanese later in this section.

the German *-selbst* and Korean *-casin* function as intensifiers in *sich-selbst* and *caki-casin* (both meaning ‘self-self’). Both forms are similar to the Japanese *zibun-zisin*.

There are some discrepancies in how LF movement applies to Japanese. Katada's (1988, 1991) proposal, which was designed specifically for Japanese reflexives, argued that *zibun* can be raised to a higher position outside of the initial binding domain, but movement of *zibun* out of the internal structure of *zibun-zisin* is limited (c.f., Lebeaux, 1983, for reciprocals). This is because the trace of *zibun* from *zibun-zisin* in the embedded clause “must be antecedent governed by *zibun* in order to satisfy the Empty Category Principle” (Chomsky, 1981; as cited in Aikawa, 2002, p. 179). In other words, if *zisin* was raised to the matrix verb phrase (VP) at LF, it would no longer be antecedent governed; therefore, *zibun-zisin* as a whole cannot bind to an LD antecedent. However, because *zibun-zisin* still undergoes LF movement, it maintains subject orientation based on the position of where the reflexive lands after movement.

In terms of *kare-zisin*, Katada (1988, 1991) argued that it does not undergo movement at LF because of phi-feature specifications, and instead suggested that *kare-zisin* remains *in situ* (Aikawa, 2002) for interpretation. However, principles of LF that dictate *all* anaphors raise at LF – in fact, movement to the local VP position is what “Cole et al. (1990) proposed for polymorphemic reflexives, which is why such reflexives could be c-commanded by non-subjects” (Sachs, 2010, p. 120). Thus, this dissertation maintains that *kare/kanozyo-zisin* moves to the VP position as suggested by Cole et al. (1990), permitting co-reference with either the subject or object but only via local binding.

The entire process of local and LD binding and movement at LF can be demonstrated using sentences (6) and (7) from above. The sentences are presented again (8) and (9) (*zibun-zisin* is abbreviated to *z-zisin* and *kare-zisin* to *k-zisin* in (9)):

8. John_i-wa [Mike_k-ga *zibun*_{i/k}/*zibun-zisin*_{*i/k}/*kare-zisin*_{*i/k}-o hihansita-to] itta.
 John_i-TOP Mike_k-NOM *self*_{(*)i/k}-ACC criticized-COMP said
 “John said [that Mike criticized (him)*self*].”
9. John_i-wa Mike_k-ni *zibun*_{i/*k}/*z-zisin*_{i/*k}/*k-zisin*_{i/k} -no syasin-o misete-ageta.
 John_i-TOP Mike_k-DAT *self*_{i/(*)k} -GEN photograph-ACC show-gave
 “John showed Mike a photograph of (him)*self*.”

First, in sentence (8), *zibun* and *zibun-zisin* move out of the VP position and raise to the T position within the same binding domain as ‘Mike’ (the embedded/local antecedent). As *kare-zisin* moves to the VP position, all three reflexives at this juncture are bound with ‘Mike;’ hence, ‘Mike’ is the antecedent of the reflexives. However, *zibun* can further move to the T position of the matrix (or root) clause and complete LD binding with ‘John,’ but *zibun-zisin* and *kare-zisin* cannot for the reasons laid out above. In this way, *zibun* can participate in local and LD binding without modifying the current Binding Principles, as shown in Figure 1. In addition, LF movement correctly predicts the antecedents of *zibun*, *zibun-zisin*, and *kare-zisin* in mono-clausal sentences, such as in (9). Here, initial movements of all three reflexives are similar to (8) – both *zibun* and *zibun-zisin* move to the T position that is within the same binding domain as ‘John,’ and *kare-zisin* moves to the VP position that is c-commanded by both DPs, ‘John’ and ‘Mike.’ In this way, *zibun* and *zibun-zisin* cannot bind with the object DP ‘Mike,’ but *kare-zisin* can, as shown in Figure 2.

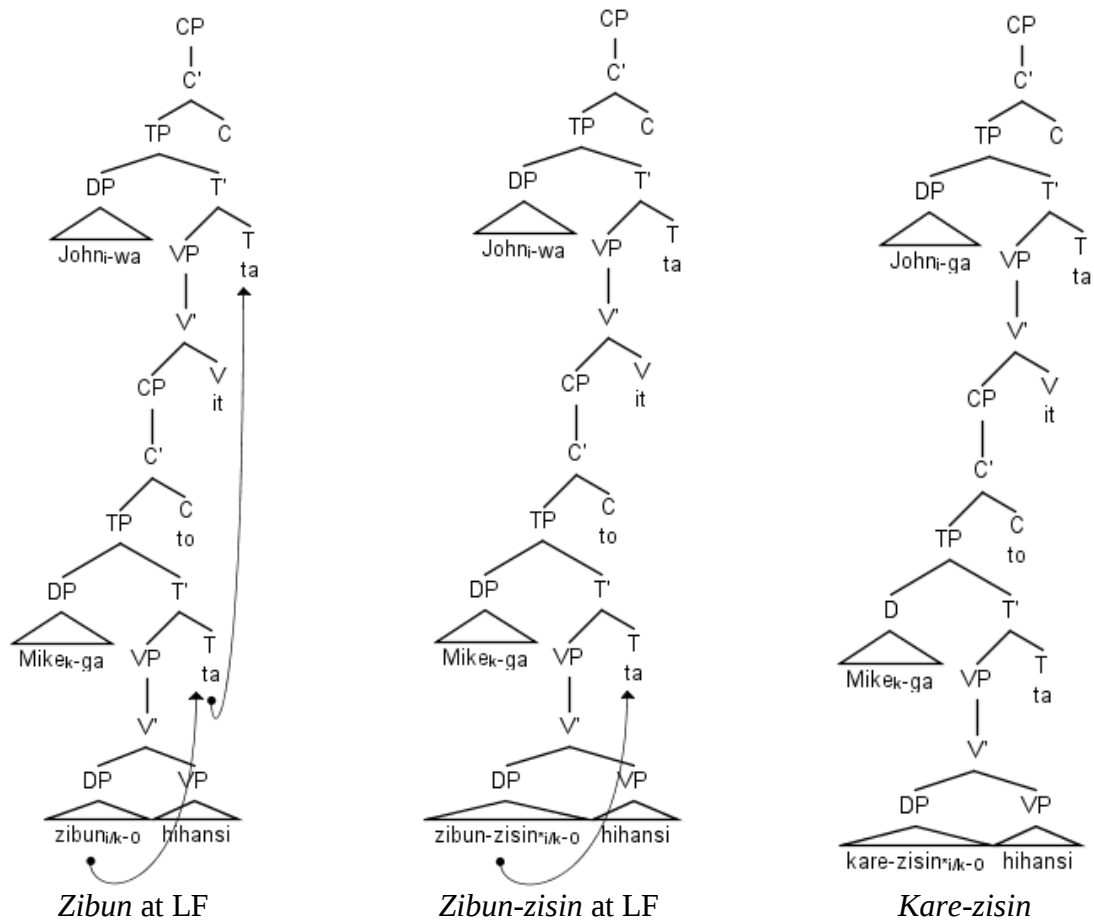


Figure 1. LF movement of *zibun*, *zibun-zisin*, and *kare-zisin* with sentence (8)

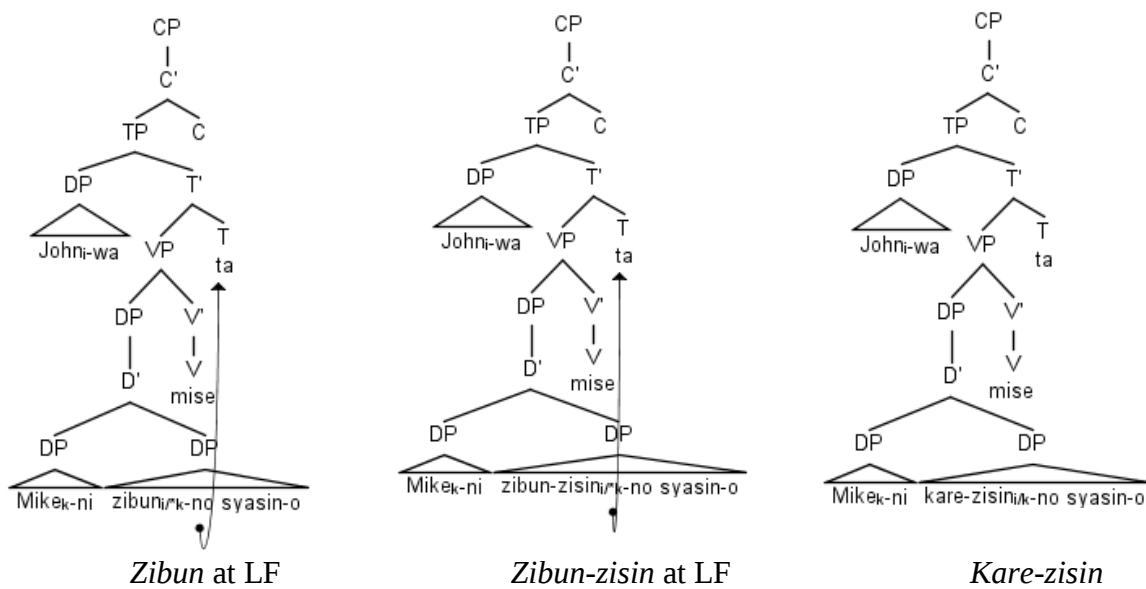


Figure 2. LF movement of *zibun*, *zibun-zisin*, and *kare-zisin* with sentence (9)

The question still remains as to which subject is the correct antecedent for *zibun* in multi-clausal sentences and *kare/kanozyo-zisin* in mono-clausal sentences, but also whether L1 speakers and L2 learners of Japanese ‘know’ the subjecthood conditions and locality constraints that are ascribed to these reflexives.¹⁵ While there are no recent studies, at least to my knowledge, that experimentally examined subject- and object binding of *zibun*, two recent studies by Yoshimura, Nakayama, Shirahata, Sawasaki, & Terao (2012) and Yoshimura et al. (2013) examined local and LD binding of *zibun* through truth-value judgment tasks. The results from both studies showed that L1 Japanese speakers (as a control group) accepted both local and LD binding at similar rates (93.6% true for local and 94.9% true for LD in Yoshimura et al., 2012; 94.2% for local and 93.6% for LD in Yoshimura et al., 2013). (Their L1 Chinese-speaking learners of L2 Japanese participants produced varying results, but they were consistent in accepting more locally-bound sentences than LD-bound (96.5% true for local and 78.9% true for LD in Yoshimura et al., 2012; 71.2% for local and 66.7% for LD in Yoshimura et al., 2013).

¹⁵ The stimuli for bi- and tri-clausal have almost identical linear structures, such as the following:

- a. John-wa [Mike-ga *zibun*-no totta syasin-o Mary-ni miseta-to] itta.
 John-TOP [Mike-NOM *self*-GEN took photograph-ACC Mary-DAT showed-COMP] said
 ‘John showed Mike *self*’s photographs.’
- b. John-wa [[Mike-ga [*zibun*-ga totta syasin-o] Mary-ni miseta-to] itta.
 John-TOP [[Mike-NOM [*self*-NOM took picture-ACC] Mary-DAT showed-COMP] said
 ‘John said Mike showed photographs that *self* took.’

As shown, these two sentences have the exact sentence structures, but because the nominative marked *zibun* establishes an additional clause, (a) is bi-clausal and (b) is tri-clausal.

These empirical results have three important implications for this dissertation: 1) the L1 Japanese results showed that context should usually disambiguate which antecedent a reflexive links to, 2) the results from L2 learners, which also included L1 English and L1 Turkish speakers, showed that as a whole learners were more accurate with local binding as opposed to LD, and 3) acquisition of LD binding of *zibun* was difficult regardless of L1 background (acquisition of L2 Japanese reflexives is discussed in detail in Section 6.0).

However, Li and Juffs (2017), who examined reflexive-antecedent binding patterns of *zibun* by L1 Japanese and L1 Koreans, found that even when context was provided, participants would reject certain multi-clausal sentences, in particular, those that involved grammatically local-bound *zibun*. Using a truth-value judgment task, Li and Juffs (2017) found that certain case-marked reflexives influenced local or LD binding in both Japanese and Korean. Statistically, L1 Japanese speakers bound *zibun* with the local antecedent significantly more than the LD when the reflexive was marked by the nominative case, but were more accurate with the LD over the local for dative and accusative case-marked reflexives (no reliable effect was found for the genitive case-marked reflexives). The L1 Koreans showed statistical significance for LD binding for accusative, genitive, and dative case-marked reflexives (but not nominative-marked), and while these patterns contrast with L1 Japanese, the results suggest that L1 speakers of head-final languages with overt-case marking use case information as important cues when binding. Further item analyses, though, revealed cross-linguistic variation between Japanese and Korean was also based on the VP of certain stimuli. This raises the issue of the role of the predicate in binding.

2.1.2 The predicate effect in binding

Though the role of the predicate was not an integral part of analysis in Principles and Parameters (for an approach in which the predicate plays a more central role, see Reinhart and Reuland's (1993) theory of reflexivity), there is evidence of the predicate playing a role in grammaticality and acceptability of certain sentences with anaphoric elements that should not be overlooked. Haiman (1985) first drew attention to the role of verbs in reflexivization and proposed a distinction between two types of verbs: "introverted" or "extroverted." Introverted verbs involve actions directed toward oneself, and extroverted verbs involve those actions directed toward others (Konig & Vezzosi, 2009). Haiman (1985) exemplified introverted verbs by actions of grooming, and suggested that if the source and the goal of an action were of the same entity, the reflexive is omitted in the clause (e.g., he washed/shaved/showered/ dressed/dried/ (himself*)¹⁶. This distinction was later revised as "other" and "non-other" directed verbs (see Konig & Siemund, 2000; Konig & Vezzosi, 2009).¹⁷ Konig and Vezzosi (2009) argued that non-other directed situations typically do not select an anaphoric pronoun, as it is understood that the action is directed towards oneself, and other directed situations require a reflexive element for clarification.

¹⁶ If an instrumental phrase is added, the anaphor becomes required, e.g., "he dried himself with a towel" or "He shaved himself with an economy razor."

¹⁷ Konig and Siemund (2000) classify verbs that denote grooming, preparing, protecting, defending, liberating, and being proud/ashamed of as 'non-other directed' and violent actions, emotions, communication, and being jealous/angry/pleased as 'other directed.'

However, Japanese presents problems for these distinctions. For example, the verbs ‘to defend’ and ‘to wash’ are non-other directed and ‘to see’ and ‘to kill’ are other-directed, but in Japanese, *bengosuru* (lit. to defend) and *miru* (lit. to see) can take *zibun* as a complement, as shown in sentence (10), but *arau* (lit. to wash) and *korosu* (lit. to kill) cannot, as in (11) (adapted from Noguchi, 2015):¹⁸

10. a. John-ga *zibun-o* bengosita.
 John-NOM *self*-ACC defended
 “John defended himself.”
- b. John-ga *zibun-o* mita.
 John-NOM *self*-ACC saw
 “John saw himself.”
11. a. *John-ga *zibun-o* aratta.
 John-NOM *self*-ACC washed
 “John washed himself.”
- b. *John-ga *zibun-o* korosita.
 John-NOM *self*-ACC killed
 “John killed himself”

The results from Li and Juffs (2017) also confirmed that this other and non-other directed classification does not work in Japanese binding. For example, in sentences that involved other-

¹⁸ Sentences such as “John-ga *zibun-o* aratta” (lit. John washed himself) are not acceptable in Japanese, but can be if modified to “John-ga *karada-o* aratta” (lit. John washed body) to have the meaning that “John washed himself.”

directed situations, the majority of L1 Japanese participants accepted sentences where *zibun* was the object of the verb *hihansuru* (lit. to criticize), but rejected others, such as *korosu* (lit. to kill). One explanation for this is because verbs such as *korosu* (and others such as *arau*) require modification of the predicate in a way that directs the action to the correct referent.¹⁹ Sentences that were rejected such as in (12a) could be improved by modifying the predicate as in (12b):

12. a. *Isya-wa heisi-ga zibun-o korosita-to itta.
 Doctor-TOP soldier-NOM self-ACC kill-COMP said
 “The doctor said the soldier killed himself.”
- b. Isya-wa heisi-ga zi-satu-o sita-to itta.
 Doctor-TOP soldier-NOM self-kill-ACC did-COMP said
 “The doctor said the soldier committed suicide.”

Some argued that this is simply a result of morphosyntactic economy, where simpler expressions tend to become more favorable over complex ones (i.e., compounding the *zi-* and *satu* (the *on’yomi* reading of *koro-su*) morphemes; see Noguchi, 2005; Reuland, 2011). Nonetheless, in Li and Juffs’s (2017) data, 27.5% (22 out of 80) of the L1 Japanese participants still accepted sentence (12a), which indicated that some participants considered the literal meanings of the predicate when interpreting the entire sentence, and accepted a supposed

¹⁹ A more plausible explanation for this may be because the idiomatic meaning of “killing oneself” in Japanese indicates “to not indulge you own (self) desires or feelings, without exception.”

ungrammatical sentence with locally-bound *zibun*.²⁰ Such examples demonstrate that issues remain in the grammaticality of sentences with locally-bound *zibun* (Aikawa, 1999).

Whether the predicate plays a role in binding interpretation, though, may also be dependent on *when* the parser actually makes co-referencing decisions. There are three possible points in the sentence where this occurs: a) they select an antecedent upon processing the reflexive (i.e., the parser makes a local or LD binding decision upon passing the reflexive in the sentence), b) they select an antecedent upon processing the VP that is within the same clause as the reflexive (i.e., they pass the reflexive and do not make a co-referencing decision until a VP is processed), or c) they wait until the end when the parse is complete to select an antecedent (see Pritchett, 1991, for delayed processing models). The last option seems unlikely, as this strategy of parsing is taxing in Japanese, and the majority of sentence processing models in Japanese argue that the parser does not wait until the final VP to build syntactic constructions (Aoshima, Yoshida, & Phillips, 2009). Thus, the first two are the strategies of parsing Japanese speakers utilize, and in either process, they must build associations between various DPs and assign theta roles before processing the entire clause. Hypothetically, this is high-stakes processing, as an

²⁰ Similar patterns were found from dative case-marked *zibun*, such as in the following sentence that resulted in 86.3% of L1 Japanese participants reporting the sentence as true when *zibun* referred to the LD antecedent ‘Mary,’ but only 46.3% reporting true when it referred to the local antecedent ‘John.’

Mary-wa	John-ga	<i>zibun</i> -ni	okasi-o	katta-to	itta.
Mary-TOP	John-NOM	<i>self</i> -DAT	snack-ACC	bought-COMP	said

“Mary said John bought snacks for *self*.”

error in the parse would require reanalysis and cause delay, especially if reanalysis is required in specific challenging contexts (see Juffs & Rodríguez, 2014, pp. 16-33, for a review). Nonetheless, L1 Japanese speakers appear to be able to process ambiguity without noticeable cost. The source of such abilities arguably lies in the case particles that mark DPs. The interaction of binding ambiguity and case marking has not been thoroughly addressed in the literature to date. Thus, the roles of case markers and the predicate in sentences that involve co-reference require further analysis.

Overall, what seems essential is a more refined analysis of the entire reflexive inventory of Japanese, and examining how L1 speakers and L2 learners of Japanese bind reflexives to their antecedents without forcing theoretical conditions onto the language, but through analyses of other syntactic aspects. This comparison of the entire reflexive paradigm is of particular importance, as a general principle of language design is one of contrast to make meaning clear (e.g., the phonemic principle and the one-to-one principle). This ‘one-to-one’ or uniqueness principle extends to the lexicon where true synonymy is quite rare in acquisition where children assume no synonyms (Clark, 1987), and L2 learners generally assign one meaning to one form in acquisition (Sugaya & Shirai, 2007, see also Andersen, 1984). Thus, a clearer understanding of Japanese reflexives and their acquisition as an L2 requires testing of all anaphoric reflexive forms, and not just *zibun*.

2.2 HOW DOES ANYONE (SUCCESSFULLY) PARSE IN JAPANESE

Although LF movement (correctly) predicted how *zibun*, *zibun-zisin*, and *kare/kanozoyo-zisin* bind with their antecedents and some predicates block binding of reflexives, certain sentences

still remain ambiguous and difficult to process. Reflexive pronouns aside, Japanese is a language that is “infinitely ambiguous up to its final word, and often multiply [ambiguous] even when complete” (Inoue & Fodor, 1995, p. 9). This ambiguity is due to Japanese being a head-final language, where the VP does not appear until the end of the clause (in the standard word order), frequent scrambling of DPs within the clause, and pronouns that do not need to be explicitly stated so long as discourse provides sufficient context (even if minimal) to identify the referent (Inoue & Fodor, 1995). The most relevant points for this dissertation are the word order of Japanese and the argument structure of verb. If all DPs appear before the main (matrix) VP, meaning theta roles supposedly cannot be assigned until the parser reaches the end of the entire clause, how does anyone successfully parse a sentence in Japanese? This section discusses the argument structure of the verb in Japanese and the role of case in incremental processing, leading to the proposal of the CIA Processing hypothesis.

2.2.1 Argument structure of the verb and sentence processing in Japanese

It has been well-established that the verb plays a central role in processing the structure of a clause, and therefore, the argument structure of the verb plays a crucial role in sentence processing (e.g., Juffs & Rodríguez, 2014; Wasow, 1985). The standard Principles and Parameters approach suggests, based on the Generalized Theta Attachment (GTA) (Pritchett, 1992), that “every principle of the grammar must be satisfied as early as possible” (Juffs, 1998, p. 409). That is, the parser seeks to satisfy the theta criterion and other structural principles for as early as possible during parsing whenever possible. This approach applies well for head-initial languages. Consider the verb ‘give,’ which is universally a three-place predicate. While the subject may be omitted in some contexts, it is generally understood that the VP ‘give’ requires a

subject (AGENT), a direct object (THEME), and an indirect object (RECIPIENT). In parsing a sentence such as ‘John gave Mary a ring,’ the theta roles of AGENT, THEME, and RECIPIENT are assigned by the following steps in incremental processing (see Carnie, 2003, for arguments against whether the AGENT is specified by the verb). Upon commencing the parse, the processor first assigns [+Nom] case to the DP ‘John,’ which comes from the spec position of the Inflectional Phrase (IP). After the IP is projected by the processor, the VP ‘gave’ is processed as a tensed verb, at which point then the AGENT theta role becomes available for assignment to ‘John.’ Once the AGENT and argument structure of the verb are established, predictions can be made that the VP ‘give’ requires THEME and RECIPIENT theta roles, and upon fulfillment of these theta roles, the parse is successfully completed (Juffs & Rodríguez, 2014).²¹ Thus, the argument structure of the verb and the predicate play an imperative role in clause structure and sentence processing.

However, in head-final languages, given the way constituents are ordered, the available information early in the parse is limited. As all DPs appear before the head of the VP (at least in standard word order), the parser in Japanese is presented with a number of DPs for which they must build various associations, but without sufficient information that would be made available by the VP (Inoue & Fodor, 1995). Such fundamental differences potentially have profound effects on how Japanese parsers build syntactic structures and associations between various phrases, especially in sentences with anaphoric elements.

²¹ This also explains why garden path effects sometimes occur in processing. If a subsequent clause does not agree with the original theta role predictions, the parser must reanalyze and reassign new theta roles, as an argument can only take one theta role (Chomsky, 1981).

Let us compare sentences (8) and (9) in Japanese and English to illustrate this point. The sentences are repeated in (13) and (14):

13. John_i-wa Mike_k-ni *zibun_i/*_k/z-zisin_i/*_k/k-zisin_i/_k* -no syasin-o misete-ageta.

John_i-TOP Mike_k-DAT *self_i/(*)_k* -GEN photograph-ACC show-gave

“John_i showed Mike_k a photograph of (him)*self*.”

14. John_i-wa [Mike_k-ga *zibun_i/_k/z-zisin_i/*_k/k-zisin_i/*_k-o* hihansita-to] itta.

John_i-TOP Mike_k-NOM *self_i/(*)_k*-ACC criticized-COMP said

“John_i said [that Mike_k criticized (him)*self*].”

Starting with (13), in English, the VP ‘showed’ activates three arguments (AGENT, THEME, and RECIPIENT) upon processing, and the parser is quickly able to construct associations between the various phrases for this sentence. In sentence (14), the association between the noun and main verb is again established early between the VP ‘said’ and the DP ‘John,’ and the parser can initiate the basic construction of “John said X.” Further, the complementizer that appears after the VP indicates that the subsequent clause is embedded. Therefore, the English language allows the parser to not only build syntactic structures of various phrases early in sentence processing, but also recognize ambiguity early in the parse of multiple clauses in a sentence. This is especially helpful in sentences that have anaphoric elements in English, as Binding Principles govern the binding parameters of anaphors and pronouns.

In head-final languages, as mentioned earlier, the primary ramification of the VP appearing at the end of the clause is that the associations between various DPs must be established without having critical information that would be supplied by the head of the VP. Thus, in sentences such as (13), the only indication that this sentence involves three arguments is the appearance of the three consecutive DPs. Furthermore, there is no clear indication in

Japanese whether a clause is embedded or finished until the end, as is the case in (14), where the complementizer appears after the clause it governs and before the VP from the matrix clause. In terms of sentences with anaphoric elements, they must, at least initially, bind a reflexive with a DP without knowing what action took place. The implication here is that if the parser in Japanese binds the reflexive to the wrong antecedent, they would have to reanalyze their original parse, leading to potential delay in processing.

However, such delays do not seem to occur in Japanese;²² while sentences may appear to be ambiguous with the possibility of multiple interpretations, Japanese speakers are able to accurately process sentences on-line without any (if not barely) noticeable cost.²³ This requires parsers in Japanese being able to accurately build hierarchical structures incrementally, anticipate subsequent heads that appear (Kamide, 2008; Miyamoto, 2002), and if reanalysis is necessary, to

²² An explanation for this is that there are more interpretable possibilities from ambiguous sentences that contain less parsing information, which leads to more alternative analyses. The availability of multiple analyses allows reanalysis to be easier than sentences with less ambiguity and more information, as the alternative possibilities are likely to be inaccurate, and reanalysis becomes more laborious. See Inoue & Fodor (1995) for more details.

²³ An example of a sentence that has multiple interpretations is:

Atama-ga	akai	sakana-o	tabeta	neko.
Head-NOM	red	fish-ACC	ate	cat

The possible interpretations are as follows: 1) The cat with a red head ate the fish; 2) The cat ate a fish with a red head; 3) The cat's head ate the red fish; 4) The person with a cat head ate a red fish; 5) The person with a red cat head ate the fish.

do so with ease. This is a critical observation in processing because none of the basic designs of sentence processing systems, parallel, serial, or delay of decisions, seem to fit well with Japanese.²⁴ To further illustrate this point, consider the following fragment in (15) and sentences in (16) (adapted from Inoue & Fodor, 1995):

- | | | | | | |
|-------------|----------|--------------|--|--|--|
| 15. John-ga | Mary-ni | ringo-o... | | | |
| John-NOM | Mary-DAT | apple-ACC... | | | |
-
- | | | | | | |
|-----------------------------|----------|-----------|--------|--|--|
| 16. a. John-ga | Mary-ni | ringo-o | ageta. | | |
| John-NOM | Mary-DAT | apple-ACC | gave | | |
| “John gave Mary the apple.” | | | | | |
-
- | | | | | | |
|--|----------|------------|---------|---------|--------|
| b. John-ga | Mary-ni | [ringo-o | tabeta] | inu-o | ageta. |
| John-NOM | Mary-DAT | [Apple-ACC | ate] | dog-ACC | gave |
| “John gave Mary the dog that ate the apple.” | | | | | |

If L1 Japanese speakers are presented with the fragment in (15), they will usually anticipate a VP that takes three arguments such as *ageta* (lit. to give) to appear, as demonstrated in (16a). This is made possible by assigning AGENT, RECIPIENT, and THEME to the three DPs, ‘John,’ ‘Mary,’ and ‘apple’ based on their case particles that mark the DPs, and approach that follows Pritchett’s (1992) proposition that all arguments must be licensed as soon as possible by receiving both a theta role and case. Thus, the VP *tabeta* in (16b) will initially cause some surprise to the reader, because *tabeta* is a one-place predicate and cannot take the dative-marked

²⁴ It should be noted that constraint based theories (e.g., MacDonald, 1994) that are similar to parallel processing, seem to do a better job than Garden Path models (e.g. Frazier 1987, 2013; Frazier & Fodor, 1978) that are similar to serial processing.

RECIPIENT ‘Mary.’ Instead, it must modify the DP ‘dog’ (hence, ‘the dog that ate the apple’). Nonetheless, Japanese speakers are able to incorporate the VP *tabeta* into the clause, and once the DP ‘dog’ is processed they reanalyze the argument structure without any delay or difficulty. These observations serve as key evidence that Japanese speakers rely on case marking to establish co-arguments among DPs before they arrive at any VP (Fodor & Hirose, 2003; Inoue & Fodor, 1995; Mazuka & Itoh, 1995; Miyamoto & Takahashi, 2002). The ability to incrementally process and build DP constructions pre-verbally has also been confirmed in other sentences types in Japanese, such as scrambling.

2.2.2 Scrambling

In Japanese, scrambling is highly prevalent. Within a clause, DPs can be freely ordered without changing the meaning of the sentence (Nemoto, 2002; except for focus, i.e., pragmatics, confirmed by L1 Japanese). For example, consider the sentence in (17a) and the scrambled sentences in (17b-f):

17. ‘John gave the apple to Mary.’

Base structure:

a.	John-ga	Mary-ni	ringo-o	ageta.
	John-NOM	Mary-DAT	apple-ACC	gave

Scrambled structures:

b.	John-ga	ringo-o	Mary-ni	ageta.
	John-NOM	apple-ACC	Mary-DAT	gave
c.	Mary-ni	John-ga	ringo-o	ageta.
	Mary-DAT	John-NOM	apple-ACC	gave

- | | | | | |
|----|-----------|-----------|----------|--------|
| d. | Mary-ni | ringo-o | John-ga | ageta. |
| | Mary-DAT | apple-ACC | John-NOM | gave |
| e. | Ringo-o | John-ga | Mary-ni | ageta. |
| | Apple-ACC | John-NOM | Mary-DAT | gave |
| f. | Ringo-o | Mary-ni | John-ga | ageta. |
| | Apple-ACC | Mary-DAT | John-NOM | gave |

As illustrated here, there are six different structures for ‘John gave the apple to Mary;’ and all six sentences lead to one single interpretation. Scrambling in Japanese has been well-documented (e.g. Mitsugi & MacWhinney, 2010; Nemoto, 2002; Yamashita, 1997) and while it is not the focus of this dissertation, how Japanese speakers process scrambled sentences provides important evidence for incremental processing models. This is because scrambled (or ‘non-canonical’) word orders generally increase structural ambiguity, based on the notion that if “non-canonical word orders are derived by transformational operations, then those operations may be associated with increased processing difficulty” (Aoshima et al., 2009, p. 97). Miyamoto and Takahashi (2002) examined whether scrambled word order in Japanese induced processing difficulty over standard word order, such as in the following sentences in (18) (18a is the canonical NOM-DAT-ACC word order, and 18b is the scrambled NOM-ACC-DAT word order):

18. “At the office, Aihara said that the employee politely praised the woman who had served tea to the manager.”

- | | | | | | |
|-----|------------|--------------|---------------|---------------|--------------|
| (a) | Ohuisu-de | syokuin-ga | kakarityoo-ni | <i>otya-o</i> | dasita |
| | zyosei-o | teineini | hometa-to | Aiharasan-ga | hanasiteita. |
| | Office-LOC | employee-NOM | manager-DAT | tea-ACC | served |
| | woman-ACC | politely | praised-COMP | Aihara-NOM | said |

(b) Ohuisu-de	syokuin-ga	otya-o	<i>kakarityoo-ni</i>	dasita
zyosei-o	teineini	hometa-to	Aiharasan-ga	hanasiteita.
Office-LOC	employee-NOM	tea-ACC	manager-DAT	served
woman-ACC	politely	praised-COMP	Aihara-NOM	said

While slightly different overall reading times between the two sentences were observed (see Section 2.3 for more details on self-paced reading), Miyamoto and Takahashi (2002) reported that non-canonical word orders do not necessarily lead to increased processing difficulty (supported also by Aoshima et al., 2009; Miyamoto, 2008; Yamashita, 1997). This indicates that even if case-marked DPs appear in different positions in the clause, L1 Japanese speakers are able to process and organize scrambled DPs successfully to construct associations between them as they would if they were in standard word order. The logic behind this is that scrambled sequences do not guarantee that a sentence would end the same way as a non-scrambled sentence; i.e., the NOM-ACC sequence in 18b does not guarantee that *kakarityoo-ni* or any other DP-DAT will appear next (Nakayama, 2002). Thus, Japanese speakers must be prepared for any phrase to successively appear and process them without cost, tax, or delay.

The ability for Japanese speakers to construct associations between DPs pre-verbally is attributed by incremental processing (e.g., Aoshima, Yoshida, & Phillips, 2009; Frazier & Rayner, 1982; Kamide, 2008; Kamide, Altmann, & Haywood, 2003; Lombardo & Sturt, 2002; Pritchett, 1991). Incremental processing, as mentioned earlier, involves accurately building hierarchical structures of DPs as they appear and wrap up the parse upon processing the final VP. In particular, Kamide et al. (2003) proposed an extension of incremental processing such that L1 Japanese speakers utilize an anticipatory process in sentence processing. They argued that the parser in Japanese builds “sentence structures prior to the verb (c.f., the head-driving parsing

account, e.g., Pritchett, 1991), and achieves anticipation of forthcoming arguments if the pre-verbal information, especially case-marking information combined with real-world knowledge, is sufficiently constraining” (Kamide, 2008; p. 659). That is, in sentences such as (16a), if the parser was presented with two DPs that are marked by the nominative and dative case in sequence (e.g., *John-ga Mary-ni*), the parser would anticipate an accusative-marked DP (e.g., *ringo-o*) to follow. If the parser was presented with an accusative case-marked DP instead of the dative case (e.g., *John-ga ringo-o*), Kamide et al. (2003) suggested the parser would anticipate a dative-marked DP or mono-transitive verb to follow.

However, anticipatory processing does not answer questions of whether the parser commits to serial or parallel processing, or whether it is applicable to L2 learning and processing. Further, it does not make predictions of how the parser would reanalyze when surprise effects occur, such as in (16b), or how they make decisions on co-reference, which was addressed in Aoshima et al. (2009). They argued that the parser is able to make accurate anaphoric relations between reflexive and antecedent DPs before any input of the verb, and only seek antecedents that are in the correct *structural* position. Their conclusions are consistent within the incremental processing approach that argue the parser “incremental [assembles] detailed grammatical structure as each new word is encountered rather than [follow] models in which structure building is delayed until a clause-final verb is reached” (Aoshima et al., 2009, p. 127).

What is missing from the previous research, though, is a full analysis of the constructions that are built based on case information, which is one of the key differences between head-initial and head-final languages: head-initial languages rely on word order, while case marking, especially in Japanese where it is marked overtly, is heavily relied upon in head-final languages

(Aoshima et al., 2009; Inoue, 1991; Miyamoto, 2002; Yamashita, 1997). Previous studies have recognized the importance of case marking in Japanese (it would be difficult to dismiss or ignore its significance in sentence processing), but a more detailed analysis of case in incremental processing and reflexive-antecedent binding is necessary. This dissertation proposes that the case particles that mark reflexives play a crucial role in resolving the ambiguity of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* in reflexive-antecedent binding, and makes predictions of the role they play in incremental sentence processing.

2.2.3 Case and CIA processing hypothesis

The formal role of case in standard Principles and Parameters approach is to make the DP visible in the syntax. Case is the theoretical tool in Principles and Parameters that determines grammaticality that is not satisfied by other constructs, such as the Extended Projection Principle. For example, a sentence such as “*Bill_i is likely John to hit *t_i*” and “*It was kissed the puppy” are permissible by the Extended Projection Principle, but case theory tells us that receiving a theta role is not sufficient to determine grammaticality as ‘John’ and ‘the puppy’ fail to receive case in these sentences.

Case is especially important in Japanese as it is marked overtly by a post-positional suffix in the grammar (as opposed to English which only exhibits overt case marking on pronouns).²⁵

²⁵ Some (structural) case particles can be dropped in the written and spoken language, such as the nominative and accusative, but inherent cases that carry semantic meaning are usually

Although there are eight case particles (*kakuziyosi*) in Japanese – nominative *-ga*, accusative *-o*, genitive *-no*, dative *-ni*, instrumental *-de*, ablative *-kara*, comitative *-to*, and comparative *-yori* – we are only concerned with the nominative, accusative, genitive, and dative case markers in this dissertation.²⁶ This is based on the previous pilot data by Li and Juffs (2017) that showed specific local or LD binding constraints for *zibun* marked by instrumental, ablative, comitative, and comparative case markers, but both local and LD binding was possible with nominative, accusative, genitive, and dative cases.²⁷ This dissertation expands on the previous study by examining the interaction between case and the predicate in local and LD binding, and whether L1 speakers and L2 learners of Japanese bind reflexives to their antecedents according to the subject-hood conditions that is ascribed to *zibun* and *zibun-zisin*, and locality constraints for *zibun-zisin* and *kare/kanozyo-zisin*.

maintained (some exceptions in the spoken language include the dative, such as “*gakkō (ni) itta*” (went to school)).

²⁶ Broadly, the nominative case marks the subject of the sentence; however, it can also mark an object when it appears in the middle of the sentence. The genitive case establishes possession by marking the DP (e.g., John’s book would be *John-no hon* in Japanese). The dative and accusative cases are object markers – the dative marks indirect objects, indicating the direction of, location, goal and other adjuncts in the clause. The accusative marks direct objects of transitive verbs, and certain adjectives in Japanese, such as *na*-type adjectives in Japanese.

²⁷ Norming tasks of the stimuli confirmed that all four case particles can mark each of the three reflexives without violating grammaticality.

In Japanese sentence processing, case markers are considered to be one of the most important pieces of information that is accessed during the parse (Aoshima et al., 2009; Inoue, 1991; Miyamoto, 2002). Case is particularly important in binding in Japanese as co-reference of reflexives and antecedents can occur beyond clause boundaries.²⁸ Because case is relied upon in building DP constructions, it is reasonable to presume that case information also plays a role in local or LD binding; however, it is still unclear “specifically what representations are constructed on the basis of case information” (Aoshima et al., 2009; p. 95).²⁹ Thus, the question remains as to what the exact nature and role of case markers are in incremental processing and co-reference of reflexive and antecedent DPs.

The role that case plays in co-reference of DPs may be based on their categorization. In Case theory, cases are divided between “structural” or “inherent” case. Structural cases, such as nominative and accusative, have strict structural configuration, and case assignment is dependent on government (nominative is assigned by Tense and accusative by the verb). Inherent cases, such as genitive and dative, are dependent on theta marking; i.e., assignment of such cases must

²⁸ English pronouns and DPs receive case based on their position in the structural tree, but case information is not sought out in construing DPs. Further, case information is not necessary to make co-referencing decisions because anaphors in English cannot bind with DPs that are located beyond their governing categories.

²⁹ Languages that have isolated morphology do not rely on case marking but rather word-order; however, even in languages such as Mandarin has evidence of case marking in passive sentences. Based on this premise, we understand that languages use different strategies of processing.

agree with theta marking (Chomsky, 1986). The distinction between structural and inherent is clear in the following two sentences:

19. John believes [the Seahawks will win].

20. *John's belief [the Seahawks will win].

Sentence (20) is ill-formed because the DP 'John' cannot receive a theta role from 'belief,' and since 'belief' is an NP it cannot assign structural case. Therefore, case is inherent when it is "assigned by α to NP only if α theta-marks NP" (Chomsky, 2014, p. 104).

As it is generally agreed upon that the parser in Japanese does not wait until the clause VP to build structural relations between DPs, I suggest a model of sentence processing in which the parser accesses and retrieves information through case marking of DPs in order to successfully parse Japanese sentences, and that co-reference decisions are based on whether case marking on reflexives is structural or inherent. To first establish how the parser processes a Japanese sentence, consider the following sentence (21) from above:

21. John-ga Mary-ni ringo-o ageta.

John-NOM Mary-DAT apple-ACC gave

"John gave Mary the apple."

Once the three DPs 'John,' 'Mary,' and 'apple' are processed, Japanese speakers should anticipate a VP that takes three arguments to appear (following Kamide et al.'s 2003 model), because the DPs that are marked by the nominative, dative, and accusative case particles should trigger and activate AGENT, RECIPIENT, and THEME theta roles. This approach follows Pritchett's (1992) theory of Theta Attachment, which states, "Every principle of the syntax

attempts to be maximally satisfied at every point during processing” (the GTA, p. 138),³⁰ and Kamide’s (2008) model of anticipatory processing; however, what is not predicted by Pritchett and Kamide is how the parser deals with VPs that violate theta criterion, such as if *tabeta* appears instead of *ageta* as shown in (22).

22. John-ga Mary-ni [ringo-o tabeta] inu-o ageta.
 John-NOM Mary-DAT [Apple-ACC ate] dog-ACC gave
 “John gave Mary the dog that ate the apple.”

We understand from Inoue and Fodor (1995) that even if such VPs that violate the argument structure appear, L1 Japanese speakers are unfazed during the parse. Based on this notion, the prediction of what occurs is as follows. The DP ‘apple’ is assigned THEME theta role as the structure up to this point is the same as (19). Upon processing the VP *tabeta*, the THEME ‘apple’ is taken by that VP, and the parser interprets [ringo-o tabeta] as a single clause. At that moment, the parser places AGENT ‘John’ and RECIPIENT ‘Mary’ on hold and anticipates another THEME DP to appear to replace the original THEME ‘apple’ that was taken away by *tabeta*. As the DP *inu* appears, the parser can assign a second THEME, retrieve the DPs AGENT and RECIPIENT that were on hold, and once again anticipate a three-place predicate to appear, which is satisfied by the VP *ageta*. This fulfills the argument structure of the verb and the parse is successfully completed with both clauses processed. The ability to access and retrieve

³⁰ Juffs and Rodríguez (2014, p. 26), summarized the GTA as “the parser attempts to form as complete an interpretation as possible, with all principles satisfied as soon as they possibly can be. These principles include theta attachment, case assignment, binding, and fillers with gaps.

previously leftover DPs to complete the parse without cost or delay is what I hypothesize as “Case Information Access Processing”:

Case Information Access (CIA) Processing hypothesis: Syntactic structures are incrementally constructed upon processing case-marked DPs, theta roles are simultaneously licensed upon processing case, and if necessary, DPs are accessible and covertly retrievable at any point of the parse to satisfy the argument structure of the verb.

CIA processing is distinct from previous models of sentence processing in that it explains how the parser incrementally constructs DPs based on case information, licenses theta roles, and resolves ambiguity without delay. In sentences that induce supposed surprise effects, such as in (22), it is hypothesized that the parser successfully processes the subordinate clause without delay, and retrieves the DPs that were on hold to complete the parse.³¹ The question remains as to how the CIA processing accounts for sentences that involve anaphoric elements.

³¹ In sentences such as (22) that involve a relative clause, Ozeki and Shirai (2007) claim that there are no processing differences in subject, object, and oblique relatives in Japanese, and that L2 learners should be able acquire these as adjectival clauses. The following are examples of subject, object, and oblique relative clauses:

- a. Subject relative: [Bisuketto-o tabeta] inu
[Bisuketto-ACC ate] dog
“The dog that ate the biscuit”

Presumably, there will be differences in how the parser makes co-reference decisions in mono- and multi-clausal sentences, because all antecedents in mono-clausal sentences are local and multi-clausal sentences involves an LD subject antecedents. First, let us examine how the parser would process mono-clausal sentences with *zibun*, as in (23):

23. John_i-wa Mike_k-ni *zibun*_{i/*k}-no syasin-o miseta.

John_i-TOP Mike_k-DAT *self*_{i/*k}-GEN photograph-ACC showed

“John showed Mike a photograph of (him)*self*.”

In sentence (23), the parser assigns AGENT to the DP ‘John’ marked by the topic marker and RECIPIENT to the dative case marked DP ‘Mike.’ Upon processing *zibun-no*, the parser recognizes that the genitive case indicates a possession, which is satisfied by the DP *syasin* (photograph) that is marked by the accusative case and assigns THEME. However, before processing the DP *syasin*, the parser should already make co-reference decisions at this point. Because *zibun* must co-refer with the subject of the sentence, the parser should block any dative case marked DP as a possible referent of *zibun* and only bind with the subject ‘John.’³² Finally,

b. Object relative: [Sinzi-ga katta] piza

[Sinzi-NOM bought] pizza

“The pizza that Shinji bought”

c. Oblique relative: [Kozi-ga tomatta] hoteru

[Kozi-NOM stayed] hotel

“The hotel that Kohji stayed at”

³² There is a possibility of a spillover effect where the parser passes through the reflexive but exhibits a slowdown in processing in the following phrase.

as the three theta roles have been assigned, the parser can expect a three-place predicate to appear, which is fulfilled by the VP *miseta*, and the parse with proper reflexive-antecedent binding is successfully completed.

Crucial to the analysis is how the parser would process an ambiguous sentence, such as (24) and (25), in which both subject antecedents, without a definite contextual indication, are possible referents of *zibun*.

24. John_i-wa Mike_k-ga *zibun*_{i/k}-o hihansita-to itta.

John-TOP Mike-NOM *self*-ACC criticized-COMP said

“John said that Mike criticized (him)*self*.”

25. John_i-wa Mike_k-ga *zibun*_{i/k}-ni bentō-o tyūmonsita-to itta.

John-TOP Mike-NOM *self*-DAT lunchbox-ACC ordered-COMP said

“John said that Mike ordered a bento for (him)*self*.”

The main difference between the two sentences (other than the predicate) is in (24) *zibun* is marked by the accusative case and in (25) *zibun* is marked by the dative case. Based on the differences in how structural and inherent cases are assigned, and because case plays a crucial role in establishing co-reference among DPs, it is plausible that the parsing strategies and resolution of ambiguity between *zibun* marked by structural case and inherent case will differ; i.e., the parser in Japanese resolves co-reference differently between sentence (24) and (25).

The predictions are as follows. Upon commencing the parse, AGENT is assigned to ‘John,’ but another AGENT is assigned to ‘Mike,’ which is marked by the nominative case.³³ As

³³ The topic marker in Japanese is interchangeable with the nominative case at the beginning of the sentence without drastically changing the meaning of the sentence, and Japanese speakers

the complementizer does not appear until the end of the clause, there is actually no indication at this juncture in the parse whether the sentence involves multiple clauses, but it is plausible that the parser recognizes at this point that the nominative case marking on the second DP establishes an embedded clause, given that a single clause generally does not have two AGENTs. If the parser does not wait until the clause-final VP to build syntactic relations, L1 Japanese speakers, presumably, do not have to wait until the complementizer appears in Japanese to determine whether the clause is embedded (waiting until the end potentially leads to reanalysis of the location of clause boundaries, and delay of decision is not predicted sentence processing of Japanese).³⁴ Because LD dependencies of anaphora are covertly local, I propose that the parser keeps both AGENT assignments for ‘John’ and ‘Mike’ with the option of retrieving one of the AGENTs later in the parse, if necessary, to co-refer *zibun* with the matrix DP.

Continuing with the parse, *zibun* marked by the accusative case in (24) is assigned THEME leading the parser to expect a two-place predicate to appear. In (25), *zibun* marked by the dative case is assigned RECIPIENT leading the parser to expect a THEME and three-place

have no particular issues for interpreting a *wa*-marked DP in multi-clausal sentences as the subject of the main clause (Miyamoto, 2002).

³⁴ There is actually no literature, at least to my knowledge, to date that suggests this possibility.

Note that there are simplex sentences that have [DP-TOP DP-NOM...] structures, such as:

John-wa Mary-ga sukida.

John-TOP Mary-NOM like

“John likes Mary.”

predicate to appear. However, similar to how mono-clausal sentences with *zibun* are processed, this is first point in the parse where co-reference decisions may be made, as described earlier.

There are critical processing strategies that occur at this point for co-reference that differ between *zibun* that is marked by structural case and inherent case based on Case theory and CIA processing. If *zibun* is marked by structural case (nominative and accusative), case is attached early in the parse because GTA needs to be resolved locally for structural case. Because of this, co-reference decisions can be made early for *zibun*-NOM or *zibun*-ACC. If LD binding is required, moving the reflexive to the LD position would not be costly, though processing times may slightly differ because LD binding requires movement. Thus, the prediction is that the parser is initially inclined to locally bind *zibun*-NOM and *zibun*-ACC (such as in (24)), and if necessary based on the context, they may move *zibun* to the matrix T position. If the case that marks *zibun* is inherent case (genitive or dative), case is attached late, because GTA does not need to be resolved locally if *zibun* is marked by inherent case; i.e., inherent cases are not resolved in the lower VP. This leads the parser in Japanese to incorporate the VP at a higher level for GTA resolution, leading to an inclination to initially bind *zibun* with the LD subject antecedent. Binding with the LD antecedent in this situation would require the parser to hold genitive or dative case-marked *zibun* and retrieve them when the matrix T position is made available, a strategy that is predicted by CIA processing. Now, if the parser decides that they need to bind *zibun* locally, they would have to re-open the closed VP in order to return to the embedded T position, an operation that is costly and would result in processing breakdown. Thus, the prediction is that parser is inclined to bind *zibun*-GEN and *zibun*-DAT (as in (25)) with the LD antecedent rather than the local.

Once co-reference decisions are made, the parse resumes with the following steps. 1) in (24), AGENT ‘Mike’ are licensed and the theta roles discharged from *hihansita*, and in (25), THEME *bentō* (lit. lunchbox) and AGENT ‘Mike’ are licensed and the theta roles discharged from *tyūmonsita* (lit. ordered); 2) the parser should interpret [Mike-ga *zibun*-o *hihansita*] in (24) and [Mike-ga *zibun*-ni *bentō*-o *tyūmonsita*] in (25) as a single clause; 3) the parser should place the other AGENT ‘John’ on hold until the matrix VP is presented; 4) the complementizer *-to* confirms that the clauses are embedded; 5) the parser should now expect a matrix clause VP to complete the sentence; and 6) once the matrix VP *itta* (lit. said) is processed, the parser can retrieve and assign the leftover AGENT ‘John’ to fulfill the argument structure of the verb *itta*.

At this point, the parser can confirm its original binding decision(s) and complete the parse without cost or delay. However, if reanalysis is necessary, presumably, inherent case-marked reflexives will lead to more processing problems than structurally case-marked reflexives, because, as mentioned earlier, the operation to reopen an embedded VP that had been closed is a costly. This is similar to Pritchett’s (1992, p. 94) theta reanalysis constraint, version 3: “Syntactic reanalysis which reinterprets a theta marked constituent as outside of a current theta domain and as within a distinct theta domain is impossible for the *automatic* Human Sentence Processor.” In other words, one can raise a reflexive but cannot return to the original location without having conscious processing breakdowns. If processing breakdowns occur, we would predict that the complementizer region or matrix VP region will induce increased reading times in processing (see Section 2.3 for an overview of main effects on reading times). On the other hand, if reanalysis does not induce a main effect, it would provide evidence that the parser in Japanese is able to access and retrieve any case-marked DP without cost or delay, as the CIA processing hypothesis predicts.

For the other Japanese reflexives, if *zibun-zisin* was the reflexive in sentence (23), the parser should deploy similar processing strategies as *zibun* since both reflexives have similar binding constraints in mono-clausal sentences. In sentence (24), the parser should only bind *zibun-zisin* with the local antecedent as it cannot participate in LD binding based on the principles of LF movement; thus, we should not see a case effect in multi-clausal sentences with *zibun-zisin*. The same strategies in multi-clausal sentences should apply to *kare/kanozyo-zisin*; however, mono-clausal sentences may present some processing difficulty, as binding with the subject or object is possible. Nonetheless, any LD binding of *zibun-zisin* or subject/object binding patterns of *kare/kanozyo-zisin* that appears in the data would provide as evidence of co-reference activity that contradicts locality constraints of *zibun-zisin* and a subject or object bias for *kare/kanozyo-zisin*, which have not been reported, as far as I am concerned, in any of the previous literature on Japanese reflexives.

Thus, based on the binding constraints of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, and the predictions of how Japanese speakers parse sentences based on the CIA processing hypothesis, the following flowchart in Figure 3 illustrates a parsing algorithm for *zibun*, Figure 4 for *zibun-zisin*, and Figure 5 for *kare/kanozyo-zisin*:

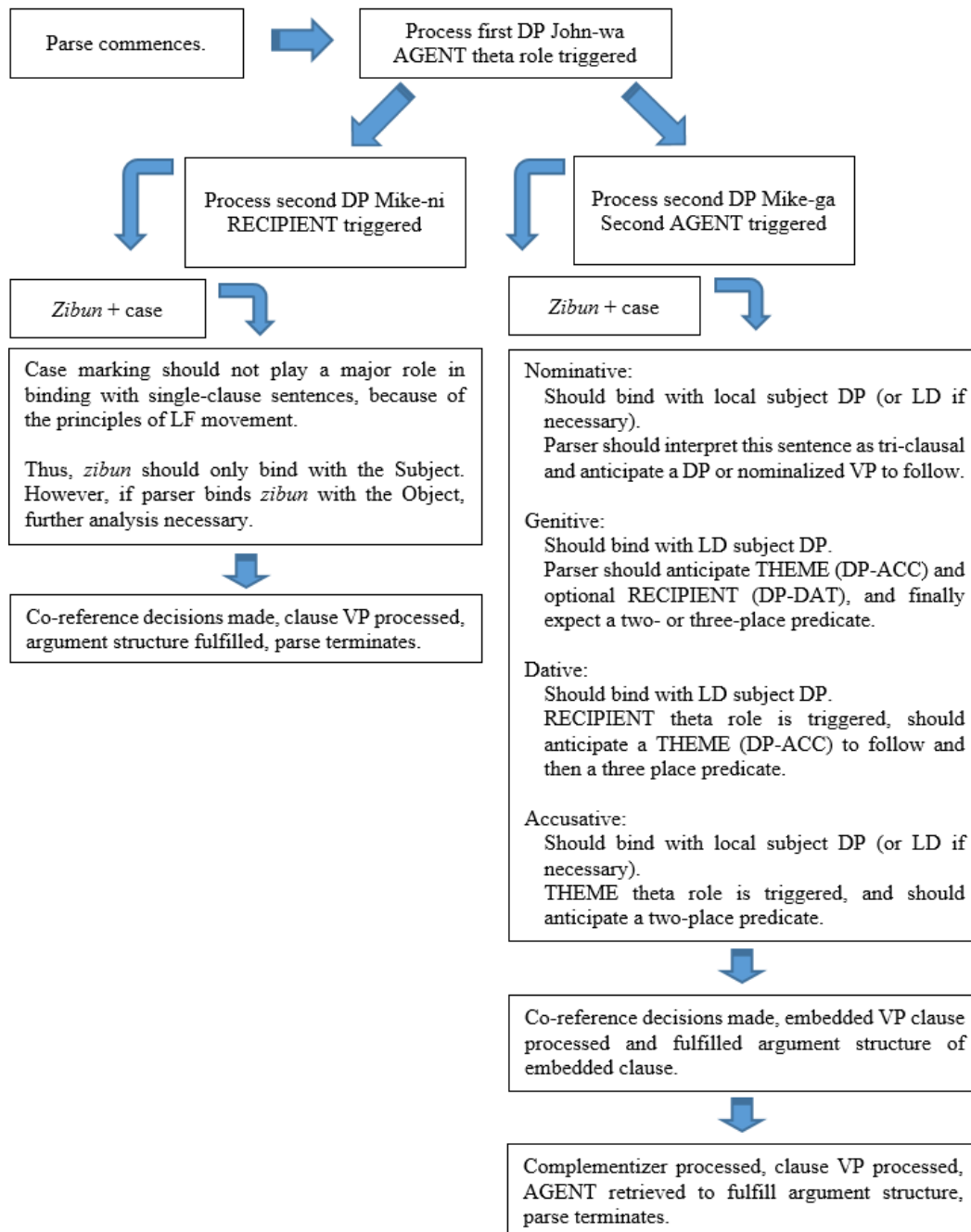


Figure 3. Parsing algorithm for *zibun*-binding

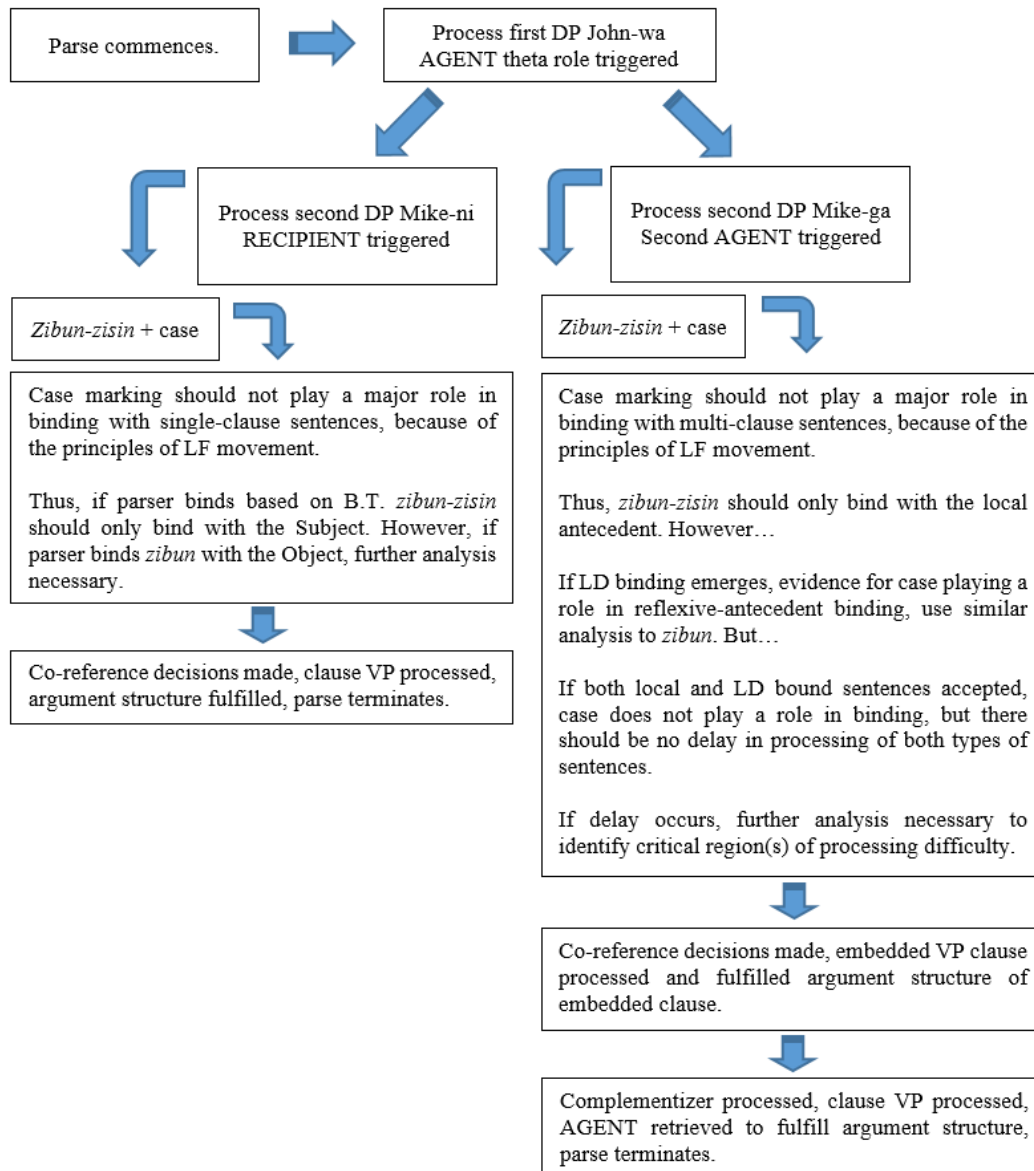


Figure 4. Parsing algorithm for *zibun-zisin* binding

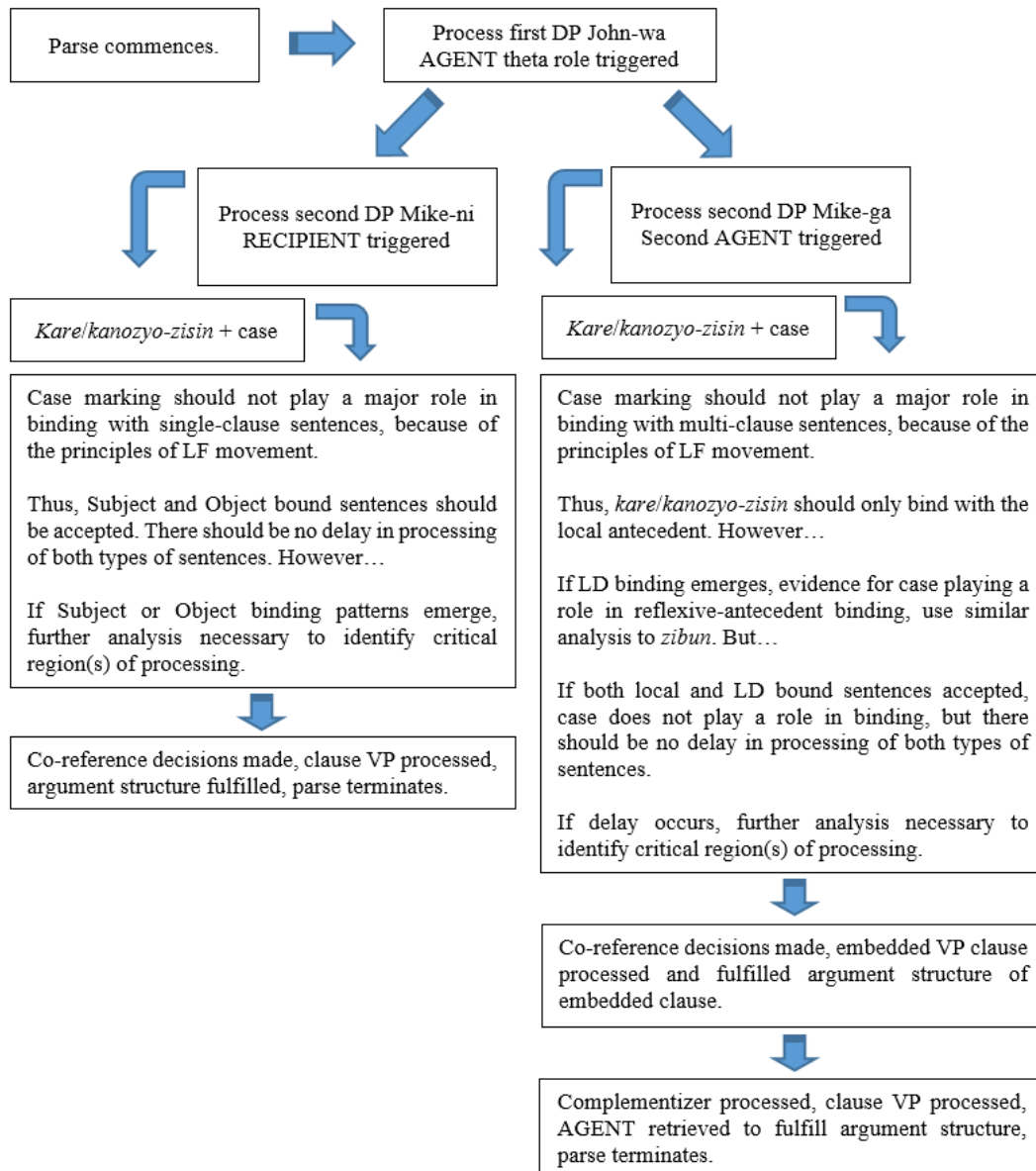


Figure 5. Parsing algorithm for *kare/kanozyo-zisin* binding

I believe this algorithm provides a comprehensive analysis for the roles that case play in reflexive-antecedent binding and incremental processing in Japanese. The figures show how the parser builds DP constructions in both mono- and multi-clausal sentences for all three reflexive types, how theta roles are triggered and assigned, and how co-reference decisions may be made.

2.3 SELF-PACED READING

In order to examine how L1 Japanese construct anaphoric relations between DPs and reflexives, on-line measures of sentence processing analysis are necessary. One of the central objectives of on-line sentence processing research is to examine how L1 speakers process sentences. On-line measures provide researchers opportunities to closely examine how L1 speakers parse a sentence and pinpoint specific areas of interest in the parse, such as a critical word or spillover effects, and permitting a more comprehensive view on sentence processing.

In sentence processing, self-paced reading (SPR) methodology is one of the most popular forms of experimental tasks in psycholinguistic research. Developed in the 1970s (Aaronson & Scarborough, 1976; Mitchell & Green, 1978), the objective of an SPR task was to provide a tool that “measures language comprehension processes in real time (on-line)” (Jegerski, 2014, p.21) in a way that resembles natural reading (Mitchell, 2004; cf. Tabor, Galantucci, & Richardson, 2004). While a number of other forms of on-line processing research are available (e.g., eye-tracking, event-related potentials (ERP) in electroencephalography (EEG) studies, and positron emission tomography (PET)), SPR remains to be the most widely used methodology of on-line processing analysis, as it is cost-effective, practical, and fairly simple to design and use.

There are some disputes as to whether SPR truly resembles ‘natural’ reading, as opposed to other point-driven approaches. Eye-tracking, for example, has several strengths that are not available in SPR, such as, it does not require participants to press a button to reveal a word, texts are not artificially segmented, and eye-movements through texts are as a result of natural movements and reactions. However, in eye-tracking experiments, head movement is generally restricted. The heads of participants are sometimes positioned and clamped down to prevent the readers from making any unnecessary movements, or they are instructed to not move their heads

as much as possible during the experiment (Mitchell, 2004). This is necessary in order for the camera to be able to accurately record eye movements and prevent unnecessary noise in the data. Nonetheless, head movement is a natural physical response in reading, and preventing the participant from moving their head is generally regarded as a constraint. Mitchell (p. 23) further suggests that “in computer displays, advancing is typically achieved by pressing a key, and in cell-phone text messages, the display is routinely restricted to just a few words.”

The main purposes of using SPR tasks are to record reading times of specified segments (such as a word or phrase) of a sentence (Jegerski, 2014), as well as provide global reading times. The segments of a sentence are presented on a screen where the reader progresses through segments of the stimuli at their own pace; i.e., self-paced reading. This is usually done by clicking on the spacebar or designated key on the keyboard. The stimuli are presented by either *cumulative* or *noncumulative* display. In cumulative presentations, as shown in Figure 6, the segments appear in sequence and remain visible on the screen as the participant progresses through the sentence; hence, the words or phrases appear cumulatively.

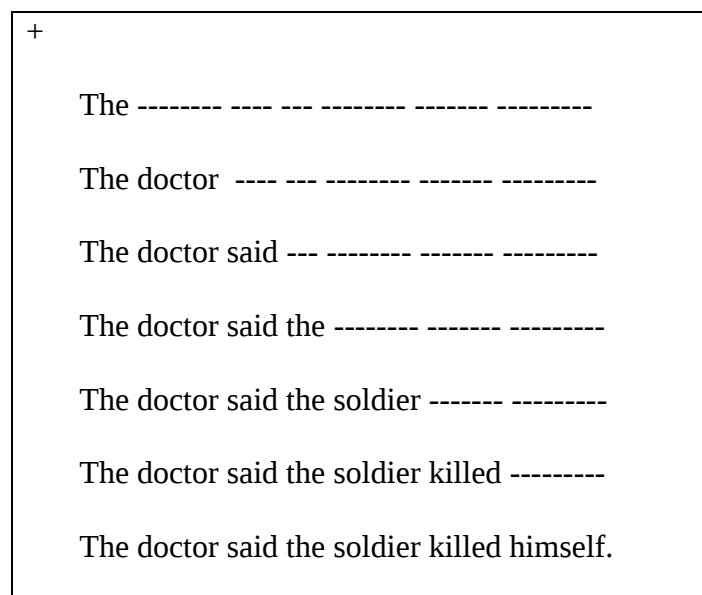


Figure 6. Cumulative linear display of SPR

On the other hand, in noncumulative presentations, as shown in Figure 7, the segments are visible only once, and as the participant progresses to the next segment, preceding segments disappear. That is, the participant cannot see any of the previous words or phrases once they progress to following segments, and in general, SPR experiments do not allow participants to retract to a previous word or phrase, as this interferes with the recorded reading times.

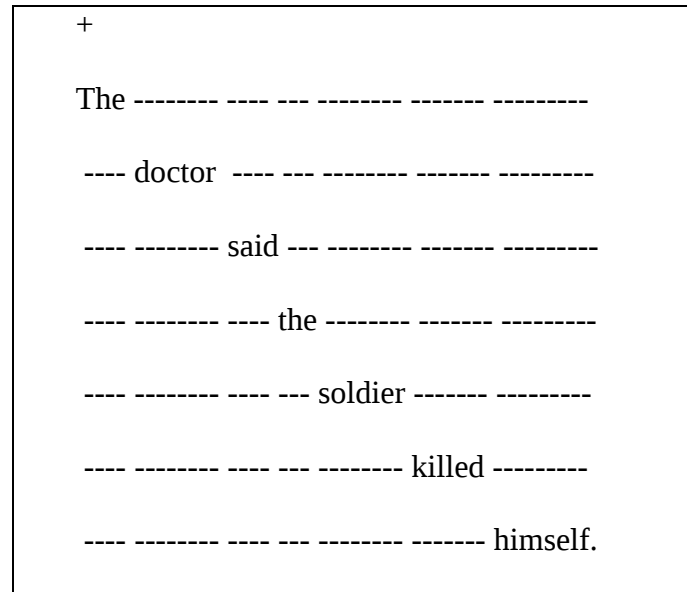


Figure 7. Noncumulative linear display of SPR

Another method of noncumulative display is *centered*, where each segment appears at the center of the screen, rather than left to right as a normal linear sentence appears on print. The subsequent segments are stacked and replace preceding segments as the participant progresses through the sentence; thus, the view on the screen is centered and fixated.

The noncumulative linear format is the most commonly used SPR method for the following reasons. Cumulative presentations result in participants rushing through all of the stimuli segments and revealing the entire sentence, which defeats the purpose of being able to record word-by-word reading times (Ferreira & Henderson, 1990). One prevailing argument

against centered presentations is that it does not resemble normal reading because segments do not appear in linear order, but rather only at the center of the screen.

Two of the main features of SPR are revealing a critical word effect and detecting a spillover effect in ambiguous sentences. These effects reveal to the researcher at which points in the parse ambiguity is maximized and lead to increased reading times. In order to reveal these main effects, as mentioned earlier, the phrases/words appear word-by-word on the screen (usually non-cumulatively) and reading times of each segment are recorded. Increased reading times of a region indicates to the researcher that the parser has paused to process certain ambiguities of the clause.

There are generally two regions that are of interest in an SPR task – the critical and spillover region. The critical region is generally where ambiguity lies, whether it is DP that is either a direct object of the verb or subject of an embedded clause, a DP in non-canonical position in scrambled structures, or a DP that require co-reference with an antecedent DP. In some cases, the parser may pass through the critical region without initially recognizing the ambiguity until the subsequent segment. This is known as the spillover, or in some cases the wrap up effect, where “increased reading times on the stimulus region immediately following the site of an immediate effect are assumed to reflect later phases of comprehension and can be indicators of processing difficulty that is either persistent or delayed” (Jegerski, 2014, p. 26).

In Japanese, one structure that has been widely examined is scrambling, as mentioned earlier, based on the notion that scrambled sentences should increase processing difficulty (over standard word order) as they derive from transformations. Thus, overall reading times of the underlined sequence in (26b) in which the DPs are scrambled should result in higher reading times than (26a) which is in standard word order (adapted from Miyamoto & Takahashi, 2002):

26. (a) Ohuisu-de	<u>syokuin-ga</u>	<u>kakarityō-ni</u>	<u>otya-o</u>	dasita
zyosei-o	teineini	hometa-to	Aiharasan-ga	hanasiteita.
Office-LOC	<u>employee-NOM</u>	<u>manager-DAT</u>	<u>tea-ACC</u>	served
woman-ACC	politely	praised-COMP	Aihara-NOM	said
(b) Ohuisu-de	<u>syokuin-ga</u>	<u>otya-o</u>	<u>kakarityō-ni</u>	dasita
zyosei-o	teineini	hometa-to	Aiharasan-ga	hanasiteita.
Office-LOC	<u>employee-NOM</u>	<u>tea-ACC</u>	<u>manager-DAT</u>	served
woman-ACC	politely	praised-COMP	Aihara-NOM	said

“At the office, Aihara said that the employee politely praised the woman who had served tea to the manager.”

This is exactly what was found in Miyamoto & Takahashi (2002) (see also Mazuka, Itoh, & Kondo, 2002, for scrambling and sentence processing); however, Miyamoto (2008) suggested that such differences in reading times were relatively small, and in many cases significant differences do not appear in SPR between standard and scrambled sentences. Furthermore, miniscule differences in reading times do not necessarily connote increased processing difficulty. Aoshima et al. (2009) also noted that increased reading times may be due to less frequent word ordered sentences generally take longer to process, which led to reading times of the DPs in (26a) was faster than (26b) (the underlined sequence (DP-NOM DP-DAT DP-ACC) in (26a) is more frequent than the underlined sequence (DP-NOM DP-ACC DP-DAT) in (26b) in Japanese). Nonetheless, these results provided evidence from SPR tasks that L1 speakers construct relations between DP prior to arriving at the VP.

These abilities have also been observed in constructions of anaphoric relations of DPs. Aoshima et al. (2009) reported that L1 Japanese speakers actively searched for an available

antecedent during the parse and also built co-reference relations between two DPs before *any* VP was processed. More importantly, they argue that evidence of processing effects before any VP “implicates the selective formation of compositional relations (specifically, anaphoric relations) among NPs in advance of the verb, [which goes] beyond previous evidence based on sensitivity to preferred resolution of ambiguous NPs or effects of canonical sequencing of NPs” (p. 127). While the stimuli that Aoshima et al. (2009) used were mainly tested for semantic mismatch (*kare* and *kanozyo*) and other pronouns (*soko* and *asoko*) that usually sway bound-variable interpretations, their results also provide important evidence that L1 speakers build anaphoric relations before the VP is accessed.

However, even if the parser is able to make L1 speakers establish co-reference among DPs before the VP is processed, the question remains as to what occurs when reanalysis is necessary and where the main effects occur. Based on the predictions made above on how the parser in Japanese processes mono- and multi-clausal sentences with *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, increased reading times may occur in different regions for different sentence types, but also among the three reflexives. For example, with *zibun-zisin*, there should not be any increased reading times in any region, because *zibun-zisin* must be bound to the subject in mono-clausal sentences and the local antecedent in multi-clausal sentences. Multi-clausal sentences with *kare/kanozyo-zisin* also should not induce any slowdown effects in any region as it must be bound to the local antecedent; however, because it can bind with the object in mono-clausal sentences, there may be increased reading times upon processing *kare/kanozyo-zisin* or in the spillover region. This is based on the notion that scrambling changes the focus of the sentence, and *kare/kanozyo-zisin* in non-canonical positions may induce a main effect. Finally, with *zibun*, there should not be any increased reading times in any region in mono-clausal sentences as *zibun*

should only bind with the subject. In multi-clausal sentences, there may be increased reading times based on case marking on *zibun*. With structural case-marked *zibun* (nominative and accusative cases), there should not be increased reading times at the critical word region, but potentially in the spillover region in order to confirm their original co-referencing decision. If reanalysis is necessary, it would not be costly, for the reasons laid out above. However, with inherent case-marked *zibun*, there may be potential increased reading times in the spillover region, or more specifically, in the VP-COMP region or the wrap-up region where the matrix VP is. This is because, as mentioned earlier, inherent cases are not resolved in the embedded VP, and the parser waits until the matrix VP to appear for case assignment. Hence, there is an inclination to bind inherent case-marked *zibun* (genitive and dative cases) to the LD antecedent and reject local. Therefore, local-binding of *zibun*-GEN and *zibun*-DAT are costlier (or “more costly”) than *zibun*-NOM and *zibun*-ACC, and we should notice a spillover effect in sentences with inherent case-marked *zibun*, especially in those that are locally bound. Table 3 summarizes these predictions:

Table 3. Processing predictions of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*

<u>Sentence Type</u>	<u>Reflexive</u>	<u>Case marking effects?</u>	<u>Main effect region</u>
Multi-clausal	<i>Zibun</i>	Yes (structural vs. inherent)	Spillover/wrap-up
	<i>Zibun-zisin</i>	No	None
	<i>Kare/kanozyo-zisin</i>	No	None
Mono-clausal	<i>Zibun</i>	No	None
	<i>Zibun-zisin</i>	No	None
	<i>Kare/kanozyo-zisin</i>	No (but reflexive effects are predicted)	Critical (reflexive)

Thus, this dissertation also uses SPR tasks in order to examine how L1 Japanese speakers establish co-reference in DPs and Japanese reflexives pre-VP, and whether any differences in processing surface between these reflexives.

3.0 L1 INTERPRETATION AND PROCESSING OF JAPANESE REFLEXIVES

Several issues remain based on the previous research on Japanese reflexives. First, much of the research has been heavily focused on *zibun* compared to the other reflexives in Japanese. This is because *zibun* has many properties that are different from English anaphors, even though both are subject to Binding Principle A, and *zibun* is the most frequently used reflexive in Japanese. However, in order to fully understand reflexivity in Japanese, an analysis of all reflexive forms is necessary. Previous analyses have demonstrated that *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* have different binding properties; thus, questions remain as to who are the correct antecedents for these reflexives, and how L1 speakers interpret these reflexives.

The studies for this dissertation are distinct from previous research within this domain for the following reasons. The innovative focus of the dissertation is the role of case in sentence processing of anaphoric elements. The consensus in the literature on Japanese sentence processing is that L1 Japanese speakers incrementally process and build syntactic associations between various DPs before arriving at the main VP, and that case plays a crucial role in being able to do so. The stimuli that were developed for the experiment, which are detailed below in Section 3.2, have been constructed with case markers as independent variables and responses to the stimuli as dependent variables. Further, I examine the potential influence of the argument structure of the verb, and whether certain predicates influence acceptability of local and LD binding. Another aspect of this dissertation is the deployment of methodology that allows the

researcher to track real-time processing of sentences. As mentioned earlier, on-line techniques allow us to track and identify at which points in the parse processing difficulty is encountered. Analyzing the reading profiles of different sentence types (i.e. mono-, bi-, and tri-clausal sentences), and examining *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* may provide a more comprehensive analysis and understanding of the Japanese reflexive system, processing of reflexives, and L2 acquisition of reflexives.

3.1 RESEARCH QUESTIONS

The following two studies and research questions were proposed in consideration of the aforementioned gaps in the previous research on the identification of co-reference of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*.

Study 1: Japanese reflexives: Examining binding patterns of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*.

- a. Will specific binding patterns (i.e., local vs. LD binding) emerge according to the binding constraints (subject orientation or locality constraints) of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, or will results show contradicting patterns?
- b. Will case play a role in resolving ambiguity in reflexive-antecedent binding, and specific local and LD binding patterns emerge based on case-marked reflexives?
- c. Will the predicates that have different subcategorization/meaning influence the local or LD binding of reflexives?

The goal of the first study is to fully examine what binding patterns emerge from data that include all Japanese reflexives. The proposed experiment (which is detailed in Section 3.2.2)

involves a story and the truth-value of a sentence that comments on the story. Participants answer whether the sentence is true or false based on the context provided. Though context should disambiguate with which antecedent DP the reflexive co-refers, participants may still report certain sentences as true or false based on local or LD binding biases. Such preferences may be based on case-marked reflexive or the predicate complements required by the verb. Furthermore, we also examine whether participants accept or reject sentences that should be blocked by the principle of movement at LF, such as object binding with *zibun* and *zibun-zisin*, and LD binding with *zibun-zisin* and *kare/kanozyo-zisin*. The overall goal is to show how L1 speakers bind reflexives to their antecedents, rather than forcing binding theory onto the language.

Study 2: Processing of ambiguous sentences in Japanese.

- a. Will processing differ among *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*?
- b. Will certain case-marked reflexives induce longer processing times than other case markers?
- c. Will scrambling induce longer processing times of reflexives?

The previous research on L1 sentence processing of Japanese has shown that L1 Japanese speakers are able to build anaphoric relations before any VP is processed, and also that scrambling does not lead to processing difficulty. The goals of the second study are to examine whether processing will differ between the different Japanese reflexives, and investigate whether one type of reflexive has longer reading times than others. Further, scrambling effects will be examined in mono-clausal sentences. As mentioned in the literature review, scrambling and word orders that are non-canonical should slightly increase reading times of the critical regions. However, if the results show no scrambling effects in reading times, the new data would provide

further evidence that L1 Japanese speakers use case information to process DPs and reflexives regardless of their location in the clause.

Study 3: Picture description task

- a. Which reflexives will L1 speakers use to describe situations that require local and LD binding?

In addition to the comprehension data, production data are also important. The goal of the third study is to examine how L1 speakers (and subsequently L2 learners), use *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* when describing situations from a picture description task. This is a free-production writing task that requires participants to describe a situation with the option of using any of the four reflexives of interest. In production, *zibun* may be used for all different types of sentences, but *zibun-zisin* and *kare/kanozyo-zisin* may be reserved for descriptions that are more local. This is based on the notion that *zibun-zisin* is limited to local binding and *kare/kanozyo-zisin* can bind with an object.

3.2 METHODOLOGY

3.2.1 Participants

Data for this dissertation were collected from 48 adult native speakers of Japanese (22 males and 26 females, mean age = 19.3). All L1 Japanese participants were recruited from two universities in Osaka, Japan. Background information was collected from each participant to determine basic demographic information. All L1 Japanese participants would presumably have received formal education through high school as they were all recruited at universities.

Participants who did not complete the tasks were not included in the final analysis. Any outliers from the initial data set were excluded before the final statistical analysis. Finally, all participants were compensated 1,500 Japanese yen (approximately 15 United States dollars) for their participation in the data collection.

3.2.2 Materials

3.2.2.1 Truth-value judgment task

A truth-value judgment task in Japanese was prepared for the studies. In total, there were 112 sentences of interest for the overall analysis. These sentences were selected from a norming task that originally consisted of 240 sentences. The norming tasks were taken by five native speakers of Japanese. The norming participants were presented with 240 sentences, for which they were asked to provide ratings from 1 to 5 (1 being the sentence was least natural in Japanese, and 5 being the sentences was completely natural in Japanese). As instructions, they were provided with three example sentences – one grammatical, one ungrammatical, and one ambiguous – and detailed explanation as to how to interpret the example sentences. Two of the native speakers were from Tokyo, Japan, and had been living in Pittsburgh for about one year with their families. The other three native speakers were from Hokkaido, Japan, and were living in Japan during the time the norming tasks were taken. The sentences that returned with the highest average ratings from norming were selected for the final cut. The 112 sentences were evenly divided among *zibun*, *zibun-zisin*, *kare-zisin*, and *kanozyo-zisin* (28 sentences each). Because it is unrealistic for participants to take a test consisting of over 112 sentences (with the addition of fillers, it would take more than two hours of testing), sentences were divided into four different forms. Each test form consisted of 60 sentences with accompanying short stories, about two to four sentences

each. A confidence interval scale from 1 to 4 was also included (1 indicating they guessed (0% confident), 2 indicating they are not very sure (50% confident), 3 indicating they are quite sure (75% confident), and 4 indicating they are completely sure (100% confident)).³⁵ All stories were originally constructed in Japanese and proofread by several native speakers of Japanese. Among the 60 sentences in the task, 48 of them were relevant to the issues being addressed in the study, and 12 were filler sentences.

The following description outlines how these sentences were divided by reflexives and sentence types for each test form. Among the 48 sentences, 12 involved *zibun*, another 12 involved *zibun-zisin*, an additional 12 involved either *kare-zisin* or *kanozyo-zisin*, and 12 more consisted of a combination of three of the above reflexives as false sentences (see Appendix A for full list of stimuli). Ideally, the task would have both *kare-zisin* and *kanozyo-zisin*; however, to prevent the task from being too long, and considering that *kare-zisin* and *kanozyo-zisin* have identical binding properties (other than male/female specification), one form of the tasks contained only *kare-zisin* and the other only *kanozyo-zisin*. Finally, among the 48 sentences, 36 were multi-clausal and 12 were mono-clausal sentences.

The 36 multi-clausal sentences were divided into 9 tri-clausal and 27 bi-clausal sentences. 3 of the tri-clausal and 9 of the bi-clausal sentences (12 total) were designed to be completely false. The remaining 24 sentences were divided by the following: for *zibun*, half of the sentences forced the local subject as the correct antecedent, and half the LD subject as the correct antecedent; for *zibun-zisin*, half forced the local subject as the correct antecedent, and the

³⁵ Gass (1994) recommended that judgment tasks of any sort should also include confidence interval scales. Sperlich's (2013) four-point scale was adapted for this study.

other half led participants to bind *zibun-zisin* with the LD subject, which would be incorrect, and participants should report such sentences as false; as *kare/kanozyo-zisin* have similar binding constraints as *zibun-zisin*, those sentences were similarly set up. In total, there were 16 true and 20 false stimuli in the multi-clausal sentences.

In mono-clausal sentences, half of the sentences bound *zibun* and *zibun-zisin* with the subject antecedent, and the other half with the object antecedent; hence, the correct response for object-bound *zibun* and *zibun-zisin* would be false. However, binding to an object is possible for *kare/kanozyo-zisin*, and the correct response for object-bound sentences with these reflexives would be true if the context permitted it. There was one mono-clausal sentence that was used in the task that comments on two different stories – one story guides the reader to bind the reflexive with the subject, and other the to bind with the object. The sentence was scrambled into four different sentence types to examine whether scrambled sentences led to the same interpretation, but also if it increased processing difficulty. In total, there were 12 true and 4 false sentences in the mono-clausal set. Minus one of the pronoun-*zisin* sentences, there were 8 true and 4 false stimuli in the mono-clausal sentences that appeared in the task. Overall, among the 48 sentences of interest in the task, there are 24 true and 24 false sentences.

The flow chart in Figure 8 illustrates how the sentences were selected, Table 4 summarizes how tri- and bi-clausal sentences were divided by case markers, Table 5 by reflexives, and Table 6 summarizes the division for mono-clausal sentences:

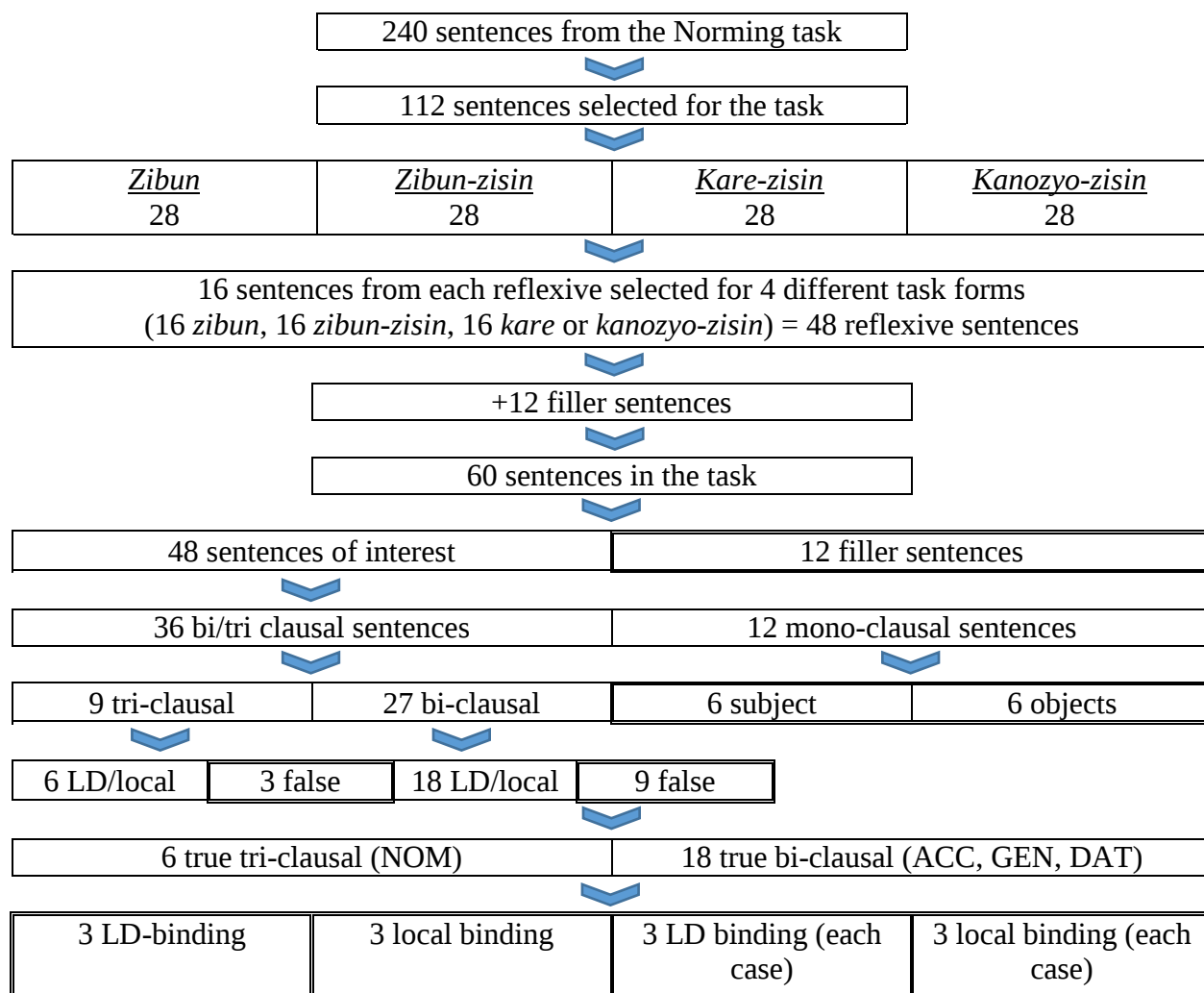


Figure 8. Flowchart of how sentences were selected for the experiment.

Table 4. Truth value judgment task sentences divided among case markers

Case	<u>Local antecedent</u>	<u>LD antecedent</u>	<u>False statements</u>
Nominative	3	3	3
Accusative	3	3	3
Genitive	3	3	3
Dative	3	3	3

Table 5. Tri- and bi-clausal sentences divided by local, LD antecedents, and false statements in the task

	<u>Local antecedent</u>	<u>LD antecedent</u>	<u>False statements</u>	<u>Total</u>
<i>Zibun</i>	4	4	4	12
<i>Zibun-zisin</i>	4	4*	4	12
<i>Kare/kanozyo-zisin</i>	4	4*	4	12

Note: asterisk* denotes false sentences

Table 6. Mono-clausal sentences divided by subject- and object-bound reflexives in the task

	<u>Subject</u>	<u>Object</u>	<u>Total</u>
<i>Zibun</i>	2	2*	4
<i>Zibun-zisin</i>	2	2*	4
<i>Kare/kanozyo-zisin</i>	2	2	4

Note: asterisk* denotes false sentences

All multi-clausal sentences were constructed with the following structure: the matrix DP subject (LD antecedent) was marked by the topic marker, the adjacent embedded DP subject (local antecedent) by the nominative case, followed by one of the reflexives + case, and then the clause VPs. The four case particles that marked the reflexives were the nominative, accusative, genitive, and dative.

There were four different structures for the mono-clausal sentences. Sentence Type A was the standard word order structure, and Type B, C, and D were the scrambled structures: A) the standard structure was almost identical to the multi-clausal sentences, with the only difference being the second DP was marked by the dative case particle; B) the reflexive was moved to the position that immediately followed the subject DP; C) the subject DP and object

DP were swapped; D) the reflexive was moved to a position that immediately followed the object DP that was at the front of the clause. Table 7 details how these sentences were structured:

Table 7. Sentence structure types developed for the stimuli

<i>Tri-clausal sentence:</i>					
DP-TOP	DP-NOM	[<i>reflexive</i>]-NOM		VP (DP, VP)-COMP	VP
<i>Bi-clausal sentence</i>					
DP-TOP	DP-NOM	[<i>reflexive</i>]-GEN/DAT/ACC		VP (DP, VP)-COMP	VP
<i>Mono-clausal sentence</i>					
A. DP-TOP	DP-DAT	[<i>reflexive</i>]-GEN	DP-ACC	VP	
B. DP-TOP	[<i>reflexive</i>]-GEN	DP-ACC	DP-DAT	VP	
C. DP-DAT	DP-NOM	[<i>reflexive</i>]-GEN	DP-ACC	VP	
D. DP-DAT	[<i>reflexive</i>]-GEN	DP-ACC	DP-NOM	VP	

Table 8 presents the sentence types based on the structures from Table 7 using *zibun* as the example reflexive. Note that *zibun-zisin* and *kare/kanozyo-zisin* are interchangeable in these sentences and maintain grammaticality (all sentences with *kare/kanozyo-zisin* have gender-matched antecedents in the stimuli):

Table 8. The three sentence types and the stimuli divided by case markers for bi-clausal sentences, and by different sentence structures for mono-clausal sentences

Tri-clausal sentence

Nominative-marked reflexive

Taro-wa Hanako-ga *zibun*-ga totta syasin-o Keiko-ni miseta-to itta.

Taro-TOP Hanako-NOM *self*-NOM took photograph-ACC Keiko-DAT showed-COMP said

‘Taro said Hanako showed Keiko a photograph that *self* took.’

Bi-clausal sentences

Accusative-marked reflexive

Suzuki-wa Sato-ga *zibun*-o hihansita-to itta.

Suzuki-TOP Sato-NOM *self*-ACC criticized-COMP said

‘Suzuki said Sato criticized *self*.’

Genitive-marked reflexive

Taro-wa Hanako-ga *zibun*-no totta photograph-o Keiko-ni miseta-to itta.

Taro-TOP Hanako-NOM *self*-GEN took photograph-ACC Keiko-DAT showed-COMP said

‘Taro said Hanako showed Keiko a photograph taken by *self*.’

Dative-marked reflexive

Yuji-wa Keiko-ga *zibun*-ni aipaddo-o katta-to itta.

Yuji-TOP Keiko-NOM *self*-DAT iPad-ACC bought-COMP said

‘Yuji said Keiko bought an iPad for *self*.’

Table 8 (continued)

Mono-clausal sentences

‘John showed Mike a photograph of *self*.’

A.	John-wa	Mike-ni	<i>zibun</i> -no	syasin-o	miseta.
	John-TOP	Mike-DAT	<i>self</i> -GEN	photograph-ACC	showed
B.	John-wa	<i>zibun</i> -no	syasin-o	Mike-ni	miseta.
	John-TOP	<i>self</i> -GEN	photograph-ACC	Mike-DAT	showed
C.	Mike-ni	John-wa	<i>zibun</i> -no	syasin-o	miseta.
	Mike-DAT	John-TOP	<i>self</i> -GEN	photograph-ACC	showed
D.	Mike-ni	<i>zibun</i> -no	syasin-o	John-wa	miseta.
	Mike-DAT	<i>self</i> -GEN	photograph-ACC	John-TOP	showed

The following is an example of two stories and a sentence commenting on the story. Story A in (27) requires a local binding interpretation in sentence (28) that is commenting on the story, and Story B requires a LD binding interpretation. The same sentence comments on both stories in the task.

27. *Story A*: Keiko went to the department store to buy an iPad for herself. She went home and showed Yuji her new iPad. The next day, Yuji told his friends what Keiko did yesterday.

Story B: Keiko went to the department store to buy an iPad for her boyfriend Yuji. She went home and gave Yuji his new iPad. Delighted, Yuji told his friends the next day what Keiko did.

28. Sentence: Yuji said that Keiko bought an iPad for self.

Yuji-wa Keiko-ga zibun-ni aipaddo-o katta-to itta.

Yuji-TOP Keiko-NOM self-DAT iPad-ACC bought-COMP said

Finally, it is important to note that although the stories “forced” a local/LD or subject/object interpretation onto the participants with the provided context, whether the participant answered true or false was dependent on how they ultimately bind the reflexives and antecedents during the parse. It was assumed that providing context would override preferences of local or LD binding, following White et al.’s (1997) methodology. However, if the participant locally-bound the reflexive even if the context should have induced LD binding, or object-bound the reflexive even if the context should have led them to link the reflexive to the subject, they will inevitably answer false. Such instances, though, should also provide evidence for whether certain case markers or predicates influence local or LD binding, and sentence constructions influence subject or object binding.

3.2.2.2 SPR task

The following explains how the sentence stimuli were segmented for noncumulative display in the SPR task. Following Hara’s (2009) methodology, region lengths were defined by the number of morae in each phrase (e.g., Hanako-wa ^{はなこ}花子は = 4 morae). As each region had slightly different morae per phrase, residual reading times were calculated for the analysis in order to reduce effects of longer or shorter reading times based on morae length (see Section 4.2 for more detail on how residual reading times were calculated).

Table 9 and Table 10 show how the phrases were divided by regions in multi-clausal sentences. First, Table 9 shows the stimuli from sentences with nominative and genitive case-

marked reflexives. The initial region (1) consisted of the matrix subject DP. The second region (2) consisted of the embedded subject DP. The third region (3) always consisted of the reflexive. This region is termed the critical region as it is the predicted region where ambiguity occurs; hence, the second region is termed the pre-critical region. The fourth region (4) is the spillover region, where if the participant does not slow down at the critical region, they may do so in the subsequent region. The remaining regions are the wrap-up regions (5-8), which consisted of the other phrases necessary to complete the sentence.

The wrap-up regions varied based on sentence type due to certain predicates requiring more phrases than others. First, sentences with nominative and genitive case-marked reflexives were divided by the predicates of the sentences (i.e., “showed,” “believed,” and “went/returned”). Sentences with the predicate “showed” had a total of eight regions and sentences with the predicates “believed” and “went/returned” had six regions.

In sentences with the predicate “showed,” the spillover region (4) consisted of a VP, followed by a direct object in (5), an indirect object in (6), the embedded VP in (7), and finally the matrix VP in (8). In sentences with the predicate “believed,” the spillover region consisted of a copula DP in (4), followed by the embedded VP in (5), and finally the matrix VP in (6). In sentences with the predicate “went/returned,” the spillover region (4) consisted of a dative-marked DP, followed by the embedded VP in (5), and finally the matrix VP in (6). Table 9 summarizes how these sentences were divided into regions with example sentences (the initial region (1) was omitted in the analyses but was a DP-TOP in all stimuli sentences):

Table 9. Division of regions based on predicate for nominative and genitive case-marked reflexives

<u>Predicate</u>	<u>Pre-</u>	<u>Critical</u>	<u>Spillover</u>	<u>Wrap-up Regions</u>			
	<u>critical</u>	<u>(reflexive)</u>					
	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Showed	DP-NOM	DP-NOM/GEN	VP	DP-ACC	DP-DAT	VP-COMP	VP
(Nom/Gen)	<i>Keiji-ga</i>	<i>zibun-ga/no</i>	<i>totta</i>	<i>syasin-o</i>	<i>Taro-ni</i>	<i>miseta-to</i>	<i>itta</i>
	“...said that Keiji showed Taro a photograph of <i>self</i> .”						
	(2)	(3)	(4)	(5)	(6)		
Believed	DP-NOM	DP-GEN	DP-COMP	VP-COMP	VP		
(Nom)	<i>Keiko-ga</i>	<i>zibun-ga</i>	<i>itiban.kireida-to</i>	<i>zihusiteiru-to</i>	<i>itta.</i>		
	“...said that Keiko believes that <i>self</i> is the most beautiful.”						
Went/Ret.	DP-NOM	DP-GEN	DP-DAT	VP-COMP	VP		
(Gen)	<i>Yuji-ga</i>	<i>zibun-no</i>	<i>ie-ni</i>	<i>kaetta-to</i>	<i>itta</i>		
	“...said that Yuji went/returned to <i>self</i> 's home.”						

Table 10 shows how sentences with dative and accusative case-marked reflexives were divided by regions. Sentences with dative case-marked reflexives had a total of six regions, and sentences with accusative case-marked reflexives had five regions. The pre-critical and critical regions were the same as the other multi-clausal sentences. The spillover region in sentences with dative-case marked reflexives consisted of a direct object in (4), followed by the embedded VP in (5), and finally the matrix VP in (6). In sentences with accusative case-marked reflexives, the spillover region consisted of the embedded VP in (4), followed by the matrix VP in (5).

Table 10. Division of regions based on dative and accusative

<u>Sentence</u>	<u>Pre-critical</u>	<u>Critical</u>	<u>Spillover</u>	<u>Wrap-up</u>	
<u>Type</u>	<u>(reflexive)</u>				
	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>
Dat	DP-NOM	DP-DAT	DP-ACC	VP-COMP	VP
	<i>Keiji-ga</i>	<i>zibun-ni</i>	<i>bentō-o</i>	<i>katta-to</i>	<i>itta</i>
	“...said that Keiji bought lunch for <i>self</i> .”				
Acc	DP-NOM	DP-ACC	VP-COMP	VP	
	<i>Suzuki-ga</i>	<i>zibun-o</i>	<i>hihansita-to</i>	<i>itta</i>	
	“...said that Suzuki criticized <i>self</i> .”				

Table 11 shows how the phrases in the stimuli sentences were divided by regions in mono-clausal sentences. As part of the objective of mono-clausal sentences was to examine effects of non-canonical word orders, the placement of phrases differed between sentence type. Type A and Type C have similar structures, the subject DP and object DP were swapped in Type C (regions 1 and 2). In Type B and Type D, the reflexives and the direct object (DP-ACC) were in region 2 and region 3, respectively. In Type B, the initial region consisted of the subject DP and the wrap-up regions (4) and (5) consisted of the object DP and clause VP. On the other hand, the initial region in Type D consisted of the object DP, and the wrap-up regions (4) and (5) consisted of the subject DP and clause VP.

Table 11. Example stimuli of mono-clausal sentences divided by regions used in SPR task

<u>Sentence Type</u>	<u>Initial (1)</u>	<u>Pre-critical (2)</u>	<u>Critical (3)</u>	<u>Spillover (4)</u>	<u>Wrap-up (5)</u>
A (Standard)	DP-TOP	DP-DAT	<i>Self</i> -GEN	DP-ACC	VP
C	DP-DAT	DP-TOP	<i>Self</i> -GEN	DP-ACC	VP
	<u>Initial (1)</u>	<u>Critical (2)</u>	<u>Spillover (3)</u>	<u>Wrap-up (4)</u>	<u>Wrap-up (4)</u>
B	DP-TOP	<i>Self</i> -GEN	DP-ACC	DP-DAT	VP
D	DP-DAT	<i>Self</i> -GEN	DP-ACC	DP-TOP	VP

3.2.2.3 Picture description task

After completing the truth-value judgment task, participants were presented with a packet of six pictures (see Appendix B for each picture described below) for the picture description task. These pictures were randomly ordered into six different sets. Each picture involved a sequence of four boxes of pictures describing a short story, similar to a traditional Japanese *yonkoma manga* (lit. four cell comics). The participants' task was to describe the final scene of the *yonkoma manga* based on the overall context. The following stories (27a-f) were the situations depicted in the pictures. The underlines sentences were the descriptions of the fourth and last picture of the *yonkoma manga*, and the predicted responses from the participants.

29. a. Yuji is a photographer doing a photoshoot for Natsuko. He did some editing of the photos on his computer. Later, Yuji met Natsuko at a café to give her the photographs. There, Yuji showed Natsuko a photograph of *self*. (Local binding).
- b. Yuji is a photographer doing a photoshoot for Natsuko. He did some editing of the photos on his computer. Later, Yuji met Natsuko at a café to give her the

photographs. Afterwards, Natsuko showed her friend at the library a photograph of self. (LD binding).

c. Shinji saw a commercial advertising a special discount for the Nintendo DS. After deliberating, he went to the electronics store to buy a DS. Excited, he showed his girlfriend, Alice, the new DS. Later, Alice told her friend Keiko that Shinji bought a DS for self. (Local binding).

d. Keisuke's girlfriend's birthday was coming up, and he was thinking what he should buy for her birthday. He went to the Apple Store to buy a gift. On Friday, he gave his girlfriend, Manami, a brand new iPad. Excited, Manami told her friend that Keisuke bought an iPad for self. (LD binding).

e. There was an election to vote for "Mr. University," and the finalists were Yuji, Keisuke, and Shinji. At the time of voting, Yuji voted for Shinji, but Keisuke voted for himself. Later Yuji found out what Keisuke did. Unamused, Yuji told Natsuko that Keisuke voted for self. (Local binding).

f. There was an election to vote for "Mr. University," and the finalists were Yuji, Keisuke, and Shinji. At the time of voting, Yuji voted for Shinji, but Keisuke voted for himself. Later, Shinji found out that Yuji had voted for him. Excited, Shinji told Taro that Yuji voted for self. (LD binding).

3.2.3 Procedure

The truth-value judgment task was conducted by both off- and on-line formats. The off-line format was a traditional paper-and-pen task, and the sentences were randomized into eight different forms. The on-line task was conducted on Linger (developed by Doug Rhode, MIT,

<http://tedlab.mit.edu/~dr/Linger/>), version 2.94, software running on Dell Latitude E5430 computers operated by Windows 7. Linger is a free application for computerized experiment design, data collection, analysis, and provides millisecond reaction time recording in SPR tasks for both word-by-word and global reading times. The stories and sentences appeared in random order on Linger, and were presented in 12pt font. The stories were shown over one single line, and the sentences that commented on the stories appeared below in noncumulative linear format.

In both formats, L1 Japanese participants were given a maximum of one hour to complete the task. No participant in the data collection period exceeded the time limit (on average, L1 Japanese speakers finished the task in approximately 40 minutes).

Off-line task: At the time of testing, participants were first presented with instruction in written form as to how to complete the task. They were instructed to read the story first and determine whether the sentence that followed was true or false based on the context in the story. Participants were provided with four sets of examples for practice – one LD true, one local true, one mono-clausal sentence true, and one completely false. Specifically, participants were instructed to focus on the subjects that were presented in the story and the statements, not on any non-present plausible referents.

On-line task: The instructions on how to complete an SPR task were first presented on the screen. The same instructions were given from the off-line task. Four practice sentences were provided to familiarize the participant with the SPR method, and another set of four stories and sentences were provided for additional practice. Specifically, participants were warned in the instructions that they cannot return to any previous slide once the task commenced. The stories first appeared on the screen with a set of dashed lines below the story, as shown in Figure 9.

Once the participant read the story and pushed the SPACEBAR, the first word of the sentence appeared, as shown in Figure 10.

写真家の太郎は花子の写真撮影をした。写真を編集して、数日後喫茶店で花子に撮った写真を見せた。

Figure 9. Example story from SPR task on Linger

太郎は _____

Figure 10. Example sentence stimuli from SPR task on Linger

This marked the beginning of the self-paced reading task. The words of the sentence appeared word-by-word in noncumulative display as the participants progressed through the task. To reiterate, participants were not able to return to any previous word that they had passed already. Once all the words have passed, a true or false screen appeared, where participants answered whether the sentence was TRUE or FALSE, based on the context they had just read. These stories and sentences, as mentioned earlier, appeared in sequence, but the pairs appeared in random order during the task.

Picture description task: After completion of the truth-value judgment task, participants were presented with a packet of six *yonkoma manga* sheets. Participants who took the on-line truth-value judgment task documented their answers on Microsoft Word 2013, and those who took the off-line task wrote their answers at the end of the truth-value judgment task. They were explicitly instructed to use one of the reflexives – *zibun*, *zibun-zisin*, *kare-zisin*, or *kanozoyo-zisin* – in their answers, but had a choice of using just one reflexive for all answers, or a combination of two, three, or all four of them in describing the different situations. Although not explicitly

instructing participants to use reflexives may have provided more natural responses, pilot tests revealed that no instruction resulted in some answers without reflexives; thus, it was determined that explicit instruction should be provided.

4.0 L1 RESULTS

The results of the statistical analyses carried out from the experiments laid out above are presented by the order of study. First, the results from the truth-value judgment task are presented, followed by the self-paced reading data, and finally the picture description task. All statistical analyses for the truth-value judgment task were conducted on IBM SPSS Statistics 24, and the alpha levels were set at .05 for all tests, unless noted otherwise. Before any analyses were performed, the results from the paper and pen format and Linger format were compared for format reliability (see Appendix C for full raw data results). The total results were submitted to an ANOVA to test for statistical significance, and the difference between the two formats are not significant, $F(2, 100) = 0.122$, $p = .885$, for all L1 groups, confirming that whether participants took the off- or on-line task did not have any effect on the outcome. Thus, all data were combined for the overall analysis.

The analysis of the SPR task was conducted on R (Version 3.2.2; CRAN project; R Developmental Team, 2016). R is a freeware programming software made available by GNU General Public License, and is widely used in a range of fields for conducting statistical analyses of data. Raw reading times were first recorded in Microsoft Excel and then transferred over to R to calculate for residual reading times. More information of calculating residual reading times and outliers are in Section 4.2.

For the picture description task, the results are presented in groups based the context of the pictures. Pictures A and B are analyzed together as they have similar contexts but different local and LD binding situations. Subsequently, Pictures C and D are analyzed together, and finally Pictures E and F. The analysis is divided into these three groups to examine which reflexives L1 speakers use in describing different binding situations within similar actions and whether L2 learners show similar or different patterns. Statistical analysis for reliable effects of reflexive use were conducted on SPSS 24, and the alpha level was set at .05, unless otherwise noted.

4.1 STUDY 1

Study 1 examines how L1 Japanese bind *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* to their antecedents, whether they follow the binding constraints that are ascribed to each reflexive, and if any specific binding patterns emerge based on case and the predicate. To review, the following research questions were set for Study 1:

- a. Will specific binding patterns (i.e., local vs. LD binding) emerge according to the binding constraints (subject orientation or locality constraints) of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, or will results show contradicting patterns?
- b. Will case play a role in resolving ambiguity in reflexive-antecedent binding, and specific local and LD binding patterns emerge based on case-marked reflexives?
- c. Will the predicates that have different subcategorization/meaning influence local or LD binding of reflexives?

Table 12 shows the overall accuracy scores for multi-clausal sentences divided by case markers (nominative, accusative, genitive, and dative) and local and LD binding of each reflexive. The totals are reported by the mean accuracies as a group (not individually), and the percentages provided in each cell represent the number of correct interpretations based on the context given. The n-size for each case-marked reflexive cell is 48 – to review, there were 48 participants that took the truth-value judgment task, and each test form consisted of only one local-bound and one LD-bound sentence for each case-marked reflexive; hence, each participant answered one local-bound and LD-bound sentence for each case-marked reflexive. For each cell, the raw totals of true responses are provided in parentheses; the means of true responses per local- and LD-bound sentences for each reflexive are provided in parentheses in the totals.

Table 12. L1 Japanese accuracy rates for local/LD binding by case in the truth-value judgment task

<u>Reflexive</u>	<u>Binding</u>	<u>Total</u>	<u>Nominative</u>	<u>Accusative</u>	<u>Genitive</u>	<u>Dative</u>
<i>Zibun</i>	Local	49.0% (23.5)	64.6% (31)	52.1% (25)	45.8% (22)	33.3% (16)
	LD	63.0% (30.25)	43.8% (21)	64.6% (31)	68.8% (33)	75.0% (36)
<i>Zibun-zisin</i>	Local	67.7% (32)	81.3% (39)	62.5% (30)	66.7% (32)	56.3% (27)
	LD	53.6% (25.75)	35.4% (17)	52.1% (25)	62.5% (30)	64.6% (31)
<i>Kare/ kanozyo-zisin</i>	Local	67.2% (32.25)	64.6% (31)	58.3% (28)	81.3% (39)	64.6% (31)
	LD	30.2% (14.5)	18.8% (9)	27.1% (13)	33.3% (16)	41.7% (20)

Overall, the results in Table 12 show that L1 Japanese participants in total accepted more LD, as opposed to local, subjects in sentences with *zibun*, but more local than LD subjects in sentences with *zibun-zisin* and *kare/kanozyo-zisin*. As a group, the L1 Japanese accepted 63.0% of the sentences when forced an LD binding interpretation of *zibun*, and only 49.0% of the sentences when *zibun* was local-bound. In sentences with *zibun-zisin*, the L1 Japanese reported

true to 67.7% of local-bound sentences, and, surprisingly, 53.6% of LD-bound sentences (note that LD binding should be blocked based on movement at LF). Finally, the L1 Japanese participants showed a substantial bias for local binding with *kare/kanozyo-zisin*, for which they accepted 67.2% local-bound sentences, but only 30.2% when LD.

In examining these results by case markers, the L1 Japanese accepted more local than LD subjects when *zibun* was marked by the nominative case (31 local to 21 LD), but more LD than local subjects when the other case particles marked *zibun* (31 to 25 for accusative, 33 LD to 22 local for genitive, and 36 to 16 for dative). For *zibun-zisin*, they accepted more local subjects when the reflexive was marked by the nominative (39 local to 17 LD), accusative (30 to 25), and genitive (32 to 30) cases, but more LD subjects for dative case-marked *zibun-zisin* (31 LD to 27 local). Finally, the participants substantially accepted more local subjects than LD regardless of which case particle marked *kare/kanozyo-zisin* (31 local to 9 LD for the nominative case, 28 to 13 for the accusative, 39 to 16 for the genitive, and 31 to 20 for the dative).

Thus, the L1 Japanese participants appear to have some specific binding patterns based on case marking for *zibun* and *zibun-zisin*, but not for *kare/kanozyo-zisin*. These results were submitted to an ANOVA to test for statistical significance between local and LD accuracy with case as a factor. The differences between local and LD were significant with a case effect for *zibun*, $F(1, 47) = 8.007$, $p = .007$, *zibun-zisin*, $F(1, 47) = 7.888$, $p = .007$, and *kare/kanozyo-zisin*, $F(1, 47) = 6.188$, $p = .016$ (note that local and LD binding differences with *kare/kanozyo-zisin* were stronger without case as a factor, $F(1, 47) = 41.838$, $p < .001$). These values indicate that

L1 Japanese have different patterns in accepting local- and LD-bound antecedents not only between the three reflexives types, but also between the four case markers.³⁶

Table 13. Bonferroni post-hoc tests for multiple comparisons for local vs. LD binding (L1 Japanese)

<u>Reflexive</u>	<u>Case</u>	<u>Mean Difference</u>	<u>Binding Effect</u>	<u>Std. Error</u>	<u>p</u>
<i>Zibun</i>	Nominative	.208*	Local	.089	.024
	Accusative	-.125	None	.102	.224
	Genitive	-.229*	LD	.100	.026
	Dative	-.417*	LD	.102	.000
<i>Zibun-zisin</i>	Nominative	.458*	Local	.084	.000
	Accusative	.104	None	.104	.322
	Genitive	.042	None	.099	.674
	Dative	-.083	None	.102	.420
<i>Kare/</i>	Nominative	.458*	Local	.079	.000
<i>kanozyo-zisin</i>	Accusative	.313*	Local	.090	.001
	Genitive	.479*	Local	.099	.000
	Dative	.229*	Local	.100	.026

Note: the mean difference is significant at the .05 level.

³⁶ Differences between local and LD binding of *zibun* and *zibun-zisin* without case as a variable remained significant for *zibun*, $F(1, 47) = 7.011$, $p = .011$, and *zibun-zisin*, $F(1, 47) = 4.858$, $p = .032$, but the observed power was substantially higher for *zibun*, .737, than *zibun-zisin*, .579.

Table 13 shows Bonferroni post-hoc tests for multiple comparisons between local and LD binding of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*. A positive mean difference indicates a bias for local binding and a negative mean difference indicates a bias for LD binding. First, post-hoc test results for *kare/kanozyo-zisin* confirmed a local binding effect for all case markers (i.e., L1 Japanese bound *kare/kanozyo-zisin* with the local antecedent regardless of case). With *zibun* and *zibun-zisin*, there were no main effects for when the accusative case marked *zibun*, $p = .224$, and when the accusative, $p = .332$, genitive, $p = .674$, and dative, $p = .420$, cases marked *zibun-zisin*. All other results found reliable interactions between case and local or LD binding: for *zibun*, a local binding effect with nominative case and an LD binding effect with genitive and dative case, and for *zibun-zisin*, a local binding effect with nominative case. These results indicate different binding patterns specifically based on which case particle marked reflexives: for *zibun*, an LD bias with genitive and dative case (i.e., inherent cases) and a local bias with nominative case (no statistical bias was found with accusative case); for *zibun-zisin*, a local bias occurs with nominative case but no bias with other case markers. Figure 11 illustrates the accuracy scores, as a group, from the truth-value judgment task.

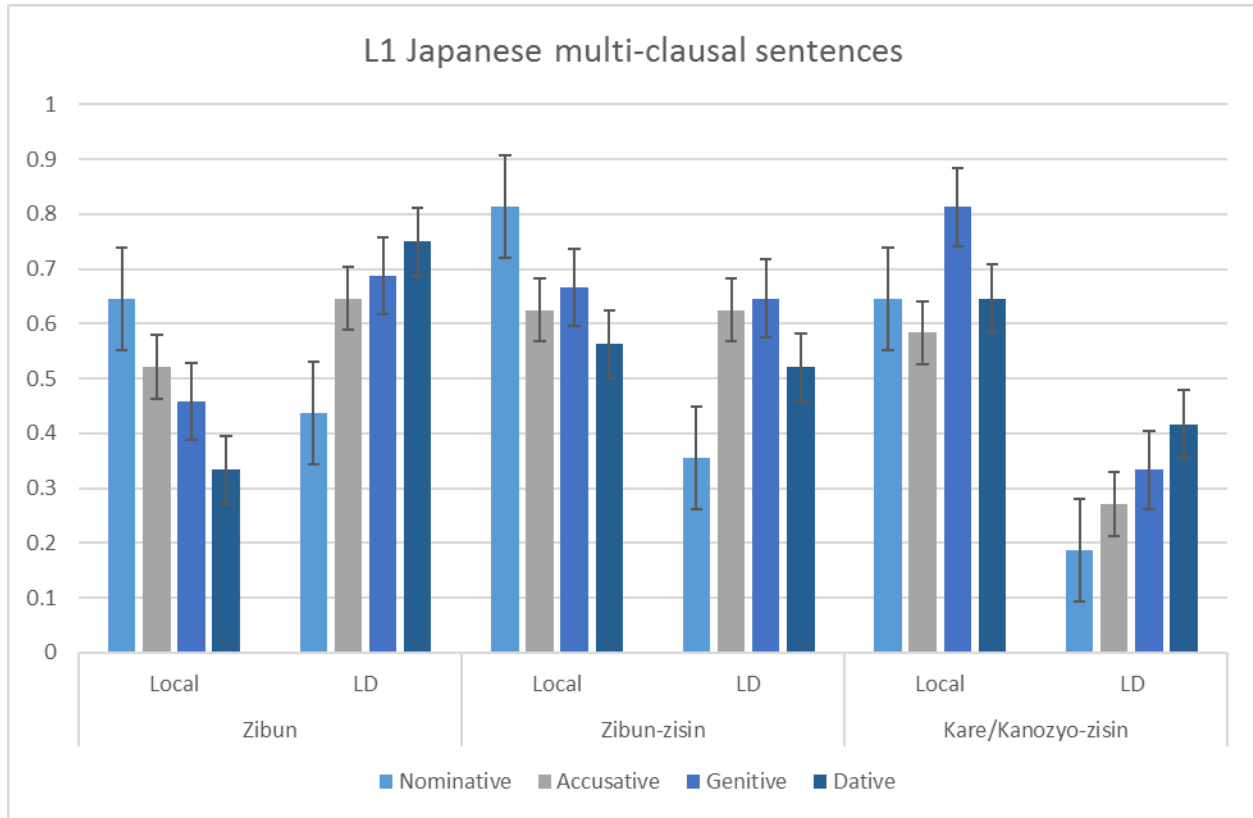


Figure 11. Illustration of L1 Japanese results from multi-clausal sentences

Next, the results were further examined by predicate for each sentence. Table 14 shows the accuracy results based on predicate type (see Appendix D for n-sizes of Table 14).³⁷ In most

³⁷ The n-sizes for each cell in Table 14 slightly vary as 25 L1 Japanese participants took Test Form 1 and 23 took Test Form 2 of the truth-value judgment task. As mentioned earlier, the stimuli were separated into two test forms to prevent the task from being too long; thus, participants only saw one locally bound sentence for each predicate (i.e., if they saw a sentence that involved local binding of *zibun* and the predicate “showed,” they did not see the same sentence in the task that involved LD binding of *zibun*). In other words, if Test Form 1 included a local-bound sentence of *zibun*-NOM and the predicate “showed,” then Test Form 2 contained the LD-bound sentence of *zibun*-NOM and the predicate “showed.” In this case, 25 participants saw

sentences, the local or LD binding biases found in the earlier results based on case marking overlapped with the predicate results, such as in the following sentence:

30. Taro-wa Keiji-ga *zibun*-ni bentō-o tyūmonsita-to itta.

Taro-TOP Keiji-NOM *self*-DAT lunchbox-ACC ordered-COMP said.

“Taro said that Keiji ordered a bento for *self*.”

In this sentence where the predicate is *tyūmonsita*, the majority of participants accepted the LD-bound subject over the local (61% LD and 24% local), but the above analysis with case-marked reflexives already confirmed an LD bias for dative case-marked *zibun*. However, the VP *zihusiteiru* (lit. to believe) resulted in a particularly strong binding bias across all reflexives. The following stories in (31) and sentence in (32) demonstrates how a sentence with *zihusiteiru* was used in the stimuli. Story A guides the reader to a local binding interpretation and Story B guides an LD binding interpretation:

31. *Story A*: Keiko is a narcissist and believes she is the most beautiful student at the university. Hanako found this unattractive and told her friends about Keiko.

Story B: Keiko believes that Hanako is the most beautiful student at the university. Hanako was flattered by this and told her parents the compliment Keiko gave her.

the local-bound sentence and 23 saw the LD-bound sentence; thus, the n-sizes for that particular cell (nominative case, predicate “showed”) would be 25 for local and 23 for LD.

32. *Sentence*: Hanako said that Keiko believes *self* to be the most beautiful.

Hanako-wa Keiko-ga *zibun*-ga itiban.kireida-to
zihusiteiru-to itta.
Hanako-TOP Keiko-NOM *self*-NOM most.beautiful-COMP
believe.IMPF-COMP said

With all three reflexives (*zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*), almost all L1 Japanese participants rejected sentences when the context of the story guided the reader to bind the reflexive with the LD antecedent (Story A), but the majority of them accepted the same sentence when the context guided them to bind locally (Story B). Thus, the results from *zihusiteiru* suggest that certain predicates that have yet to be uncovered in the literature continue to play a role in binding.

Table 14. Results from Table 12 by predicate

% in each cell = total accurate responses to T/F stories collapsed across participants

<u>Predicate</u>	<u>Case</u>	<u>Zibun</u>		<u>Zibun-zisin</u>		<u>Kare/kanozyo-zisin</u>	
		<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>
Showed	Nom	13 (52%)	18 (78%)	19 (83%)	13 (52%)	11 (44%)	8 (35%)
Believed	Nom	18 (78%)	1 (4%)	20 (80%)	4 (17%)	20 (87%)	1 (4%)
Blamed/criticized	Acc	14 (56%)	14 (61%)	13 (57%)	14 (56%)	16 (70%)	6 (24%)
Praised	Acc	10 (43%)	17 (68%)	17 (68%)	11(48%)	12 (48%)	7 (30%)
Showed	Gen	12 (48%)	14 (61%)	14 (61%)	16 (64%)	14 (61%)	8 (32%)
Returned/went	Gen	10 (43%)	19 (76%)	18 (72%)	15 (65%)	25 (100%)	7 (30%)
Ordered	Dat	6 (24%)	14 (61%)	9 (39%)	15 (60%)	14 (56%)	12 (52%)
Bought	Dat	11 (48%)	22 (88%)	18 (72%)	18 (78%)	17 (74%)	7 (28%)

Next, Table 15 shows the overall accuracy scores for mono-clausal sentences divided by sentence type.³⁸ The totals are again reported by the mean accuracies as a group (not individually), and the percentages provided in each cell represent the number of correct interpretations based on the context given.³⁹ As expected, the L1 Japanese accepted 93.8% of the sentences when the subject was the antecedent of *zibun*, but they also accepted 44.8% of the object-bound sentences with *zibun*, which should be blocked by movement at LF and the subject-hood condition ascribed to *zibun*. With *zibun-zisin* and *kare/kanozyo-zisin*, binding accuracies were as predicted as they accepted more subject-bound (83.3%) than object-bound (12.5%) sentences with *zibun-zisin*, and accepted both subject (61.5%) and object (66.7%) antecedents with *kare/kanozyo-zisin*. Sentence type, though, appears to play a role in the interpretations of subject or object binding with *kare/kanozyo-zisin*. The L1 Japanese accepted more object DPs than subject DPs in Type A and Type D (22 object to 12 subject for Type A, 21 to 12 for Type D), but more subject DPs than object DPs in Type B and Type C (20 subject to 11 object for Type B and 15 to 10 for Type C). Overall, the results from mono-clausal sentences indicate that L1 Japanese generally followed the binding constraints ascribed to *zibun-zisin* and *kare/kanozyo-zisin*, but not with *zibun* as object-binding was clearly evident.

³⁸ For review, sentence Type A is in the standard word order and Type B, C, and D are the scrambled structures. See Table 11, Section 3.2.2.1, for details.

³⁹ N-sizes for Table 15:

Subject: Type A = 20, Type B = 23, Type C = 28, Type D = 25

Object: Type A = 28, Type B = 25, Type C = 20, Type D = 23

Table 15. L1 Japanese results of mono-clausal sentences from the truth-value judgment task

<u>Reflexive</u>	<u>Binding</u>	<u>Total</u>	<u>Type A</u>	<u>Type B</u>	<u>Type C</u>	<u>Type D</u>
<i>Zibun</i>	Subject	93.8% (22.5)	90.0% (18)	100% (20)	89.3% (25)	96.0% (24)
	Object	44.8% (10.8)	35.7% (10)	52.0% (13)	45.0% (9)	47.8% (11)
<i>Zibun-zisin</i>	Subject	83.3% (20)	70.0% (14)	73.9% (17)	85.7% (24)	100% (25)
	Object	12.5% (3)	21.4% (6)	4.0% (1)	10.0% (2)	13.0% (3)
<i>Kare/</i>	Subject	61.5% (14.8)	60.0% (12)	87.0% (20)	53.6% (15)	48.0% (12)
<i>kanozyo-zisin</i>	Object	66.7% (16)	78.6% (22)	44.0% (11)	50.0% (10)	91.3% (21)

Table 16. Bonferroni post-hoc tests for multiple comparisons for subject-object binding (L1 Japanese)

<u>Dependent</u>	<u>Reflexive</u>	<u>Mean</u>	<u>Binding</u>	<u>Std. Error</u>	<u>p</u>
<u>variable</u>		<u>Difference</u>	<u>Effect</u>		
	<i>Zibun</i>	.979*	Subject	.125	.000
Subject vs. object	<i>Zibun-zisin</i>	1.417*	Subject	.111	.000
	<i>Kare/kanozyo-zisin</i>	-.125	None	.135	.360

Note: The mean difference is significant at the .05 level

The total results from Table 15 were submitted to an ANOVA to test for statistical significance between subject and object binding accuracy with reflexives as a factor. The differences were significant, $F(1, 47) = 39.025$, $p < .001$, and Bonferroni post-hoc tests for multiple comparisons, as shown in Table 16, also show a reliable effect for subject binding with *zibun*, $p < .001$, and *zibun-zisin*, $p < .001$, but not with *kare/kanozyo-zisin*, $p = .360$. Nonetheless, there are two important points from the results to re-emphasize here: 1) although there was a reliable effect for subject binding with *zibun*, the raw numbers show that L1 Japanese speakers

accepted object binding of *zibun* at a considerable rate; 2) detailed analysis of *kare/kanozyo-zisin* shows that sentence type has an effect on whether L1 Japanese bind *kare/kanozyo-zisin* with the subject or the object. These results are illustrated in Figure X.

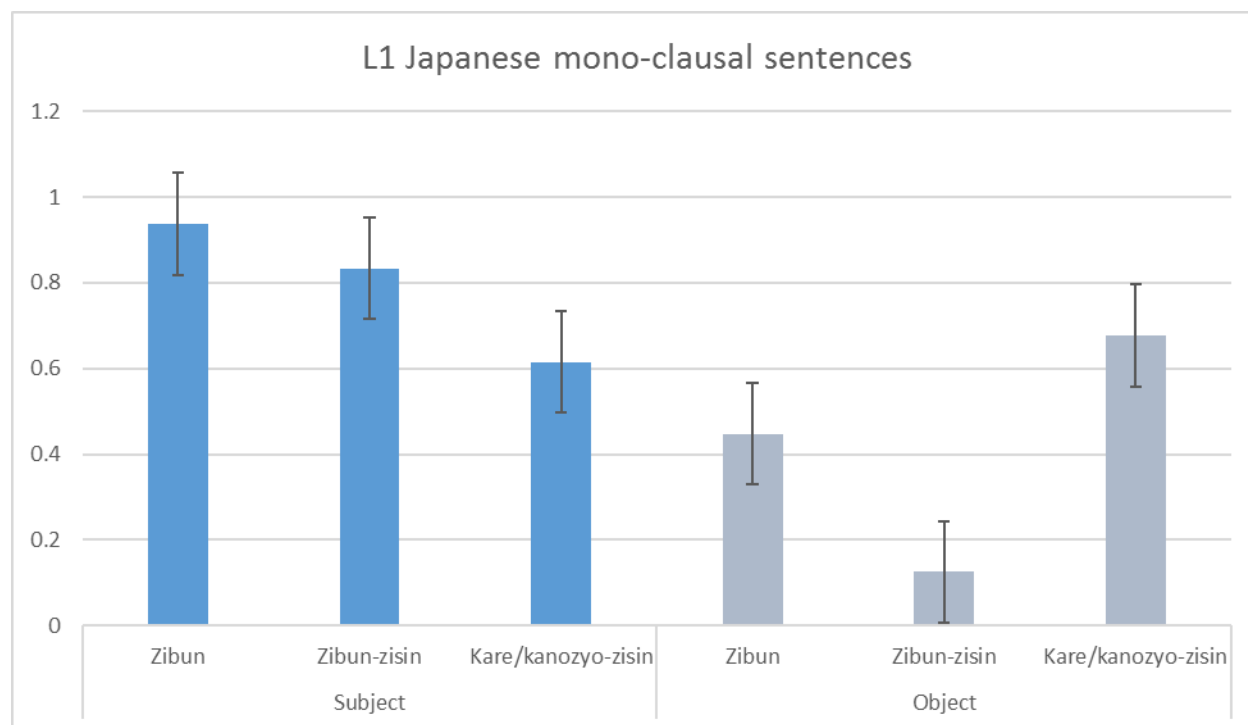


Figure 12. Illustration of L1 Japanese results from multi-clausal sentences

4.2 STUDY 2

Study 2 examines how L1 speakers process ambiguous sentences by analyzing their reading profiles from the SPR task. Among the 48 L1 Japanese participants, 21 took the task on Linger. The three objectives were to examine whether processing times differ between the three reflexives, whether certain case-marked reflexives induce longer processing times (e.g., structural vs. inherent case), and if non-canonical word orders lead to increased ambiguity and reading times. The research questions that were raised in Study 2 are repeated below:

Study 2: Processing of ambiguous sentences in Japanese.

- a. Will processing differ between *zibun*, *zibun-zisin*, and *kare/kanozoyo-zisin*?
- b. Will certain case-marked reflexives induce longer processing times than other case markers?
- c. Will scrambling induce longer processing times of reflexives?

All SPR data were converted to residual reading times for the analyses. Residual reading times were calculated based on the predicted reading time subtracted from the actual reading time of each participant. Residual reading times are useful in analyzing SPR data as they reduce “extraneous variance by subtracting out the participant’s button-press baseline time and by controlling for length effects due to region length” (Hara, 2009, p. 42). Particularly in Japanese, it also mitigates the effects of different morae lengths in phrases within each region. Before residual reading times were calculated, outlier data for each participant were calculated to eliminate any unusual data. If a participant’s response time were two standard deviations removed from the mean response times, their data was eliminated. In total, 1.80% of the L1 Japanese data were removed for the final analysis. All statistical analysis of the SPR data was conducted on R.

The results for this section are divided between multi-clausal sentences and mono-clausal sentences to separately examine the effect of case (in multi-clausal sentences) and scrambling (in mono-clausal sentences). First, let us examine the SPR data from multi-clausal sentences. Table 17 (*zibun*), Table 18 (*zibun-zisin*), and Table 19 (*kare/kanozoyo-zisin*) present the mean residual reading times divided by local and LD binding (see Appendix E for standard deviations of the residual reading times, Appendix F for global reading times, and Appendix G for the graphs of the residual reading times). The regions of interest for the analysis are the critical region,

spillover region, and wrap-up regions. The critical region for all sentences was located in region (3) and the spillover region was located in region (4), and the wrap-up regions were in regions (5) through (8) (see Section 3.2.2.2 for how the wrap-up regions were divided based on sentence type). To review, the predictions that were set within multi-clausal sentences were as follows: 1) there will be main effects in the wrap-up regions for local-bound sentences with inherent case-marked reflexives (genitive and dative case), based on the notion that reopening a closed VP to force local binding is costly; and 2) LD-bound sentences with structural case-marked reflexives will show main effects in the wrap up regions, based on the notion that structural case attaches early and raising a reflexive to the higher T position naturally takes more time.

Table 17. Residual reading times of multi-clausal sentences with *zibun* (ms)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	134.7	-22.5	27.3	-113.7	-62.8	-133.4	-163.9
	Believed	-20.6	-136.5	107.6	-77.7	-85.9		
Acc	--	-10.2	-83.7	150.0	-23.9			
Gen	Showed	73.8	131.5	45	-37.5	-14.5	73.9	-40.5
	Returned	103.6	-1.2	55.6	-46.1	-194		
Dat	--	14.9	22.8	33.3	-28.9	65.3		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	-81.3	-15.2	-23.8	-69.2	75.9	86.9	78.6
	Believed	69.4	228.8	576.5	416.3	196		
Acc	--	109.7	-23.2	-42.6	-74.9			
Gen	Showed	-14.3	-13.8	-81.6	-88	-55.5	-150	-52.4
	Went	10.9	-60.3	-110.4	-17.3	-84.4		
Dat	--	-87.2	-118.8	-7.8	-125.1	-66.9		

Table 18. Residual reading times of multi-clausal sentences with *zibun-zisin* (ms)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	26	162.8	-107	-172.7	-126.8	35.2	-109.7
	Believed	-52.6	23.2	-72.7	-167.3	-85.8		
Acc	--	-25.0	-29.7	273.3	67.1			
Gen	Showed	-18.4	-4.3	-13	-107.6	-73.1	-126.2	-95.9
	Returned	62.4	128.3	165.2	-114.6	35.6		
Dat	--	-48.3	41.6	-26.9	-160.1	-57.3		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	-69.2	247.4	247.7	-105.7	40.4	-166.3	91.7
	Believed	41.4	167.2	296.1	236.5	140.2		
Acc	--	-19.5	-1.4	13.8	73.9			
Gen	Showed	-39.6	380.8	94.2	-33	-17.9	-2.7	101.3
	Went	0	152.1	-49.7	-67.9	79.3		
Dat	--	-2.3	96.9	03.6	46.9	136.4		

Table 19. Residual reading times of multi-clausal sentences with *kare/kanozyo-zisin* (ms)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	100.7	242.9	405.2	-106.6	0.6	148.3	145.9
	Believed	-76.7	-12.3	407.2	40.6	357.6		
Acc	--	45.7	193.9	331.0	-34.5			
Gen	Showed	-36.8	272.8	77.5	-38.7	-15.5	120.8	23.9
	Returned	47.3	78.8	110.2	-5.8	-163.2		
Dat	--	64.4	638.4	-83.1	-42.2	-149.6		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	19.9	192.4	-68.6	-62	-62.5	-30.1	-55
	Believed	-17.4	348.6	-66.4	-138.6	-143.4		
Acc	--	-51.5	92.0	185.7	22.6			
Gen	Showed	96.5	27.5	155	20	39.1	-159.4	-147
	Went	24.3	273	-62.1	-120.7	-102.6		
Dat	--	-49.9	100.1	243.6	-55.6	19.7		

Overall, the reading profiles show that sentences with polymorphic reflexives produced more critical region effects than the monomorphic reflexive. In both local- and LD-bound sentences, *zibun* only induced two critical region effects out of all sentences (one for local binding with the predicate “showed” (genitive) and one for LD binding with the predicate “believed”). In turn, *zibun-zisin* had more critical region effects than *zibun* with six instances of increased reading times, specifically in local-bound sentences with the predicates “showed” (nominative) and “returned,” and in LD-bound sentences when the nominative and genitive case

marked *zibun-zisin*. Finally, *kare/kanozyo-zisin* induced critical region effects in almost all sentences. These results indicate that *kare/kanozyo-zisin* poses more processing difficulty than *zibun* and *zibun-zisin*, but within *zibun-zisin*, LD binding induced more increased reading times than local binding.

In examining the spillover and wrap-up regions, the reading profiles show that the spillover or wrap-up effects that occurred in sentences with *zibun* and *zibun-zisin* were not as predicted. Recall the prediction was that there would be a wrap-up effect in local-bound sentences with inherent case. However, there was little evidence of any wrap-up region effects with either *zibun* and *zibun-zisin* (a marginal effect was found in region 7 in the sentence with *zibun-zisin* and the VP “showed” (genitive case)). In turn, there were increased reading times in the wrap-up regions of all LD-bound sentences with *zibun-zisin* (except for the predicate “believed”). These patterns indicate that while L1 Japanese permit LD binding of *zibun-zisin*, they process LD-bound sentences with *zibun-zisin* slightly differently from those with *zibun*.

In turn, *kare/kanozyo-zisin* induced a number of spillover and wrap-up effects, but these main effects were more prevalent in local-bound sentences than LD-bound; the main effects in LD-bound sentences mainly occurred in the critical regions. These results suggest upon initial slowdown in the critical region, the parser likely determined that the LD-bound sentence with *kare/kanozyo-zisin* is false. That is, unlike the other reflexives that induced less main effects in the critical region, increased reading times at the critical region indicates that the parser in Japanese makes co-reference decisions for *kare/kanozyo-zisin* upon processing this reflexive before resuming the parse. On the other hand, in local-bound sentences with *kare/kanozyo-zisin*, the pervasiveness of spillover and wrap-up regions suggests that the L1 Japanese participants for this study were seeking for more information to complete local binding of *kare/kanozyo-zisin*.

Next, Table 21 and Table 22 presents the residual reading times from the mono-clausal sentences (see Appendix E for standard deviations). These sentences are divided by subject- and object-bound sentences for the analysis and further divided by sentence type (standard vs. scrambled). Scrambling effects were examined based on the previous research that claimed that non-canonical word orders generally increase structural ambiguity, because they are derived from transformation.

To review, the critical, spillover, and wrap-up regions were in different locations due to scrambling of DPs. Table 20 below reviews how the phrases in the stimuli were divided into their respective regions. Type A and Type C have similar structures where the reflexive appears after the subject DP and object DP, but Type C is scrambled because the object DP appears before the subject DP. In Type B and Type D, the reflexives appear between the subject DP and object DP. Thus, the critical region is in region 3 for Type A and Type C, and in region 2 for Type B and Type D. The spillover and wrap-up regions are the same for Type A and Type C. In Type B, the object DP appears in region 4, whereas the subject DP appears in the same region in Type D.

Table 20. Example stimuli of mono-clausal sentences divided by regions used in SPR task

<u>Sentence Type</u>	<u>Initial (1)</u>	<u>Pre-critical (2)</u>	<u>Critical (3)</u>	<u>Spillover (4)</u>	<u>Wrap-up (5)</u>
A (Standard)	DP-TOP	DP-DAT	<i>Self</i> -GEN	DP-ACC	VP
C	DP-DAT	DP-TOP	<i>Self</i> -GEN	DP-ACC	VP
	<u>Initial (1)</u>	<u>Critical (2)</u>	<u>Spillover (3)</u>	<u>Wrap-up (4)</u>	<u>Wrap-up (4)</u>
B	DP-TOP	<i>Self</i> -GEN	DP-ACC	DP-DAT	VP
D	DP-DAT	<i>Self</i> -GEN	DP-ACC	DP-TOP	VP

First, let us examine the results from subject-bound mono-clausal sentences. The results show that there were no critical region effects with *zibun* in any subject-bound sentence, and one marginal critical region effect with *zibun-zisin* in Type C. However, in Type D, both sentences with *zibun* and *zibun-zisin* induced spillover effects in region 4 where the subject DPs were located. A similar wrap-up effect also occurred in sentences with *kare/kanozyo-zisin*, except the main effect was detected in region 5 instead of region 4. In addition, Type B and Type C induced increased reading times in the critical region with *kare/kanozyo-zisin*. These results indicate that although L1 Japanese exhibited some processing difficulty with *kare/kanozyo-zisin*, they generally processed subject-bound sentences with *zibun* and *zibun-zisin* without delays. In addition, even when wrap-up effects were detected in Type D sentences, the L1 Japanese were 100% accurate in identifying the subject antecedent of *zibun* and *zibun-zisin*.

In turn, there were substantially more increased reading times in a number of regions with object-bound mono-clausal sentences. Main effects were detected in the critical regions for all reflexives in Type C, and Type D incurred increased reading times the spillover and wrap-up regions (regions 4 and 5 with *zibun*, regions 3 and 5 with *zibun-zisin*, and regions 3 and 4 with *kare/kanozyo-zisin*). While there were other separate cases of increased reading times in certain regions (such as, the critical region in Type B with *zibun* and in Type A with *zibun-zisin* and *kare/kanozyo-zisin*), the overall results show that the L1 Japanese participants had more difficulty in processing sentences that forced an object binding interpretation than subject binding.

Table 21. Residual reading times of subject-bound mono-clausal sentences (ms)

<u>Reflexive</u>	<u>Sentence</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
<i>Zibun</i>	A	-60.8	-92.7	-51.9	-100.5	20.3
	B	-38.8	37.5	-131.3	-19.0	-176.2
	C	24.9	29.8	14.6	-104.0	-152.0
	D	157.0	78.0	-8.5	243.7	-30.6
<i>Zibun-zisin</i>	A	13.8	-80.0	-42.2	-73.4	-52.3
	B	-75.0	-71.2	-123.9	-182.2	-213.4
	C	-29.2	60.7	116.5	-55.2	-215.6
	D	27.6	-42.4	-52.5	309.4	-76.3
<i>Kare/</i>	A	-65.7	-87.6	-165.7	-13.5	-166.6
<i>Kanozyo-zisin</i>	B	-120.0	241.6	88.6	-65.8	-152.6
	C	-36.0	-121.2	407.6	-95.9	-49.7
	D	7.5	-18.1	-40.2	-72.5	307.8

Table 22. Residual reading times of object-bound mono-clausal sentences (ms)

<u>Reflexive</u>	<u>Sentence</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
<i>Zibun</i>	A	17.9	-29.1	-36	-15.4	66.6
	B	-4.9	138.7	162.3	-38	-63
	C	-53.0	16.8	121.7	-47.1	-143.4
	D	25.6	-36.2	-13.6	102.5	242.2
<i>Zibun-zisin</i>	A	15.9	-126.5	242.8	-25.0	150.8
	B	-4.1	5.3	-23.1	-74.6	22.5
	C	-9.4	12.3	185.7	59.9	148.0
	D	59.3	67.3	244.2	67.8	255.5
<i>Kare/</i>	A	12.2	-106.6	201.9	-141.6	-148.2
<i>Kanozyo-zisin</i>	B	-148.2	-48.3	292.8	-158.6	386.6
	C	106.4	115.4	266.9	-64.7	-193.2
	D	-17.9	188.9	354.3	355.0	-96.1

4.3 STUDY 3

Study 3 examines how L1 speaker select reflexives when describing situations from a picture description task, and whether any local and LD binding patterns emerge based on the reflexive. To review, the following research question was raised in Study 4:

- a. Which reflexives will L1 speakers and L2 learners use to describe situations that require local and LD binding?

Table 23 shows the overall results from the picture description task (see Appendix H for full list of responses). The results for *kare/kanozyo-zisin* were combined for this table, as both reflexives have the same reflexive properties (aside from gender specification), but are split in the separate analyses of the pictures below. Overall, the majority of L1 Japanese participants selected *zibun* the most (37.2%), followed by *kare/kanozyo-zisin* (35.0%), and *zibun-zisin* (26.4%). While it was not surprising that *zibun* was selected the most, the high frequency of *kare/kanozyo-zisin* was unexpected, as the previous literature that claimed *kare/kanozyo-zisin* is not used as much in production.

Table 23. Overall L1 Japanese results from the Picture Description Task

Reflexive	<u>Japanese (n = 288)</u>
<i>Zibun</i>	107 (37.2%)
<i>Zibun-zisin</i>	76 (26.4%)
<i>Kare/kanozyo-zisin</i>	101 (35.0%)
<i>Kare-zisin</i>	45 (15.6%)
<i>Kanozyo-zisin</i>	56 (19.4%)
Other/no reflexive	4 (1.4%)

Next, the results were examined by picture type. Each set of pictures had similar background situations but different endings to the *yonkoma manga* (lit. four-cell comic). The fourth and last scenes of Pictures A and B (Table 24) involved a person showing a photograph to someone else, and the objectives of these sentences were to examine how the participants report pictures that depict object-bound (Picture A) and subject-bound (Picture B) situations. The last scenes of Pictures C and D (Table 25) involved a person buying a gift for himself (Picture C) and someone else (Picture D), and Pictures E and F (Table 26) involved a person voting for either himself (Picture E) or someone else (Picture F) in an election. The goals of these prompts were to examine how the participants reported situations that require local binding (Pictures C and E) and LD binding (Pictures D and F). The overall objective in examining all sentences was to see which reflexive participants select in object-bound, subject-bound, local-bound, and LD-bound sentences.

Table 24. L1 Japanese Picture A and B results

Picture A: Yuji showed Natsuko a photograph of <i>self</i> . (Object binding)		
Picture B: Natsuko showed her friend at the library a photograph of <i>self</i> . (Subject binding)		
<u>Reflexive</u>	<u>Picture A</u>	<u>Picture B</u>
<i>Zibun</i>	13 (27.1%)	18 (37.5%)
<i>Zibun-zisin</i>	6 (12.5%)	10 (20.8%)
<i>Kare-zisin</i>	5 (10.4%)	1 (2.1%)
<i>Kanozyo-zisin</i>	24 (50.0%)	17 (35.4%)
Other	0 (0%)	2 (4.2%)

First, let us examine the results from Picture A and B, as shown in Table 24. The results from Picture A show that L1 Japanese used the pronoun-reflexive form, *kanozyo-zisin* the most

to describe the scene at 50.0%, followed by 27.1% selecting *zibun*, and 12.5% selecting *zibun-zisin*. In some cases, there were examples of participants selecting *kare-zisin*, but those that used *kare-zisin* correctly referred to Yuji and described the sentence as, “the picture that was taken by *kare-zisin*.”

However, the results from Picture B reveal that the L1 Japanese participants use a variety of reflexives to refer to the subject ‘Natsuko,’ and used *zibun* (37.5%) and *kanozyo-zisin* (35.6%) at similar rates, followed by *zibun-zisin* (20.8%). Overall, these results indicate that L1 Japanese generally use pronoun-*zisin* or *zibun* to describe an object binding situation, but use all three reflexive types more liberally in subject binding.

Table 25. L1 Japanese Picture C and D results

Picture C: Alice told her friend that Shinji bought a Nintendo DS for <i>self</i> . (Local binding)		
Picture D: Manami told her friend that Keisuke bought an iPad for <i>self</i> . (LD binding)		
<u>Reflexive</u>	<u>Picture C</u>	<u>Picture D</u>
<i>Zibun</i>	13 (27.1%)	30 (62.5%)
<i>Zibun-zisin</i>	11 (22.9%)	7 (14.6%)
<i>Kare-zisin</i>	15 (31.3%)	2 (4.2%)
<i>Kanozyo-zisin</i>	7 (14.6%)	7 (14.6%)
Other	2 (4.2%)	2 (4.2%)

In the results from Table 25, Picture C (local binding) shows that L1 Japanese participants used a variety of reflexives when referring to the local antecedent ‘Shinji.’ The L1 Japanese selected *kare-zisin* (31.3%) the most, followed by *zibun* (27.1%), and then by *zibun-zisin* (22.9%). However, the results from Picture D (LD binding) show the L1 Japanese overwhelmingly selected *zibun* (62.5%) to refer to the LD antecedent, while *zibun-zisin* (14.6%)

and *kanozyo-zisin* (14.6%) were used at substantially lower rates than *zibun*. These results indicate that *zibun* is the preferred reflexive in LD binding situations, while a variety of reflexives may be used in describing local binding situations. Thus, the results from Pictures C and D show that the selection of reflexives differ for describing local and LD binding situations.

In Table 26, the results from Picture E, which requires local binding, reveals slightly different patterns from Picture C. The L1 Japanese group selected *zibun-zisin* the most at 52.1%, followed by *kare-zisin* at 35.4% and *zibun* at 10.4%. In turn, the results from Picture F, show very similar results to Picture D, as participants selected *zibun* 56.3% of the time and more than the other reflexives for LD binding. *Zibun-zisin* was selected by 31.3% of the participants and *kare-zisin* was selected by only 15%. The overall results from Table 25 and Table 26 show that *zibun* was mainly selected to describe situations that require LD binding, while all reflexives without an observable bias were used for local binding situations.

Table 26. L1 Japanese Picture E and F results

Picture E: Yuji told Natsuko that Keisuke voted for <i>self</i> . (Local binding)		
Picture F: Shinji told Taro that Yuji voted for <i>self</i> . (LD binding)		
<u>Reflexive</u>	<u>Picture E</u>	<u>Picture F</u>
<i>Zibun</i>	5 (10.4%)	27 (56.3%)
<i>Zibun-zisin</i>	25 (52.1%)	15 (31.3%)
<i>Kare-zisin</i>	17 (35.4%)	5 (10.4%)
<i>Kanozyo-zisin</i>	1 (2.1%)	0 (0%)
Other	0 (0%)	1 (2.1%)

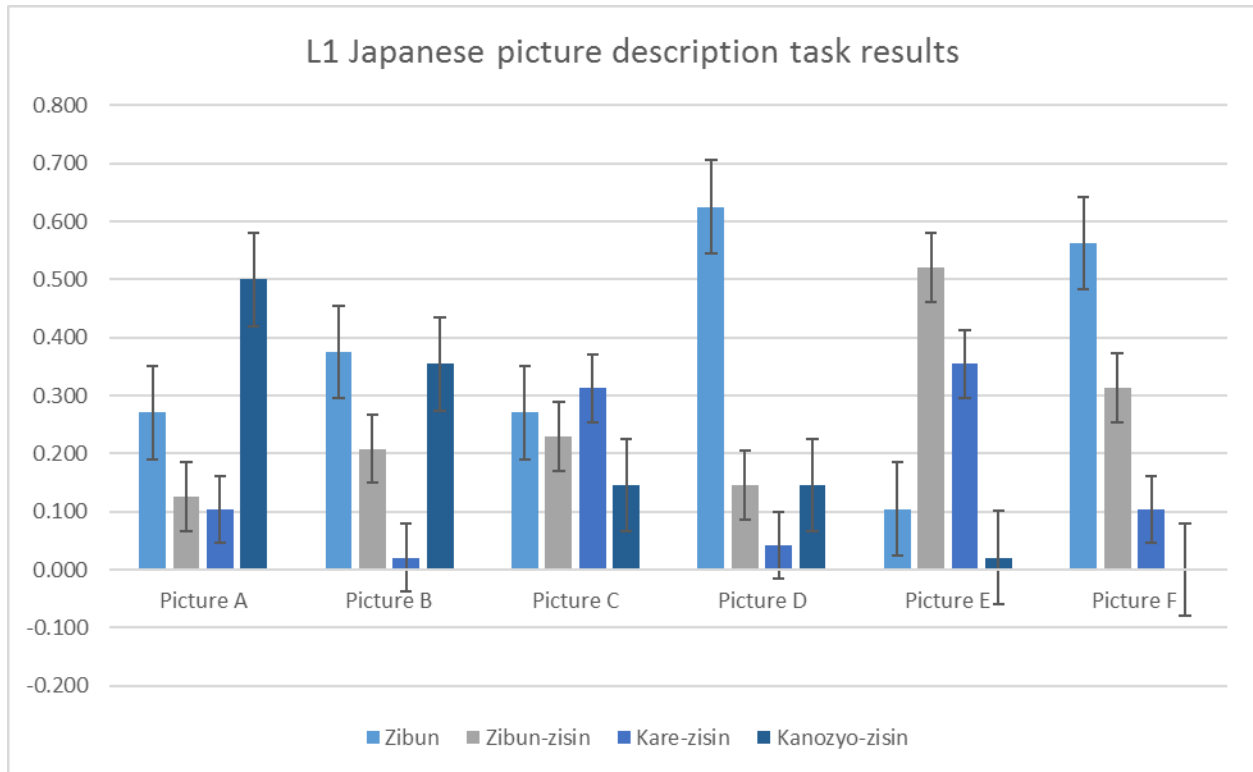


Figure 13. Illustration of L1 Japanese results from the picture description task

Figure 13 illustrates the results from the picture description task. The figure clearly shows that *zibun* was the preferred reflexive for LD binding descriptions, and other reflexives are widely used for other binding descriptions. The results from Table 24, Table 25, and Table 26 were submitted to chi-squared analysis to test for statistical significance between reflexive and sentence type based on the pictures. The results between Pictures A and B were not significant, $X^2(2, N=47) = 4.3403, p = .114$, but were significant between Pictures C and D, $X^2(2, N=47) = 13.061, p < .005$, and Pictures E and F, $X^2(2, N=47) = 24.965, p < .001$. These results indicate that L1 Japanese do not have any bias for reflexive choice in describing subject and object binding situations, but have differences in selection for local and LD binding contexts.

5.0 DISCUSSION OF THE L1 RESULTS

The discussion of the data, in relation to the research questions, are organized by the following. First, the results from the truth-value judgment task in Study 1 are discussed, followed by the results from the SPR task in Study 2, and the picture description task in Study 3. Finally, the theoretical implications of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* are presented after the discussion.

5.1 TRUTH-VALUE JUDGMENT TASK

Overall, the results show that L1 Japanese bind reflexives to their antecedents differently from the predictions described in the literature, especially with *zibun* and *zibun-zisin*. Statistically, in multi-clausal sentences, the L1 Japanese accept more LD binding of *zibun* than local, and more local binding of *zibun-zisin* and *kare/kanozyo-zisin* than LD. However, the data also show that L1 Japanese accept a substantial number of LD-bound sentences with *zibun-zisin*. In mono-clausal sentences, the majority of L1 Japanese accept subject binding with all reflexives, but they also accept a substantial number of object-bound sentences with *zibun*. Thus, there appears to be a major syntactic shift in the binding parameters and properties ascribed to *zibun* and *zibun-zisin* – the L1 Japanese participants bind *zibun* with any potential antecedent and *zibun-zisin* shows

binding behaviors that were previously described for *zibun*. These interpretations of Japanese reflexives are new developments that have yet to be uncovered in the literature to date.

In examining these results with the relevance of case in multi-clausal sentences, the data show case effects for *zibun* but not as much with *zibun-zisin* and *kare/kanozoyo-zisin*. First, post-hoc tests show that all case markers have a local binding effect for *kare/kanozoyo-zisin*, which confirms that case does not play a role with *kare/kanozoyo-zisin* – L1 Japanese will bind locally regardless of case. Second, case, for the most part, does *not* play a role in binding with *zibun-zisin*, but not in the way as predicted. Recall that one of the main properties ascribed to *zibun-zisin* by the literature was a locality constraint, which theoretically blocks LD binding. Hence, we would expect that case would not play a role in binding, only because the results should show a local binding bias regardless of case. The results from the current study are completely opposite of these predictions. With the exception of nominative case that shows a local binding bias, all other case markers do not exhibit any reliable effect for local binding. This indicates, contra our predictions, that the L1 Japanese participants accept LD binding of *zibun-zisin* just as often as local, and in some cases, more than local binding (63.5% local to 52.1% LD for accusative, 66.7% local to 64.6% LD for genitive, and 56.3% local to 68.8% LD for dative). This, as mentioned above, is an outcome that has not been described before in the literature.

Finally, in sentences with *zibun*, the total results show a significant bias for LD binding, but post-hoc tests show that case plays an influential role in the interpretation of local and LD binding. The L1 Japanese accept more local-bound subjects when nominative case marks *zibun*, but more LD-bound subjects when the genitive and dative cases mark *zibun*. Accusative case-marked *zibun* shows no local or LD binding bias. In short, while previous studies have suggested

that there are no local or LD binding biases with *zibun*, detailed analysis shows different binding preference patterns emerge based on case marking of *zibun*.

In mono-clausal sentences, the L1 Japanese significantly accept more subject DPs than object DPs with *zibun* and *zibun-zisin*, and more object DPs than subject DPs for *kare/kanozyo-zisin*; however, the results also show that 44.8% of the L1 Japanese participants accept object binding of *zibun*. This is another surprising development in the interpretations of *zibun*, given that movement at LF has been predicted to block object binding of *zibun*. Such patterns of object binding are not found with *zibun-zisin*, which, along with the evidence from LD binding, confirms that Japanese participants treat *zibun-zisin* as a subject-oriented reflexive with no locality constraint. With *kare/kanozyo-zisin*, the difference between subject and object binding is not significant, but binding patterns emerge based on sentence types. For example, Type A and Type D mono-clausal sentences led to more acceptance of object-bound sentences than Type B and Type C. These patterns will be further analyzed below.

At this point, what is to be made of these binding patterns from multi- and mono-clausal sentences? Recall that the theory originally claimed that *zibun* and *zibun-zisin* were subject-oriented reflexives, and *zibun* could bind LD but *zibun-zisin* could not. The difference between *zibun-zisin* and *kare/kanozyo-zisin* was that the latter could bind with either subject or object antecedent while the former, along with *zibun*, could only bind with the subject. However, based on the current results from multi-clausal and mono-clausal sentences, L1 Japanese speakers permit LD binding with both *zibun* and *zibun-zisin*, and object binding with *zibun*. That is, they allow *zibun* to take any potential antecedent within and beyond the clause, and treat *zibun-zisin* as the “old” *zibun*. Furthermore, L1 Japanese also demonstrate different local and LD binding patterns based on case with *zibun* in multi-clausal sentences. Thus, they operationalize a binding

algorithm that is not predicted by the theory. Figure 14 illustrates an updated version of the binding algorithm based on the new data:

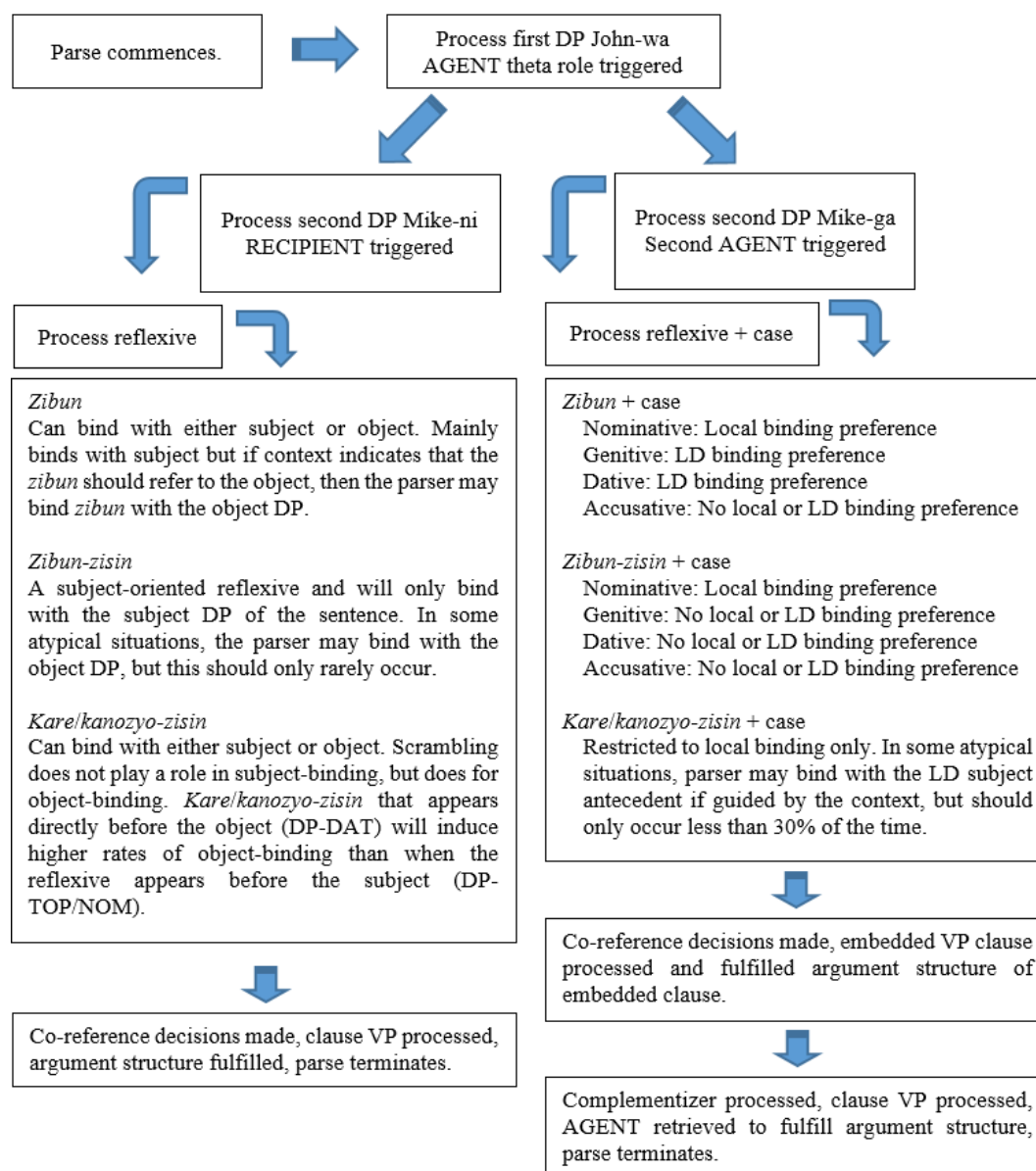


Figure 14. Updated algorithm for binding in Japanese

Thus, the current results from the truth-value judgment task show that L1 Japanese interpret reflexives differently from what the theory predicts. In addition, the data from the SPR task provides further evidence for this new development in the interpretation of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*. Theoretical implications of these results will be further discussed in the

final section of discussion (Section 5.4). For now, let us further examine some of the data that were highly variable from the truth-value judgment task.

5.1.1 Qualitative review of the stimuli

Although the results indicate case plays a major role in the identification of co-reference in *zibun* and *zibun-zisin*, and scrambling plays a role in *kare/kanozyo-zisin*, closer examination of the data also show some variability within certain stimuli. As the results show some predicate and scrambling effects that require further attention, the following sections will discuss the stimuli from the truth-value judgment task in detail divided between multi- and mono-clausal sentences.

5.1.1.1 Qualitative review of multi-clausal sentences

There were two instances in the data where the predicate appears to play an influential role in binding – *zihusiteiru* (lit. believed) in sentences with nominative case-marked reflexives and *hometa* (lit. praised) in accusative case-marked reflexives. The following section will review the stimuli from the nominative and accusative set.

First, the sentences from nominative case. The following stories in (33) and (35) are from the stimuli and provide context for the sentences in (34) and (36), respectively. Story A in both (33) and (35) forces the reader to take the local subject antecedent, and Story B forces the LD subject antecedent:⁴⁰

⁴⁰ The reflexive used the example sentences presented in the discussion will use *zibun* for space. See Appendix A full list of all stimuli including *zibun-zisin* and *kare/kanozyo-zisin*.

33. *Story A*: Hanako took some selfies of herself. The next day, she met her friend Reiko and showed her the photographs. Taro heard about this and told his roommate about what happened.

Story B: Taro is a photographer and was doing a photoshoot for Hanako. The next day, Hanako went to receive the photographs, and showed her boyfriend Keiji. Taro told his roommate about what happened.

34. *Sentence*: Taro said that Hanako showed Reiko/Keiji photographs that *self* took.

Taro-wa	Hanako-ga	<i>zibun</i> -ga	totta
syasin-o	Reiko/Keiji-ni	miseta-to	itta.
Taro-TOP	Hanako-NOM	<i>self</i> -NOM	took
photograph-ACC	Reiko/Keiji-DAT	showed-COMP	said

35. *Story A*: Keiko is a narcissist and believes she is the most beautiful student at the university. Hanako found this unattractive and told her friends about Keiko.

Story B: Keiko believes that Hanako is the most beautiful student at the university. Hanako was flattered by this and told her parents about the compliment that Keiko gave her.

36. *Sentence*: Hanako said that Keiko believes *self* to be the most beautiful.

Hanako-wa	Keiko-ga	<i>zibun</i> -ga	itiban.kireida-to
zihusiteiru-to	itta.		
Hanako-TOP	Keiko-NOM	<i>self</i> -NOM	most.beautiful-COMP
believe.IMPF-COMP	said		

When the predicate of the reflexives is “showed a photograph,” as in (34), the L1 Japanese participants accept more LD antecedents (78%) than the local (52%) with *zibun* as the

reflexive, but more local antecedents (83%) than LD (52%) with *zibun-zisin*. Although the acceptance rates of *kare/kanozyo-zisin* were relatively low, more participants accept local binding of “showed a photograph” (44%) than LD (35%). On the other hand, a clear predicate effect emerges when the predicate is ‘believed,’ as in (36). Almost all L1 Japanese participants reject LD binding when *zihusiteiru* is the predicate of *zibun* (4% accepted), *zibun-zisin* (17%), and *kare/kanozyo-zisin* (4%). The majority of them accept local binding of the same sentence for all reflexives: 78% for *zibun*, 80% for *zibun-zisin*, and 87% for *kare/kanozyo-zisin*. This shows that participants may be more inclined to bind *zibun* LD with the predicate “showed,” there is a strict local binding bias for the predicate *zihusiteiru* regardless of reflexive type. Based on these results, we can infer that while case plays an important role in local or LD binding, the predicate plays just as important a role in certain interpretation of anaphora.

Such patterns are also found in accusative case-marked reflexives. Recall that reliable effects were not found for both *zibun* and *zibun-zisin* in local or LD binding with the accusative case. However, examining the results by case and the predicate show certain binding patterns. Consider the following stories in (37) and (39) that provide context for the sentences in (38) and (40), respectively, from the stimuli. Story A again forces a local binding interpretation, and Story B forces LD binding:

37. *Story A*: Sato had made a big mistake at work. He was disappointed and blamed himself for the mistake. Suzuki, his coworker, saw this and told his friends about this after work.

Story B: Suzuki had made a big mistake at work. His supervisor, Sato, noticed and severely criticized Suzuki. Suzuki was disappointed and told his friends about this after work.

38. *Sentence*: Suzuki said that Sato criticized/blamed *self*.

Suzuki-wa Sato-ga *zibun*-o hihansita/semeta-to itta.

Suzuki-TOP Sato-NOM *self*-ACC criticized/blamed-COMP said

39. *Story A*: Nakata was running for student council and was giving a speech. Afterwards, Nakata was proud of the speech he gave and was praised himself. Kimura was there and told his friends about this the next day.

Story B: Kimura was running for student council and was giving a speech. Afterwards, his friend Nakata was impressed by his speech and praised him. Later that day, Kimura called his parents and told them about this.

40. *Sentence*: Kimura said that Nakata praised himself.

Kimura-wa Nakata-ga *zibun*-o hometa-to itta.

Kimura-TOP Nakata-NOM *self*-ACC praised-COMP said

In sentence (38), more than half of the L1 Japanese participants accept both local and LD binding contexts when *semeta/hihansita* (lit. blamed/criticized) is the predicate of *zibun* (56% true for local and 61% for LD) and *zibun-zisin* (57% local and 56% LD). However, the majority of participants accept more LD binding, as opposed to local, when *hometa* (lit. praised) is the predicate of *zibun* (43% for local and 68% for LD) and more local and LD binding for *zibun-zisin* (68% for local and 48% for LD).⁴¹

Why do such patterns occur? One possible explanation may be based on the two different VPs are used in sentence (35). Native speaker reviewers of the stimuli suggested that *zibun-o*

⁴¹ L1 Japanese participants accept more local than LD binding of *kare/kanozoyo-zisin* for both predicates.

semeta is more natural than *zibun-o hihansita* when directing blame or criticism towards oneself, and *zibun-o hihansita* is more natural when directing such acts towards someone else. Thus, the response rates are greater than 50%. However, this does not occur in the following sentence:

41. Yuji-wa Ichiro-ga *zibun/zibun-zisin-no* ie-ni kaetta/itta-to itta.
 Yuji-TOP Ichiro-NOM self-GEN house-DAT returned/went-COMP said
 “Yuji said that Ichiro returned/went to *self*’s home.”

In (38), native speaker reviewers recommended that *ie-ni kaetta* (lit. returned home) is semantically more natural than *ie-ni itta* (lit. went home) if Ichiro is going back to his home. On the other hand, if the context shows that Ichiro is going to Yuji’s home, then it is more natural to say *itta* (lit. went) than *kaetta* (lit. returned), according to the reviewers’ suggestions. However, in this example, there is a substantial difference in local and LD binding: 76% of the participants accept this sentence when the reflexive is LD-bound and the VP is *itta*, but only 43% accept this sentence when it is local-bound and the VP is *kaetta*. In turn, more participants accept local binding with *zibun-zisin* (72%) than LD (65%) in the same sentence.

Therefore, these results suggest that while the predicate plays an important role in binding, further analysis is necessary to provide a greater understanding of the role of the predicate in reflexive-antecedent binding in multi-clausal sentences of Japanese.

5.1.1.2 Qualitative review of mono-clausal sentences

The most surprising development from the mono-clausal data is L1 Japanese speakers show that they accept object binding of *zibun*, a phenomenon that is not predicted by LF movement. This cannot be emphasized enough. While the difference between subject and object binding is significant, the results show that almost half of the participants accept object binding of *zibun*

(44.8%). This new empirical result supports the previous research that claimed binding *zibun* with an object as possible (e.g., Hara, 2001; Kitagawa, 1981; Oshima, 2006).

In turn, the data show that binding of *zibun-zisin* and *kare/kanozyo-zisin* are as predicted, with the majority of L1 Japanese rejecting object-bound sentences with *zibun-zisin*, and accept both subject- and object-bound sentences with *kare/kanozyo-zisin*. However, non-canonical word orders of DPs appear to play a role in the interpretation of *kare/kanozyo-zisin*. Consider the following sentences in (42) from the stimuli. Type A is the standard word order and Type B, Type C, and Type D are the scrambled structures:⁴²

42. “Taro showed Keiji a photograph of *self*.”

Type A

Taro-wa Keiji-ni *kare-zisin-no* syasin-o miseta.

Taro-TOP Keiji-DAT self-GEN photograph-ACC showed

Type B

Taro-wa *kare-zisin-no* syasin-o Keiji-ni miseta.

Taro-TOP self-GEN photograph-ACC Keiji-DAT showed

Type C

Keiji-ni Taro-wa *kare-zisin-no* syasin-o miseta.

Keiji-DAT Taro-TOP self-GEN photograph-ACC showed

⁴² When the reflexive was *kanozyo-zisin*, the subject was ‘Hanako’ and the object was ‘Keiko’ in the stimuli.

Type D

Keiji-ni	<i>kare-zisin-no</i>	<i>syasin-o</i>	Taro-wa	<i>miseta.</i>
Keiji-DAT	self-GEN	photograph-ACC	Taro-TOP	showed.

The results show that when the *kare/kanozyo-zisin* appears before the two DPs (Type A and Type C), participants accept both the subject and object antecedent more than 50% of the time, but when the reflexive is moved in between the subject and object DPs (Type B and Type D), the results contrast. Specifically, in Type B, the L1 Japanese accept the subject antecedent substantially more than the object (87% subject, 44% object), but they accept the object antecedent more than the subject in Type D (48% subject, 91.3% object). In Type C, they accept both subject and object antecedents at similar rates (53.6% subject, 50.0% object), but recall that the only difference in Type C is the object DP and subject DP are swapped, and the reflexive still appears after the two DPs. These results show that while subject and object binding of *kare/kanozyo-zisin* are both possible, the location of the reflexive plays an important role in how L1 Japanese interpret mono-clausal sentences with *kare/kanozyo-zisin*. When *kare/kanozyo-zisin* appears after the subject DP but before the object DP, L1 Japanese will bind with the subject substantially more than with the object. In turn, when the object DP appears before *kare/kanozyo-zisin*, L1 Japanese will bind with the object more than the subject. Such biases were not found in both Type A and Type C. This serves as critical evidence that L1 Japanese speakers establish co-reference among DPs early in the parse before any VP is processed.

In answering the research questions set for Study 1, L1 Japanese show binding patterns that do not always strictly follow the conditions that are ascribed to the reflexives. In particular, L1 Japanese exhibit two patterns that contradict these conditions: LD binding of *zibun-zisin* and object binding of *zibun*. As mentioned earlier, LD binding of *zibun-zisin* is unprecedented, and

the current data provides new empirical evidence for object binding of *zibun*. Case also seems to play a role in binding and how *zibun* is interpreted. Some predicates also play a role in binding, especially the VP *zihusiteiru*, but more data would be necessary to make a stronger argument for the predicate. Finally, the position of the reflexive also plays a role in how L1 Japanese co-refer the reflexive to its antecedent. Such outcomes justify that further examination of the roles that case, the predicate, and position of the reflexive in the clause play in reflexive-antecedent binding in Japanese.

5.2 SPR TASK

The SPR task was designed with the objectives of testing whether processing differs between *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, if certain case-marked reflexives induce longer processing times than others in multi-clausal sentences, and if non-canonical word orders increase processing times in critical regions. The other goal of this task was to further examine how L1 Japanese process ambiguity and establish co-reference among DPs before arriving at the final VP, and if evidence can be extracted to support the working hypothesis of CIA processing.

First, the reading profiles from multi-clausal sentences show that sentences with *kare/kanozyo-zisin* induce more increased reading times in the critical region than *zibun-zisin* and *zibun*. In addition, increased reading times in the spillover region are more prevalent in sentences with *kare/kanozyo-zisin* over the other two reflexives. These patterns suggest that L1 Japanese process *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* differently upon encountering them during the parse. The reading profiles from local- and LD-bound sentences also reveal processing differences within reflexives. In sentences with *zibun* and *zibun-zisin*, there are almost no critical

region effects when locally bound, but increased reading times occur in almost all LD-bound sentences with *zibun-zisin*, but not with *zibun*. In turn, there are critical region effects in almost all sentences, both local- and LD-bound, with *kare/kanozyo-zisin*. In the instances where *kare/kanozyo-zisin* did not induce a critical region effect, spillover effects occurred. In viewing these patterns from a spectrum, the reading profiles show that *zibun* and *kare/kanozyo-zisin* are processed completely differently, and *zibun-zisin* falls in the center. When *zibun-zisin* is locally bound, L1 Japanese process it similar to *zibun*, and when it is LD bound, they process it similar to *kare/kanozyo-zisin*. Figure 15 below illustrates these processing patterns from multi-clausal sentences:

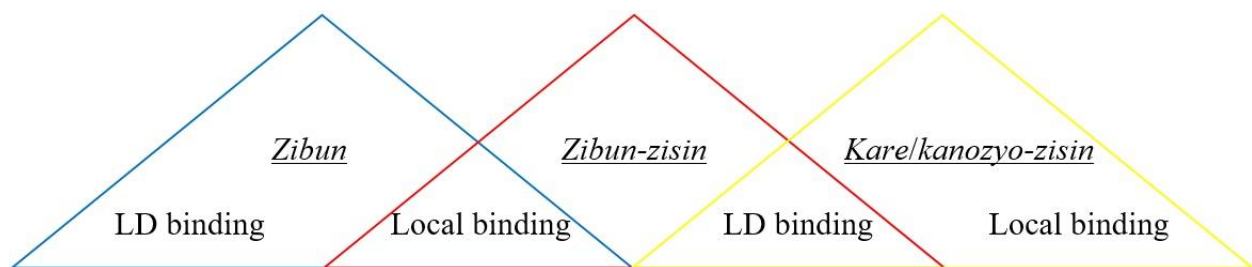


Figure 15. Processing patterns of multi-clausal sentences

Similar processing patterns are evident in the reading profiles from mono-clausal sentences. In general, there are more critical region effects with *kare/kanozyo-zisin* than *zibun-zisin* and *zibun*, but the data show that there are substantially more increased reading times across the critical, spillover, and wrap-up regions with object-bound mono-clausal sentences than subject-bound for all reflexives. This is a particularly interesting development given that mono-clausal sentences in Japanese with *zibun* and *zibun-zisin* were thought to be unambiguous, yet L1 Japanese exhibit processing breakdown in the majority of object-bound sentences, even with *zibun*. In addition, the data once again show that *zibun-zisin* behaves similarly to *zibun* in subject binding but to *kare/kanozyo-zisin* in object binding.

In subject-bound sentences, main effects only occur in the wrap-up region (region 4) of Type D with *zibun* and *zibun-zisin*, and the rest of the reading profiles are relatively even. With *kare/kanozyo-zisin*, there are two critical region effects in Type B and Type C, and a wrap-up effect in region 5 (not 4) of Type D. Thus, in subject-bound sentences, *zibun-zisin* behaves similarly to *zibun* and not *kare/kanozyo-zisin*.

In object-bound sentences, increased reading times are pervasive in a number of regions with *zibun-zisin* and *kare/kanozyo-zisin*. Critical region effects occur in Type A and Type C for both *zibun-zisin* and *kare/kanozyo-zisin*, as well as a spillover effect in Type D for both reflexives. In particular, with *zibun-zisin*, increased reading times occur in the wrap-up regions of the same sentences that incur a critical or spillover effect. Other instances of increased reading times occur sporadically with *kare/kanozyo-zisin*. On the other hand, increased reading times in sentences with *zibun* only occur in the critical regions of Type B and Type C, and in the wrap-up region of Type D. Thus, in object-bound sentences, *zibun-zisin* behaves similarly to *kare/kanozyo-zisin* but not *zibun*, an exact opposite observation from subject-bound sentences.

Overall, the results from multi- and mono-clausal sentences clearly show specific binding patterns based on sentence type. When the antecedent is a local subject, L1 Japanese treat *zibun* and *zibun-zisin* similarly, but not *kare/kanozyo-zisin*. In turn, when the antecedent is either an LD subject or local object, L1 Japanese deploy similar processing strategies with *zibun-zisin* and *kare/kanozyo-zisin*, but not *zibun*. Note that the similar strategies with *zibun-zisin* and *kare/kanozyo-zisin* in mono-clausal sentences also lead to the correct interpretations of rejecting object binding with *zibun-zisin* but accepting both subject and object binding with *kare/kanozyo-zisin*.

The following sections discuss the reading profiles from multi- and mono-clausal sentences separately to address the research questions on case marking and scrambling. The results from multi-clausal sentences are discussed first and followed by mono-clausal sentences.

5.2.1 L1 reading profiles of multi-clausal sentences

This section will discuss the reading profiles from multi-clausal sentences with a focus on case. First, in sentences with *kare/kanozyo-zisin*, L1 Japanese exhibit substantial slowdown in the critical regions of almost all sentences, and in the few instances they do not, increased reading times occur in the subsequent spillover regions. This indicates that parser most likely searches for an available antecedent as soon as they encounter *kare/kanozyo-zisin*, which is a logical approach in disambiguating *kare/kanozyo-zisin*. As mentioned earlier, one of the differences between *kare/kanozyo-zisin* is that it contains phi-feature specifications that other reflexives do not have. As the parser is provided with more information, it is reasonable to assume that these phi-features trigger the parser to search for an antecedent once the information becomes available.

The increased reading times may also be due to the nature of how the stimuli were constructed for sentences with *kare/kanozyo-zisin*. In order to maintain consistency across all reflexives and stimuli, the two subject DPs that appeared before the reflexive in the sentences were designed so that they both match the gender specifications of the reflexive. This is not a problem for *zibun* and *zibun-zisin*, as these two do not have any phi-features and can take either [+male] or [+female] antecedent. Thus, in sentences with *kare-zisin*, the matrix and embedded subjects were both [+male], and with *kanozyo-zisin*, both were [+female]. It was presumed that if both subject antecedents matched the phi-feature specifications of *kare* or *kanozyo-zisin*,

ambiguity would be increased over if only one of the subject antecedents matched the gender specification of *kare/kanozyo-zisin*. This is exactly what occurred in almost all cases with *kare/kanozyo-zisin*. However, in order to further examine how structurally ambiguous *kare/kanozyo-zisin* is, additional tests and analysis, with stimuli that involve gender mismatch, would be necessary to further our understanding of how *kare/kanozyo-zisin* selects its antecedent.

Next, the reading profiles from *zibun-zisin* show a number of processing patterns that differ from what the theory predicts, and confirms the syntactic shift of *zibun-zisin* as revealed in the truth-value judgment task. Recall that the theory predicts similar processing patterns between *zibun-zisin* and *kare/kanozyo-zisin* in multi-clausal sentence due to the locality constraint ascribed to these reflexives; however, the data from Study 1 revealed that L1 Japanese bind *zibun-zisin* with the LD antecedent considerably more than expected. The reading profiles also show processing patterns that further distinguishes *zibun-zisin* from *kare/kanozyo-zisin*. First, in sentences of locally-bound *zibun-zisin*, there are only a few main effects in the critical and spillover regions, and no wrap-up region effects. These reading profiles are more similar to those of *zibun* than *kare/kanozyo-zisin*, which suggests that L1 Japanese deploy similar processing strategies in local-bound multi-clausal sentences with *zibun* and *zibun-zisin* (SPR data of *zibun* will be discussed in more detail after *zibun-zisin*). In turn, they exhibit a number of increased reading times in the critical region when *zibun-zisin* is LD-bound. This initially suggests that L1 Japanese process LD binding of *zibun-zisin* similarly to *kare/kanozyo-zisin*. However, the locus of the difference between LD binding of *zibun-zisin* and *kare/kanozyo-zisin* lies in how they process the wrap-up regions. In sentences with *kare/kanozyo-zisin*, as mentioned earlier, the majority of increased reading times occur in the critical or spillover regions, but there are zero wrap-up region effects. On the other hand, sentences with *zibun-zisin* show an additional spike in

reading times in the final wrap-up regions where the matrix VP is located. This strongly indicates the likelihood that L1 Japanese raise *zibun-zisin* to the higher T position once the matrix VP is processed and the landing site for LD movement becomes available.

Finally, in sentences with *zibun*, L1 Japanese rarely exhibit any slowdown during the parse, with exception to when the sentence is LD-bound and the VP is *zihusiteiru* (but this occurs in all sentences with *zibun-zisin* and *kare/kanozyo-zisin* as well). Even in instances when the participants exhibit slowdown, such examples are few and marginal, and in many cases, slowdown did not occur in the predicted regions. For example, in local-bound sentences, the prediction was that inherent case-marked reflexives would result in processing breakdown, as inherent cases attach late, which presumably would have led to processing problems since local binding would require reopening a closed VP. Nonetheless, the reading profiles from local-bound sentences with *zibun* suggest otherwise. Although they reject more local binding of inherent case-marked *zibun* as opposed to LD, the processing strategies remain the same. Second, in LD-bound sentences, L1 Japanese do not exhibit any increased reading times in the wrap-up as they did with *zibun-zisin*. This patterns confirm that L1 Japanese treat *zibun* and *zibun-zisin* similarly in local binding, but differently in LD binding.

Overall, the patterns from multi-causal sentences have two important implications in the processing of reflexives. First, the reading profiles from *zibun* and local-binding of *zibun-zisin* show that L1 Japanese are able to intake various DPs, construct associations between them, and establish co-reference among DPs, all before arriving at the main VP and without considerable cost or delay (with a few exceptions from the *zibun-zisin* data). These behaviors are characteristic of incremental processing approaches that argue the parser in Japanese does not wait until the final VP to build syntactic constructions and make anaphoric relations among DPs

(Aoshima et al., 2009; Inoue & Fodor, 1995). Second, L1 Japanese exhibit more increased reading times in various regions of sentences with *zibun-zisin* and *kare/kanozyo-zisin*, which suggests that processing of LD bound sentences with polymorphemic reflexives (i.e., *zibun-zisin*) takes longer than monomorphemic reflexives (i.e., *zibun*).

These results, though, raise the questions of why *zibun-zisin* takes more time to raise than *zibun*, what is the role of the *-zisin* suffix, and what is the difference between *zibun* and *zibun-zisin*. There are a few possible explanations for this. First, the previous literature on *zibun-zisin* claimed that one of the reasons why it cannot participate in LD binding is because movement of the *-zisin* suffix out of *zibun-zisin* was restricted, which is why *zibun-zisin* and *kare/kanozyo-zisin* could not be raised to the matrix position (e.g., Katada, 1991). In addition, it had been claimed that *-zisin* functions also as an intensifier, as this aspect was not explored in this dissertation. There is little evidence from the current data to reject the function of *-zisin* as an intensifier. However, in terms of how *-zisin* raises with *zibun* but not with *kare/kanozyo*, one plausible explanation is that *zibun-zisin* as a whole has the ability to move to the matrix T position and bind with the LD antecedent because it contains a *zibun* component and *kare/kanozyo-zisin* remains locally-bound because movement is restricted by the pronouns *kare* and *kanozyo*. In other words, it is not the *-zisin* suffix that restricts movement, but movement of Japanese reflexives is governed by whether the base morpheme is *zibun* or *kare/kanozyo*. Further, in terms of why *zibun-zisin* results in wrap-up effects but *zibun* does not, it may be because the initial inclination in processing *zibun-zisin* is to bind locally, and LD binding requires reanalysis (the data from the truth-value judgment task indicates a local binding bias, even though more than half the participants accept LD binding of *zibun-zisin*). Once the entire sentence is

processed, L1 Japanese may initiate reanalysis of the parse if necessary for LD binding, and ultimately permit movement of *zibun-zisin* to the matrix T position and complete the parse.

Such wrap-up effects do not occur with *zibun* in LD binding because, as suggested in the data, L1 Japanese process both local and LD binding of *zibun* similarly. That is, in the procedure of LD binding, the L1 Japanese bind *zibun* with an LD subject antecedent well before reaching the final VP. This is entirely plausible based on the previous research in incremental processing of Japanese. Subsequently, the role of the matrix VP becomes the appropriate site to retrieve the matrix DP and fulfill the argument structure of the verb to complete the parse. I believe that such strategies support the working hypothesis for the CIA processing model, in that L1 Japanese demonstrate abilities to covertly retrieve case-marked DPs from earlier in the parse to fulfill the argument structure of the verb without delay. Zero delays in processing also suggest that L1 Japanese are assigning theta roles upon processing case-marked DPs, and do not wait until the final VP to license theta roles.

Finally, to address what the difference between *zibun* and *zibun-zisin* is, the data from the truth-value judgment task show that L1 Japanese accept both local and LD binding with both reflexives, but the reading profiles show that L1 Japanese process *zibun* and *zibun-zisin* similarly in local binding, but not in LD binding. Taking these results together, the L1 Japanese demonstrate that they treat *zibun-zisin* as what was originally claimed for *zibun*, and *zibun* as a wild card, or in other words, a logophor. This would also explain why L1 Japanese accept object binding of *zibun* in mono-clausal sentences, but not with *zibun-zisin*, for which they treat as a purely subject oriented reflexive. These theoretical implications are summarized in the final section of the discussion.

5.2.2 L1 reading profiles of mono-clausal sentences

This section will focus on the effects that scrambling of DPs have on processing in mono-clausal sentences. First, to review, the results from mono-clausal sentences also show major processing differences not only within the reflexives but also between subject- and object-bound sentences. L1 Japanese exhibit increased reading times in several critical and spillover regions with *kare/kanozyo-zisin* in both subject- and object-bound sentences. *Zibun-zisin* also induces increased reading times in some regions in object-bound sentences, but very few in subject-bound. Similar patterns occur with *zibun*, for which there are more main effects in object-bound sentences, but only one instance of a main effect in subject-bound sentences. Thus, the initial observations are that subject-bound mono-clausal sentences cause less processing breakdowns than object-bound sentences, and that *kare/kanozyo-zisin* induces more increased reading times than *zibun* and *zibun-zisin*.

Let us further examine the effect of scrambling in subject- and object-bound sentences separately by sentence type. Table 27 below provides a review of sentences types for mono-clausal sentences:

Table 27. Sentence types for mono-clausal sentences

<u>Sentence Type</u>		<u>‘John showed Mike a photograph of <i>self</i>.’</u>			
A	John-wa	Mike-ni	<i>zibun</i> -no	syasin-o	miseta.
(Standard)	John-TOP	Mike-DAT	<i>self</i> -GEN	photograph-ACC	showed
B	John-wa	<i>zibun</i> -no	syasin-o	Mike-ni	miseta.
(Scrambled)	John-TOP	<i>self</i> -GEN	photograph-ACC	Mike-DAT	showed
C	Mike-ni	John-wa	<i>zibun</i> -no	syasin-o	miseta.
(Scrambled)	Mike-DAT	John-TOP	<i>self</i> -GEN	photograph-ACC	showed
D	Mike-ni	<i>zibun</i> -no	syasin-o	John-wa	miseta.
(Scrambled)	Mike-DAT	<i>self</i> -GEN	photograph-ACC	John-TOP	showed

First, in subject-bound sentences, the results show no slowdown in any region with all reflexives in Type A. This indicates that L1 Japanese speakers process sentences in standard word order as expected. Next, in Type B, sentences with *zibun* and *zibun-zisin* also show no delay at any point, but a main effect is detected with *kare/kanozyo-zisin* in the critical region. In Type C, no effects are found with *zibun*, but main effects occur in the critical regions with *kare/kanozyo-zisin* and *zibun-zisin*. L1 Japanese do not show any effects of slowdown with *zibun* until Type D, for which they exhibit slowdown in the wrap-up region. Similar slowdown effects in Type D are also found with *zibun-zisin* and *kare/kanozyo-zisin*.

These patterns in subject-bound mono-clausal sentences show a clear pattern of how scrambling influences processing. When the reflexive appears in between immediately after the subject DP and before the object DP appears (Type B), *kare/kanozyo-zisin* causes delay but not *zibun* and *zibun-zisin*. Next, when the subject DP and object DP are swapped and the reflexive appears after the two DPs (Type C), we notice increased reading times with *zibun-zisin* and

kare/kanozyo-zisin, but not *zibun*. However, the increase with *zibun-zisin* is marginal and arguably not significant, which further suggests that *zibun* and *zibun-zisin* have similar processing patterns. Finally, in Type D, main effects occur in the wrap-up region of all sentences. This indicates that when the subject DP appears towards the end of the clause, L1 Japanese pause momentarily for reanalysis and access earlier case-marked DPs in order to establish the correct co-reference among DPs. Increased reading times at a displaced subject DP in the clause also confirms that scrambling is derived from transformational operations, because scrambling involves movement and requires the processor to check c-command relationships so that the subject DP is correctly bound to a co-indexed DP from lower in the tree. Thus, the reading profiles from subject-bound sentences not only show that L1 Japanese demonstrate similar processing strategies with *zibun* and *zibun-zisin*, but also retrieval operations that require accessing earlier case-marked DPs to make the correct binding interpretations.

The results from object-bound sentences are not as straightforward, as there are increased reading times in various regions across the sentence types. First, in sentences with *zibun*, there are no increased reading times in Type A, but main effects occur in the critical regions of Type B and Type C, and in the wrap-up regions of Type D. With *zibun-zisin*, Type A and Type C induce increased reading times in the critical and wrap-up regions, and in the spillover and wrap-up regions in Type D. However, they did not demonstrate any slowdown at any point in Type B. Finally, with *kare/kanozyo-zisin*, increased reading times occurred mainly in region 3 across all sentences, i.e., a main effect occurs in the critical regions for Type A and Type C, and in the spillover regions for Type B and Type C.

In short, object-bound sentences cause more processing breakdowns in a number of different regions compared to subject-bound sentences. While much of the increased reading

times occur sporadically, the reading profiles show patterns in how L1 Japanese process *zibun-zisin* and *kare/kanozyo-zisin* similarly, but not *zibun*. First, the increased reading times in sentences with *zibun* occur when the reflexive immediately follows the subject DP (Type B and Type C) and not the object DP (Type A and Type D). This suggests L1 Japanese are reanalyzing which antecedent *zibun* refers to in object-bound sentences when presented with a subject DP before the object DP; i.e., the subject DP acts as a distractor when appearing before the *zibun* in object-bound sentences. Hence, when the word order is [DP-DAT (object) *zibun*-GEN...], L1 Japanese immediately link *zibun* with the object antecedent, but when the word order is [DP-TOP (subject) *zibun*-GEN...], the inclination is for L1 Japanese to bind with the subject DP first, but initiate reanalysis in order to bind with the object. These patterns of reanalysis again show that scrambled structures are derived from transformation as ambiguity appears to be increased, but the ability to arrive at the correct interpretation of co-reference shows that L1 Japanese utilize an access and retrieve operation in order to make accurate decisions, as CIA processing hypothesizes. Thus, the increased reading times in the spillover region in Type B also makes sense, as they expect an object DP in the position where the reflexive is (region 2) after the subject DP, and upon processing the object DP in region 3, they must reanalyze the three DPs.

With *zibun-zisin* and *kare/kanozyo-zisin*, the processing patterns are almost identical in object-bound sentences, except for when *zibun-zisin* is the reflexive in Type B. For whatever reason, L1 Japanese show no indication of slowdown in any region with Type B. Perhaps the immediate progression of a subject DP and *zibun-zisin* in region 1 and region 2 triggers the parser that this sentence will be false according to the subject orientation ascribed to *zibun-zisin*. What is clearer from the reading profiles aside from this anomaly is that the majority of object-bound sentences with *zibun-zisin* follow the same patterns as *kare/kanozyo-zisin*. Type A and

Type C induce critical regions effects, and Type D induces a spillover effect. The similarities in object binding sentences emulate the results found in LD binding of multi-clausal sentences, in which L1 Japanese also process *zibun-zisin* and *kare/kanozyo-zisin* similarly.

Therefore, the reading profiles from both multi-clausal and mono-clausal show that when a pure local subject binding interpretation among the DPs is required, L1 Japanese process *zibun* and *zibun-zisin* similarly, and when required either an LD binding or object binding interpretation, L1 Japanese process *zibun-zisin* and *kare/kanozyo-zisin* similarly. Furthermore, the processing strategies L1 Japanese demonstrate show mechanism of incrementally constructing syntactic structures upon processing case-marked DPs, theta roles are simultaneously licensed upon processing case (there are far less wrap-up effects where the VP is located in all sentences compared to critical and spillover regions), and if necessary, DPs are accessed and retrieved not only to satisfy the argument structure of the verb, but also to formulate the correct binding interpretations. This is displayed in both their distinct processing patterns of the three reflexives and interpreting *zibun* as a logophor, *zibun-zisin* as an anaphor, and *kare/kare-zisin* as a local-bound reflexive.

5.3 PICTURE DESCRIPTION TASK

The objective of the picture description task was to examine how L1 Japanese participants use reflexives for subject, object, local, and LD binding situations. First, the overall results of the picture description task show that L1 Japanese select *zibun* the most, but also *kare/kanozyo-zisin* almost as frequently as *zibun*, and *zibun-zisin* the least out of the three reflexive types. While the frequent selection of *zibun* is not surprising, the frequency of *kare/kanozyo-zisin* is unexpected,

considering the majority of the literature claimed that the *kare/kanozyo-zisin* is not frequently used in the language. Recall that the participants were explicitly instructed to use a reflexive in their answer but were also told that they did not have to use all reflexive forms in their answers; i.e., they could have used *zibun* to describe all of the answers. However, there is only one case where a participant uses *zibun* to describe all six pictures and only two cases where *zibun* is selected five out of the six times. These figures clearly indicate that the other reflexive forms are frequently used in production, as 46 out of the 48 remaining L1 Japanese participants use *zibun-zisin* and/or *kare/kanozyo-zisin* at least 33% of the time. In further examining these results by picture type and binding, clear patterns of selection emerge in the data. The following section discusses these results in relation to the truth-value judgment task.

First, the results from Picture A show that L1 Japanese select *kanozyo-zisin* the most for describing object binding situations, followed by *zibun*, and *zibun-zisin*. This pattern directly reflects the results from the truth-value judgment task that show participants accepting object-bound sentences with *kare/kanozyo-zisin* the most (66.7%), *zibun* the second (44.8%), and *zibun-zisin* the least (12.5%). Thus, L1 Japanese participants are selecting the pronoun reflexive form the most in both interpretation and production of object binding and *zibun-zisin* the least.

However, the results for *zibun* from Picture A again clearly show that L1 Japanese frequently use *zibun* to refer to the object in the sentence. In total, participants select *zibun* 27.1% of the time to refer to the object in the sentence. Taking the results from the truth-value judgment task and the picture description task together, there is a clear contrast in what the theory predicts and in the interpretation and production of *zibun*. L1 Japanese clearly treat *zibun* as a logophor in both interpretation and production. These results suggest that the binding constraints and properties ascribed to *zibun* need to be revisited.

In Picture B, L1 Japanese select *zibun* the most at 37.5% of the time, but they also select *kanozyo-zisin* almost as frequently at 35.4% (there was only one less participant who selected *kanozyo-zisin* instead of *zibun*). L1 Japanese select *zibun-zisin* the least again at 20.8%. These results further show that L1 Japanese use *kare/kanozyo-zisin* in production far more than the literature originally had claimed. However, given that the results from the truth-value judgment task and SPR task show that *zibun-zisin* is a purely subject oriented reflexive, and that they accept a higher percentage of subject-bound sentences with *zibun-zisin* than *kare/kanozyo-zisin*, it is surprising to see that it is the least frequently selected reflexive in Picture B. Nonetheless, these results from Picture A and Picture B show that in describing subject and object binding situations, *kare/kanozyo-zisin* is used just as frequently as *zibun*.

The results from Picture C and Picture E show that L1 Japanese use a variety of reflexives in describing local binding situations, which is not necessarily surprising given that all three types of reflexives can participate in local binding. In turn, the results from Picture D and Picture F, which require LD binding in the descriptions, show that *zibun* is the most frequently selected reflexive (62.5% in Picture D and 56.3% in Picture F), which corresponds with the results from the truth-value judgment task where participant accept more LD binding of *zibun* over the local. However, there is also evidence of participants using *zibun-zisin* and *kare/kanozyo-zisin* for LD binding. While the selection of *zibun-zisin* and *kare/kanozyo-zisin* are low in Picture D (14.6%), L1 Japanese select *zibun-zisin* substantially more in Picture F at 31.3% (*kare/kanozyo-zisin* is used only 10.4%). The high frequency of *zibun-zisin* selection in Picture F further confirms that L1 Japanese accept LD binding of *zibun-zisin* in both interpretation and production of Japanese reflexives. As mentioned earlier, this is a binding behavior that is not predicted by the theory and is a new development for *zibun-zisin*.

Thus, the results from the picture description task generally correspond with the results from the truth-value judgment task. The production results show that L1 Japanese use *zibun* in object binding and *zibun-zisin* in LD subject binding, as was found in their interpretations of *zibun* and *zibun-zisin*. Furthermore, these results also show that *kare/kanozyo-zisin* is used far more frequently in production than previously claimed. Overall, these results from the picture description task confirm the syntactic shift of Japanese reflexives found in the two other tasks, which further justifies that the binding parameters and constraints of the system of Japanese reflexives needs revision. The following section provides theoretical implications based on the results from the above studies.

5.4 THEORETICAL IMPLICATIONS

To summarize the L1 Japanese results from the truth-value judgment task, SPR task, and the picture description task, we find the following binding patterns. From the truth-value judgment task, *zibun* binds with any potential antecedent, *zibun-zisin* is restricted to subject binding but can also bind LD, and *kare/kanozyo-zisin* is restricted to local binding but can refer to either subject or object. The reading profiles from the SPR task show that L1 Japanese show similar processing strategies between *zibun* and *zibun-zisin* in local subject binding interpretations, but there are more similarities between *zibun-zisin* and *kare/kanozyo-zisin* in LD-bound sentences. Finally, from the picture description task, L1 Japanese use *zibun* the most for describing LD binding situations, and *zibun-zisin* and *kare/kanozyo-zisin* are used frequently in describing pictures that require local binding. However, there is also sufficient evidence that show L1 Japanese use

zibun-zisin for LD binding, and use it far less for object-binding. Thus, the results from these three tasks show the following two new patterns:

- A. Object binding of *zibun*.
- B. LD binding of *zibun-zisin*.

These results contradict the predictions set by Binding Theory and principles of LF movement for these lexical items, although with modifications to the lexical specifications of the anaphors, the Binding Theory easily accommodates these patterns. The current results from all tasks confirm that there is a syntactic shift that within the binding parameters in which Japanese reflexives operate under, *zibun-zisin* behaves similarly to how we previously thought *zibun* does, and *zibun* is a logophor in the sense that it is able to select any antecedent within and beyond its governing clause. Table 28 shows summarizes these results as an update of the system of Japanese reflexives:

Table 28. Updated system of Japanese reflexives

<u>Ontological category</u>	<u><i>Zibun</i></u>	<u><i>Zibun-zisin</i></u>	<u><i>Kare/kanozyo-zisin</i></u>
Local binding	Yes	Yes	Yes
LD binding	Yes	Yes	No
Subject binding	Yes	Yes	Yes
Object binding	Yes	No	Yes
Phi-feature specification	No	No	Yes

These constraints, along with the data from the SPR task, show distinct binding patterns between the *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, and reveal a tripartite system of Japanese reflexives:

- 43. *Zibun* is a logophor and can bind with any potential antecedent
- 44. *Zibun-zisin* is a subject oriented anaphor that can be bound long-distance
- 45. *Kare/kanozyo-zisin* can only bind locally and can bind with the subject or object

While the original predictions that were set for this dissertation hypothesized that binding of *zibun* would be governed by the syntactic rules and properties ascribed to *zibun*, the new data clearly show that *zibun* functions as a logophor and *zibun-zisin* as an anaphor. The definitions of logophoric reflexives in Japanese have often overlapped with other properties, such as empathy and point of view (see Oshima, 2006 for an explanation on the different uses of *zibun*), but the new data show that *zibun* manifests three traditional and important properties that are ascribed to a logophor: 1) binding is permitted with non-clause-bounded antecedents; 2) the possibility of binding with a non-subject; and 3) binding based on discourse (Kameyama, 1984; Kuno, 1972, 1987; Oshima 2004, 2007).

Much of the SPR tasks from the reading profiles also show many processing strategies that are characteristic of the working CIA processing hypothesis. Especially in local binding of *zibun* and *zibun-zisin*, we expected there to be processing delays in the wrap-up regions, because reopening a closed VP for local binding is costly. However, the results indicate that zero wrap-up effects in all locally bound sentences, which indicates that 1) local binding was settled earlier in the parse, 2) theta roles were being licensed as case-marked DPs were being processed, and 3) they covertly retrieved matrix DPs to satisfy the argument structure of the main VPs. Any delay in the wrap-up region would have indicated that the parser was reopening the embedded VP for local binding after the matrix VP was processed, which did not occur. Although further testing of other sentence structures would be necessary to make a stronger case for CIA processing, I believe the current results provide initial support for the working processing model.

These new developments may not have been uncovered had it not been the inclusion of *zibun-zisin* and *kare/kanozyo-zisin*. However, the newly uncovered properties and parameters of Japanese reflexives potentially create some slight complications in L2 acquisition. Previous studies in L2 binding of Japanese were based on the traditional descriptions and constraints primarily on *zibun*, under the mistaken view that *zibun* was the analogous anaphor to ‘him/herself’ in English. However, given the new binding parameters and constraints set by the L1 Japanese results, we examine how L2 learners interpret and process Japanese reflexives based on the new data for *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*.

6.0 L2 JAPANESE LITERATURE REVIEW

The second part of this dissertation explores how *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* are acquired as an L2. Much of the research in L2 acquisition of reflexives has adopted the Principles and Parameters approach as its theoretical base. This is based on the notion that the lexical properties of anaphors and reflexives vary among languages. Indeed, cross-linguistic variation is currently treated a property of lexical and functional heads (Chomsky, 1995), and such variation plays a role in processing as both case and argument structure are involved in Merge operations (Juffs, 2004; Weinberg, 1999). As a consequence, in order to successfully acquire binding in the L2, learners must reset their parameters appropriately to the target language. Thus, two questions have remained within this domain of research 1) whether Universal Grammar (UG) is available in L2 acquisition of reflexives, as the theory claims that UG constrains L1 acquisition and how a child properly acquires anaphora in their L1; and 2) whether L2 learners are able to reset their binding parameters (e.g., Hirakawa, 1990).

This dissertation also examines whether L2 learners of Japanese are able to show evidence of resetting binding parameters (lexical features and domain constraints) appropriately to Japanese through the same experiments conducted in the L1 studies. In addition, this dissertation examines how L2 learners process ambiguity in Japanese. The field of L2 sentence processing has generally been divided between those that argue L1 and L2 processing is different, and those that argue L2 learners are able to deploy processing mechanisms that resemble L1 processing.

Thus, the objective of the SPR task with L2 learners is to examine how L2 learners process ambiguity in Japanese and compare the results to the reading profiles from the L1 study.

Before we continue, some descriptions of Korean and Chinese typologies and reflexives in relation to this dissertation are in order. Korean is morphologically and typologically similar to Japanese with similar sentence structures and word orders. Case is also overtly marked by post-positional suffixes in the grammar,⁴³ and the reflexive inventory of Korean is almost identical to Japanese. These include: *caki* (self), a simplex morpheme; *casin* (self) also a simplex morpheme;⁴⁴ *caki-casin* (self-self), a complex morpheme; and two pronoun-reflexives, *ku-casin* (he-self) and *kunyo-casin* (she-self) (Kang, 2012; Lee, 2008). Korean reflexives also have similar binding constraints as Japanese. *Caki*, *caki-casin*, and *casin* are subject-oriented reflexives, but *caki* tends to prefer the LD antecedent over the local, and *caki-casin* can only participate in local binding. *Casin* can take both local and LD binding, and does not reportedly have any local or LD bias. Finally, *ku-casin* and *kunyo-casin* are syntactically similar to *kare/kanozyo-zisin*.

Chinese employs two reflexives. *Ziji* is often identified as the equivalent form of *zibun*, and has similar constraints as it is subject oriented and can participate in both local and LD binding (Huang, 1994). The other form, *taziji* ('pro-self'), is the polymorphemic reflexive form that is similar to *kare/kanozyo-zisin*. *Taziji* is gender neutral in spoken forms (written Chinese distinguishes 她自己 (herself) and 他自己(himself), which is relatively recent innovation) and

⁴³ More case markers can be omitted in the spoken language compared to Japanese; e.g., in the DP 'friend's house,' the genitive case marker cannot be dropped in Japanese (*tomodati-no ie*), but can be in Korean (*cinkwu-(uy) jib*).

⁴⁴ Japanese does not use the equivalent form, *zisin*, as a simplex morpheme as Korean does.

can only be bound to a local antecedent, but remains subject oriented (Chien & Lust, 2006). In terms of word order and morphosyntactic typology, Chinese and Japanese are quite different (Dryer, 2003). The following examples in (46) show that Chinese constituent order is different from Japanese and Korean, and appears to be more similar to English (for reference).⁴⁵

46. *Japanese:*

John-wa	Mike-ga	<i>zibun-o</i>	hihansita-to	itta.
John _i -TOP	Mike-NOM	<i>self</i> -ACC	criticized-COMP	said

Korean:

John-un	Mike-i	<i>caki-lul</i>	pinanhayssta-ko	malhayssta.
John _i -TOP	Mike-NOM	<i>self</i> -ACC	criticized-COMP	said

Chinese:

Zhangsan	shuo	Mike	piping	<i>ziji</i> .
John	say	Mike	criticize	<i>self</i>

English:

John	said	that	Mike	criticized	himself.
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In Chinese, the VP ‘say’ appears immediately after the subject DP ‘John’ followed by the rest of the sentence, similar to English. It is also worth mentioning again that Chinese does not have markers for case or tense (e.g., “say” instead of “said” in the above examples). While

⁴⁵ Korean, similar to Japanese, also allows scrambling of DPs within the clause while Chinese and English does not. For example, the reflexives in Japanese and Korean may be moved in front of the embedded subject “Mike” and maintain grammaticality. This is not possible in Chinese or English without modification of morphemes.

(Mandarin) Chinese does not display a high degree of morphological complexity in terms word formation and morphological markers, other features, such as scrambling, and expressing subjects, direct objects, directions, and other grammatical functions by means of word order and prepositions, are characteristic of isolating languages that exhibit rich morphology (Li & Thompson, 2009, p. 11-13). In addition, Chinese also has sentence final verb particles, aspect morphemes, agreement markers, and marks passive constructions with *bǎ* and *bèi*, in which the *bǎ* noun phrase is placed before the direct object in the clause and the *bèi* noun phrase is placed after the direct object.⁴⁶

On the other hand, the VP ‘said’ appears at the end of the clause in Japanese and Korean. These basic differences in reflexive inventory and sentence structures presumably have an influence on acquisition. In theory, if an L2 learner’s L1 permits both local and LD binding and has similar reflexive properties as the target language, the learner does not have to reset their binding parameters in the L2 (such as between Japanese, Korean, and Chinese). However,

⁴⁶ The following are examples of *bǎ* and *bèi* constructions:

Bǎ construction

nǐ bǎ tā de yìsi jiǎng chū lái le
 you BA 3SG GEN meaning talk exit come CRS
 “You have explained what he/she meant”

Bèi construction

tā bèi jiějie mà le
 3SG BEI elder.sister scold CRS
 “He/she was scolded by (his/her) sister.”

because Korean has more equivalent reflexive forms and is typologically more similar to Japanese, as opposed to Chinese, L1 Korean learners of L2 Japanese should demonstrate similar binding patterns as L1 Japanese speakers than of L1 Chinese. The following Table 29 summarizes the different reflexive forms of Japanese, Korean, and Chinese (plus English for reference, and Table 30 summarizes the linguistic typologies.

Table 29. L2 learners' L1 linguistic profiles

	<u>Simplex reflexive</u>	<u>Complex reflexive</u>	<u>Reflexive Pronoun</u>
Japanese	<i>Zibun</i>	<i>Zibun-zisin</i>	<i>Kare/kanozyo-zisin</i>
Korean	<i>Caki, casin</i>	<i>Caki-casin</i>	<i>Ku/kunyo-casin</i>
Chinese	<i>Ziji</i>	--	<i>Taziji</i>
English	<i>(self)</i> ⁴⁷	--	<i>Him/herself</i>

⁴⁷ Only available as a bound morpheme, e.g., self-destruct.

Table 30. Reflexive forms of Japanese, Korean, Chinese, and English

<u>L1</u>	<u>Typologically</u> <u>similar to Japanese?</u>	<u>Case system?</u>	<u>Long distance</u> <u>binding?</u>	<u>Object binding?</u>
Japanese	--	Yes	Yes (but only <i>zibun</i>)	Only with pro- <i>zisin</i>
Korean	Yes	Yes	Yes (but only <i>caki</i> and <i>casin</i>)	Only with pro- <i>casin</i>
Chinese	No	No	Yes (but only <i>ziji</i>)	No
English	No	Yes (but only pronouns)	No	Yes

6.1.1 L2 Binding

As mentioned earlier, much of the research in L2 binding has mainly two languages that have different binding properties between the L1 and L2. This based on the notion that when the L2 binding properties are different from those in the L1 grammar, L2 learners usually demonstrate some L1-L2 transfer effects in their binding behavior. Thus, the prediction is that L2 acquisition of binding is guided by the similarities and differences between L1-L2 language typologies and reflexive parameters; however, acquisition is not as straightforward as predicted, and research within this domain has produced a range of results. The following section reviews the literature within this domain.

Hirakawa (1990) was one of the first studies to examine L2 acquisition of reflexives by L1 Japanese learners of L2 English, and examined whether Manzini & Wexler's (1987)

governing category parameter was applicable in L2 acquisition. She found that the errors made in binding in L2 English, which involved her L1 Japanese participants binding an English anaphor to an LD antecedent, was due to the Japanese participants transferring their L1 binding parameters to the L2; i.e., learners have difficulty in resetting their parameters in the target language.⁴⁸ She also reported differences in sentence types (finite vs. infinite), which has been found in other studies of L2 binding (e.g., Akiyama, 2002; Jiang, 2009).⁴⁹ Jiang (2009), who examined varying L2 proficiency levels, found that L1 Chinese learners of L2 English at the intermediate level tended to be more aware of clause types than beginning and advanced level learners, and were significantly more accurate in rejecting LD antecedents in finite clauses than non-finite clauses. In examining embedded *that*-clauses and infinitival clauses, Akiyama's (2002) results showed that advanced level L1 Japanese learners of L2 English were able to acquire the locality condition better in embedded clauses than infinitival clauses; however, the overall results showed most of his advanced learners failed to acquire the locality constraint in English as a whole. The difficulty of acquiring locality constraints in English has also been confirmed in Felser, Sato, & Bertenshaw (2009), which reported that L1 Japanese learners of L2 English were more aware of c-command violations than locality constraints (which happened to be the opposite case for their L1 English control group). This last point suggests that L2 learners

⁴⁸ This result was partly attributed to the difficulty L2 learners have in general of moving from a superset to a subset grammar. That is, learners have difficulty retreating from an overgeneralization, whatever its source.

⁴⁹ Clause-type effects have also been found in other LD syntactic operations, such as in subject vs. object extraction in *wh*-movement (see Juffs, 2005).

are able to acquire some binding properties in the target language (see Kim, Montrul, & Yoon, 2015, Kim, Montrul, & Yoon, 2009, for L1 English learners of L2 Korean; Sperlich, 2013, for L1 English and L1 Korean learners of L2 Chinese; Thomas, 1995, for L1 English learners of L2 Japanese). In particular, Kim, Montrul, & Yoon (2015) was one of the most recent studies that examined L2 binding through an on-line visual world paradigm task, and found that L2 learners were able to interpret reflexives similar to L1 speakers, but not pronouns, and concluded that learners may be able to acquire certain L2 syntactic binding properties of the target language.

However, Sperlich (2013) points out that L2 acquisition of binding may be influenced by whether the reflexives in the L1 and L2 are either syntactically or pragmatically related. She predicted that acquisition from English to Chinese is syntactically influenced and from Korean to Chinese is pragmatically oriented, because English anaphors are regulated by syntactic rules, but *ziji* and *caki* are anaphors that have pragmatic- and discourse-related aspects. In her results, though, Sperlich only found similar binding patterns between Korean and Chinese, which happen to be typologically dissimilar languages. The implication is that if two languages have reflexives with similar binding parameters, similar binding patterns between L1 speakers and L2 learners should emerge.⁵⁰

In terms of L2 acquisition of Japanese reflexives, the focus within this domain has mainly been on the acquisition of local and LD binding in Japanese. Thomas (1991) was one of the earliest studies that investigated acquisition of *zibun*, and examined how L1 Chinese and L1

⁵⁰ Akiyama (2002) notes that while certain properties of L1 reflexives may be directly transferable, “it is doubtful whether Japanese actually has a reflexive that corresponds exactly to the properties of English reflexives” (p. 46).

English speaking learners of L2 Japanese acquired local and LD binding of *zibun*. The results showed that as proficiency increased, the more L1 English speakers accepted LD binding of *zibun*. While she acknowledged that the small number of L1 Chinese participants (8) made it difficult to make any conclusions for the L1 Chinese group, the overall data showed that L2 learners were able to reset their binding parameters appropriately to the L2. Thomas (1995) later confirmed that higher proficient L2 learners of Japanese were again able to acquire proper binding of *zibun* over lower level learners, and that they “captured the full native speaker grammar of *zibun*” (p. 226). Yoshimura et al. (2012), one of the more recent studies that experimentally examined acquisition of *zibun* with L1 Chinese, L1 English, and L1 Turkish speakers, also reported higher accuracy of locally-bound sentences than LD-bound among all L1 groups, but accuracy also improved with advanced proficiency, a recurring pattern from the previous data. However, a caveat of L2 proficiency is that it is entirely conceivable that lower proficiency level learners of Japanese have not yet grasped an understanding of the functions of *zibun*, and it may be more reasonable to test L2 learners with higher proficiency in Japanese.

Overall, these studies have shown that L2 learners of Japanese are able to acquire some binding properties in the target language; however, regardless of L1 background, L2 learners have more difficulty with acquisition of LD binding of *zibun* than local binding, but accuracy improves as proficiency increases. Table 31 provides a summary of the studies mentioned above (see Appendix I for a summary of these studies).

Table 31. Selected studies on L2 acquisition of reflexives

<u>Author(s)</u>	<u>L1</u>	<u>L2</u>	<u>Task</u>
Akiyama (2002)	Japanese (n = 141)	English	Truth-value judgment task
Felser, Sato, & Bertenshaw (2009)	Japanese (n = 22 for study 1, 32 for study 2)	English	Grammaticality judgment test; eye-tracking L2 reading task
Hirakawa (1990)	Japanese (n = 65)	English	Grammaticality judgment test
Jiang (2009)	Chinese (n = 66)	English	Truth-value judgment task
Kim, Montrul, & Yoon (2015)	English (n = 32)	Korean	Visual world paradigm eye- tracking
Kim, Montrul, & Yoon (2009)	English (n = 41)	Korean	Truth-value judgment task
Sperlich (2013)	English (n = 5) Korean (n = 5)	Chinese	Interpretive judgment test; truth-value judgment task
Thomas (1991)	Chinese (n = 8) English (n = 33)	Japanese	Multiple-choice comprehension test
Thomas (1995)	English (n = 58)	Japanese	Truth-value judgment task
White, Bruhn-Gravato, Kawasaki, Pater, & Prévost (1997)	Japanese (n = 19 for story, 22 for picture) French (n = 22)	English	Truth-value judgment task – story and picture tasks.

Table 31 (continued):

<u>Author(s)</u>	<u>L1</u>	<u>L2</u>	<u>Task</u>
Yoshimura, Nakayama,	Chinese (n = 48)	Japanese	Truth-value judgment task
Sawasaki, Fujimori, &	Turkish (n = 40)		
Kahraman (2013)	English (n = 13)		
Yoshimura, Nakayama,	Chinese (n = 34)	Japanese	Truth-value judgment task
Shirahata, Sawasaki, &	English (n = 13)		
Terao (2012)			

This is not nearly an exhaustive list of the studies available on L2 acquisition of binding, and although it may not be obvious from this list, most of the previous studies have focused on L2 English, and not as much on other languages. A more conspicuous gap in the literature is that none of the studies on L2 acquisition of Japanese reflexives, at least to my knowledge, have experimentally examined the acquisition of *zibun-zisin* and *kare/kanozyo-zisin* (in Korean, there are a number of studies that have examined *caki-casin*, and *casin* by Kim, Montrul, Yoon, and other colleagues). It is unclear as to why there are no studies that have experimentally investigated *zibun-zisin* in the L2, but part of the reason why *kare/kanozyo-zisin* has not been thoroughly examined may be due to the presumption that it is not frequently used in native speech (Yusa, 1998). Nonetheless, analysis of the entire reflexive system is necessary in order to fully understand how L1 speakers and L2 learners process reflexivity in Japanese. In particular, the entire Japanese reflexive system offers an appropriate base for syntactic and psycholinguistic research – the range of different reflexives and binding constraints that are ascribed to each reflexive provides an ideal domain for L1 and L2 sentence processing research.

These remaining issues in L2 acquisition of Japanese reflexives are addressed in this dissertation by examining how L1 Korean and L1 Chinese speaking learners of L2 Japanese acquire these reflexives. If UG is active in L2 acquisition of reflexives, both L1 Korean and L1 Chinese should be able to reset their L1 parameters appropriately and show similar results as L1 Japanese. However, if the L1 typology and morphology play a role in L1-L2 transfer, L2 learners may carry their L1 parameter values to the L2 and lead to contrasting results between L1 Korean and L1 Chinese. Otherwise, if no differences between the L1 groups appear in the data, the results would provide evidence that L1 background does not play a role in the acquisition of *zibun* and other Japanese reflexives.

6.2 L2 SENTENCE PROCESSING

In order to further examine how L2 learners acquire Japanese reflexives and whether they are able to incrementally process DPs as L1 Japanese speakers, this dissertation deploys methodology to track-real time processing of Japanese sentences by L2 learners as well. The research in L2 sentence processing has generally been divided between those that argue L2 learners are able to deploy similar processing strategies as L1 speakers, and those that believe L1 and L2 processing is (fundamentally) different. The following section presents arguments from both sides.

6.2.1 L1 and L2 processing is different

Clahsen & Felser (2006) is one of the most well-known overview articles in L1-L2 sentence processing, in which they claimed on-line processing differs in levels of processing between the L1 and L2 (the Shallow Structure Hypothesis). They argued that because L2 learners are guided by lexical, semantic, and discourse factors, and not on syntactic cues, “the syntactic representations adult L2 learners compute for comprehension are shallower and less detailed than those of native speakers” (Clahsen & Felser, 2006, p. 32). Other approaches have also suggested that L2 learners process sentences differently from the L1, such as the interface hypothesis (Sorace, 2011; p. 18), which suggested that L2 learners have a “reduced ability to integrate syntactic and contextual information (as rapidly as L1 speakers)” (see also Roberts, Gullberg, & Indefrey, 2008). The good enough approach (Ferreira & Patson, 2007) claimed that a shallow understanding of a sentence often leads speakers, L2 learners in particular, to misinterpret the intended meaning(s) of a sentence. VanPatten (2015, p. 120), in a less divisive approach, suggested that L2 learners tend to “rely on event probabilities, where possible, instead of the First-Noun Principles (or the alternative L1 Transfer Principle) to interpret sentences” (the Event Probability Principle). That is, learners are able to understand that some verbs have embedded semantic meanings that prevent them from incorrectly parsing certain sentences in the L2, such as “the rock kicked the boy” (kick requires an animate AGENT), or “the child scolded the

mother” (the verb scold likely involves the mother performing the act of scolding rather than the child).⁵¹

These are, of course, reasonable arguments in L2 sentence processing, but just as plausible in L1 sentence processing as well (see Townsend & Bever, 2001). L1 speakers should be able to understand that the two sentences above are unlikely scenarios given the semantics of the sentence.⁵² Further, in Li and Juffs (2017), as mentioned earlier, the majority of L1 Japanese participants rejected the sentence “the doctor said that the soldier killed himself,” because the idiomatic meaning is more frequently used than the literal meaning. Nonetheless, 28% of the participants still accepted this sentence as true based on the given context,⁵³ which may be due to event probabilities that were triggered during the parse, as one scenario is nearly impossible – the doctor would have to be a ghost to tell someone that the soldier killed him. Or, others may suggest that the shallower “literal” interpretation of the sentences may have been triggered

⁵¹ VanPatten (2015) also presents other processing strategies that L2 learners potentially rely on, such as the Lexical Semantic Principle (learners rely on lexical semantics instead of the First-Noun Principle), or Contextual Constraint Principle (preceding context constrains possible interpretations of the sentence).

⁵² Parsing theories also tell us that kick would not be able to assign AGENT and the parse will fail.

⁵³ The context is as follows: “After three years in the way, the soldier finally went crazy and jumped off a building. He died instantly. The following day, the soldier’s doctor met with the family and told them the sad news.”

before idiomatic or other semantic meanings of the reflexive phrase, resulting in L1 participants accepting the sentence as guided by the context.

6.2.2 L2 learners demonstrate L1 processing strategies

It is important to note that second language acquisition (SLA) research in the generative approach has also been successful in showing that L2 learners use processing strategies that utilize abstract strategies (e.g., filler-gaps) and reanalysis of structural configurations which are consistent with L1 processing. This stems from the original motivation for L2 sentence processing research in which generative linguists in SLA debated “whether observed differences between L1 speaker and L2 learners were true differences in underlying grammatical competence” (Jegerski, 2014, p. 21). Juffs & Harrington (1995) was the first to apply SPR methodology (Just, Carpenter, & Woolley, 1982) in SLA research, for which they examined L1 and L2 accuracy of long-distance object vs. subject extraction. Their results not only confirmed the earlier results by Schachter & Yip (1990), but that parsing was the source of difficulty with subject extraction and not on grammatical competence or unavailability of UG. Subsequent studies that incorporated formal theories have successfully found that L2 learners deploy processing strategies that would not be predicted by Shallow Structure or the Fundamental Difference Hypothesis (Bley-Vroman, 1990) approaches (e.g., see Hoover & Dwivedi, 1998, for clitics and causatives; Juffs, 2005, for *wh*-movement; Juffs & Harrington, 1996, for garden path effects, White & Juffs, 1998, for subjacency violations, and most recently, Zhou, Rossi, Li, Liu, Chen, & Chen, 2016, for processing *wh*-extractions). These studies on filler-gaps, subjacency violations, and *wh*-islands/-extraction, have been instrumental in showing that L2 learners demonstrate retrieval operations that are similar to L1 speakers, and the syntactic structures that

are built by L2 learners are consistent when retrieval operations are initiated. (Cunnings, 2016, p. 9). L2 processing should not be expected to be the same as L1 processing, but “the mere fact that there is an observed non-isomorphy between natives and L2ers does not entail that the natives and the L2ers deploy fundamentally different mechanisms.” (DeKeyser-Price, Schwartz, & Sproule, 2006, p. 33).

Thus, a number of studies have successfully shown in SLA research from the generative approach that L2 learners are able to deploy similar processing strategies as L1 speakers. This dissertation examines whether L2 learners are able to do so in Japanese by examining how they process the range of Japanese reflexives. As mentioned earlier, very few studies that used SPR tasks exist in Japanese, but even fewer are available in L2 Japanese. The following section briefly discusses the research on L2 Japanese sentence processing and some of the issues that surround Japanese SPR methodology (refer to Section 2.3 for a review on SPR methodology).

6.2.3 L2 Japanese sentence processing

Research in L2 Japanese using SPR methods is relatively a newcomer in the field, but the objectives have remained the same in examining how L2 learners process the target language, and whether they demonstrate similar processing strategies as L1 Japanese speakers. This has been observed in several processing mechanisms, such as resolution of *wh*-scope ambiguity and recognition of ungrammatical sequences of DPs in Japanese. For example, Japanese is a language where the *wh*-phrase remains in-situ, as opposed to English, which requires *wh*-movement, and completing *wh*-phrases in Japanese requires identifying the earliest possible location to place the *wh*-marker *ka*. Further, placement of the question marker *ka* differs between types of interrogatives: in direct questions, such as in (47), *ka* is placed at the end of the matrix

clause, but in indirect questions, as in (48), *ka* is placed at the end of the embedded clause (Sawasaki & Kashiwagi-Wood, 2015) (the clause boundaries are marked in the Japanese and the question marker *ka* is underlined):

47. John-wa [Mike-ga syokudou-de dare-ni au-to] omoimasu-ka.

John-TOP Mike-NOM cafeteria-LOC who-DAT meet-COMP think-Q

“Who did John think that Mike will meet at the cafeteria?”

48. John-wa [Mike-ga syokudou-de dare-ni au-ka] sirimasen.

John-TOP Mike-NOM cafeteria-LOC who-DAT meet-Q know.not

“John does not know who Mike will meet at the cafeteria.”

The idea is in order to complete interrogative sentences in Japanese, L2 learners must demonstrate “the same processing mechanism [as L1 speakers] when resolving *wh*-scope ambiguity” (Sawasaki & Kashiwagi-Wood, 2015; p. 521). This is exactly what was demonstrated in Lieberman, Aoshima, & Phillips (2006), in which L1 English speakers were able to successfully complete both direct and indirect questions correctly, indicating that they searched for the earliest possible location to place the question marker *ka*. Furthermore, they suggested that “these findings go beyond previous studies of ambiguity resolution in L2 research in which the preferred resolution of the ambiguity in the L2 involved a surface structure that has a close counterpart in the L1” (Lieberman, Aoshima, & Phillips, 2006, p. 438) Evidence that L1 English learners of L2 Japanese utilized similar processing strategies in interrogative sentences shows that L2 learners are able to incrementally process DPs in Japanese, which has also been reported in more recent studies. Mitsugi (2011) examined how L1 speakers and L2 learners processed sentences that have two accusative-marked DPs in a single clause (“the double-o constraint”). Because this type of sentence is ungrammatical in Japanese, the second ACC-

marked DP should induce longer reading times than the first ACC-marked DP. Recognition of ungrammatical sequences was not only observed among L1 speakers but also with L2 learners of typologically similar (Korean) and different (Chinese and English) L1 backgrounds. These studies have shown that L2 learners deploy similar retrieval operations in *wh*-phrases and demonstrate slowdown at ungrammatical points in the parse, signaling that L2 learners construct DPs incrementally instead of waiting until the end of the clause to make grammaticality decisions. Their results also verify that both L1 speakers and L2 learners are sensitive to case marking in Japanese when incrementally processing DPs.

There are some factors to consider in L1 and L2 processing of Japanese. Sawasaki (2007), who examined L2 Japanese processing of L1 speakers of Korean, Chinese, and English, argued that the L1 writing system affects some of the results in Japanese SPR tasks. He claimed that because L1 Chinese speakers have familiarity with kanji characters, they have an advantage of reading kanji over other learners, such as English and Korean L1s. The Korean writing system also uses Chinese characters (*hancha*), but Sawasaki notes that since *hangul* is more frequently used than *hancha*, L1 Koreans are supposedly less familiar with kanji characters than L1 Chinese. Taylor & Park (1995) also previously claimed that L1 Korean are faster at reading sentences that were only in *hangul* instead of a mixture of *hangul* and *hancha*, but that L1 Japanese are faster with sentences that are written with kanji and kana instead of hiragana only. Tamaoka (2015) further suggested that because L1 Chinese learners of L2 Japanese have specific advantages and disadvantages based on script similarity between Japanese and Chinese, studies with such participants need to control “phonologically similar/dissimilar words, kanji compounds with on- and kun-readings, and semantic differences between the two languages (p. 49). In sum, the argument is that it may not be reliable to compare L2 Japanese SPR results

between L1 Chinese and L1 Korean, because L1 Chinese would be faster at processing kanji than L1 Korean, but L1 Korean would be faster at processing kana script exclusively than L1 Chinese.

However, these arguments are rather problematic and ignore some of the essential objectives of sentence processing research. Within different L2 learners, it is entirely conceivable that certain L1ers will have an advantage over others – based on the arguments above, we may suggest L1 French and L1 German speakers have an advantage over L1 Japanese and L1 Chinese speakers in L2 English SPR tasks because of script familiarity with the roman alphabet. L1 influence is not surprising in other modes of skills, such as in speaking (we often compare how different L1 speakers produce L2 sounds), listening (L1-L2 sound perception), and writing (see Li & Martin, 2016, for a recent analysis on L1 orthographic influence on L2 writing in Japanese). It should also be noted that written script that is exclusively kana in Japanese is unnatural and more difficult to read than when both kana and kanji are used.

Therefore, while considering L1 background may have an influence on overall reading times, the objective of using SPR tasks in this dissertation is based on one of the main trademarks of this methodology, in that we are interested in examining at which point in the parse reveals a critical word or spillover effect as a result of ambiguity. Variation between L1 backgrounds, as well as different phrase lengths, can also be addressed by calculating for residual reading times of the data, as this would be already necessary given the morae, word, and phrase lengths slightly differ for each sentence type (see Ferreira & Clifton, 1986; Trueswell, Tanenhaus, & Garnsey, 1994, for further discussion on residual reading times). Marinis (2010, p. 156) notes that “the advantage of residual reading times is that it cancels out individual differences of speed between participants,” which would also address some of the issues of script

familiarity between L1 Korean and L1 Chinese. Even if raw reading times of Japanese sentences may differ between L1 Chinese and L1 Korean speakers, I believe that minor differences in reading profiles should not interfere with the overall objective of the SPR component of this dissertation, in which the focus is on how L1 speakers and L2 learners build DP structures pre-verbally, and in the process, how they bind reflexives to antecedents through the analysis of case and argument structure of the verb.

7.0 L2 ACQUISITION OF JAPANESE REFLEXIVES

In terms of the acquisition of reflexives, if L2 learners that have similar binding parameters and typologies in their L1, they should be able to acquire binding properties of the target language more successfully than speakers who do not have similar constraints. However, studies that have examined L2 acquisition of Japanese reflexives have not been able to conclusively demonstrate this. This is not restricted to only Japanese, as studies in Chinese, Korean, and English have also showed variable results in the acquisition and interpretation of reflexives.

The second part of this dissertation examines L2 acquisition of Japanese reflexives. As mentioned in the L1 study, most of the research in the L2 has also only focused on *zibun*, and only a very limited number of studies have examined L2 acquisition of *zibun-zisin* and *kare/kanozyo-zisin*. Thus, the studies that follow intend to fill the gap in the literature on L2 Japanese reflexives.

7.1 RESEARCH QUESTIONS

The following three studies and research questions were proposed in consideration with the aforementioned gaps in the previous research on L2 acquisition of reflexives. The first two are related to the truth-value judgment task and the third to the picture description task. References to the L1 results will be made when presenting the data, if necessary. As these were the same

tasks that were conducted by L1 Japanese speakers, the descriptions of the experiments will not be repeated in the subsequent sections (see Section 3.2 for a review). However, specific details of the methodology in relation to the L2 participants will be detailed below.

Study 4: Acquisition of Japanese reflexives: Examining binding patterns of L2 learners (L1 Korean and L1 Chinese).

- a. Will specific binding patterns (i.e., local vs. LD binding) emerge according to the binding constraints (subject orientation or locality constraints) of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, or will results show contradicting patterns?
- b. Will case and the predicate play a role in resolving ambiguity?
- c. Will L2 learners successfully reset their parameters to the target language or show effects of L1 transfer?

The goal of Study 4 is to examine how L2 learners of Japanese bind *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*. Presumably, there will be differences between the L1 and L2 groups, as much of the literature in L2 binding has suggested that L2 learners often fail to reset their L1 parameters; however, the previous research in L2 acquisition of Japanese reflexives has also produced a number of different results, from high degrees of L1 influence to virtually none. Therefore, the goal of this study is to also examine whether there are cross-linguistic differences in the acquisition of reflexives between the L1 Chinese and L1 Korean groups. The influence of case, predicate, and potential L1 transfer will also be addressed in this study.

Study 5: Processing of ambiguous sentences in Japanese.

- a. Will processing differ between *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*?
- b. Will certain case-marked reflexives induce longer processing times than other case markers?

- c. Will scrambling induce longer processing times of reflexives?

The goal of Study 5 is to examine how L2 learners process ambiguous sentences in Japanese. The previous research on L2 processing of Japanese has also produced mixed results – some have reported that advanced learners, as opposed to beginning learners, demonstrated native-like processing, while others have rejected this notion. The pilot experiments that were conducted for this dissertation showed that while L1 speakers were faster than L2 learners (a fairly obvious assumption), L2 learners processed sentences with certain case-marked reflexives faster than others (such as accusative-marked vs. nominative-marked *zibun*), and they processed mono-clausal sentences faster than multi-clausal ones, indicating that non-ambiguous sentences may be processed faster than ambiguous ones. These preliminary results require further investigation of additional data.

In addition, Sawasaki & Kashiwagi-Wood (2015), after most recently reviewing the available studies on L2 Japanese sentence processing, stated that there are “only a limited number of studies [that] have been done on L2 Japanese sentence processing, [and] there is great potential for future research and valuable contributions to the L2 field” (p. 537). Thus, the objective of the third study is to examine how L2 learners process ambiguous sentences that involve anaphoric pronouns, and also whether ambiguity, in general, leads to increased reading times.

Study 6: Picture description task

- a. Which reflexives will L2 learners use to describe situations that require local and LD binding?

Study 6 is the same experiment from Study 3, and the goal is to examine how L2 learners, use *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* when describing depicted situations from

a picture description task. Using a free production task should provide a greater understanding of how L2 learners use reflexives in descriptions. If L2 learners show similar results as L1 speakers, this would provide evidence for the ability to acquire abstract properties of complex elements in the target language.

7.2 METHODOLOGY

7.2.1 Participants

Data for the L2 study was collected from 58 L2 learners of Japanese: 18 adult native speakers of Korean (11 males and 7 females) and 40 adult native speakers of Chinese (25 males and 15 females). All L1 Korean and L1 Chinese speakers were recruited from four universities in Osaka and Tokyo, Japan. Background information was collected from each participant to determine basic demographic information, including length of Japanese study and study abroad experience in Japan from the L2 learners.

All L2 participants took a short Japanese language proficiency test to ensure comparability of the data across all institutions and L2 participants. The test was compiled of sample test questions from the Japanese Language Proficiency Test (JLPT). The JLPT is a standardized test that measures Japanese proficiency for non-native speakers on their reading, listening, vocabulary, and grammar knowledge. The JLPT is divided into five levels of proficiency, N1 to N5. The N1 level is the most advanced level and N5 is the novice level. Questions from the N2 and N3 level, which are considered to be intermediate-high and intermediate level, were selected for the proficiency test. A total of 20 grammar and vocabulary

questions were used for the proficiency test (see Appendix J) Any participant that failed to answer 50% of the questions correctly were excluded from the final analysis (based on the pass/fail mark for the N2 proficiency test which is at 50%) (JLPT, 2016). L1 Japanese participants were not required to take the proficiency test; however, 8 L1 Japanese speakers were asked to take the proficiency test as a control measure. Table 32 summarizes the basic demographic information of the L1 groups, and Table 33 shows the proficiency scores across institutions. Paired samples t-tests of the proficiency test scores confirms there are no statistical differences between any of the institutions and L2 learner groups.

Table 32. Demographic information of the L1 groups (numbers indicate averages)

<u>L1</u>	<u>Age</u>	<u>Length of study in Japan</u>	<u>Proficiency test score</u>
Japanese	19.3	--	19.625 / 20
Korean	22.3	1.78 years	17.22/20
Chinese	22.9	2.21 years	16.95/20

Table 33. Average Japanese proficiency scores by institution

<u>L1</u>	<u>Institution 1</u>	<u>Institution 2</u>	<u>Institution 3</u>	<u>Institution 4</u>
Korean	n/a	17.83/20	16.83/20	17.00/20
Chinese	16.96/20	16.91/20	n/a	n/a

Note: Institution 1 and 2 were in Osaka, and Institution 3 and 4 were in Tokyo

Participants who did not complete the tasks were not included in the final analysis. Any outliers from the initial data set were excluded before the final statistical analysis (no L2 participants scored below 50% on the proficiency test). Finally, all participants were compensated 1,500 Japanese yen for their participation in the data collection.

7.2.2 Materials

All L2 participants took the same truth-value judgment task and picture description task in Japanese (see 3.2.2 for a full description of Materials). To briefly review, each truth-value judgment task involved 60 sentences. Among the 60 sentences, 48 of them are of interest, and within them, 12 involved *zibun*, another 12 involved *zibun-zisin*, an additional 12 involved either *kare-zisin* or *kanozyo-zisin*, and 12 more consisted of a combination of three of the above reflexives as false sentences. 36 of the 48 sentences were multi-clausal and the remaining 12 were mono-clausal. After completion of the truth-value judgment task, L2 participants took the picture description task, as did the L1 participants. The same pictures from the L1 study were used in the L2 study as well.

7.2.3 Procedure

The same procedures that were conducted in the L1 study were applied to the L2 study. L2 participants either took the off-line traditional paper-and-pen task or the on-line Linger task. The stories and sentences appeared in random order on Linger, and were presented in 12pt MS Mincho font. No *furigana* (hiragana superscripts) were provided in the task (the vocabulary, grammar, and kanji selected for the task were appropriate for their proficiency level). The L2 learners of Japanese were given one hour and twenty minutes to complete the task. No participant went over the time limit (on average, L2 participants finished in approximately one hour). After the truth-value judgment task, the L2 participants took the picture description task. Those who took the on-line truth-value judgment task documented their answers on Microsoft Word 2013, but had the option of writing their answers on a separate blank paper if they were

not comfortable with typing in Japanese. Participants who took the off-line task wrote their answers at the end of the paper format of the truth-value judgment task. Again, they were explicitly instructed to use one of the reflexives – *zibun*, *zibun-zisin*, *kare-zisin*, or *kanozyo-zisin* – in their answers, but had a choice of using just one reflexive for all answers, or a combination of two, three, or all four of them in describing the different situations

8.0 L2 RESULTS

The results of the statistical analyses carried out from the L2 study are in the same order as the L1 results. First, the results from the truth-value judgment task are presented, followed by the self-paced reading data, and finally the picture description task. For the truth-value judgment task and self-paced reading task, descriptive statistics will be discussed first followed by statistical analyses for any reliable effects. Statistical analysis for the truth-value judgment task was conducted on IBM SPSS Statistics 24, and the alpha level was set at .05 for all tests, unless noted otherwise. The analysis of the reading time data in was conducted on R.

8.1 STUDY 4

Study 4 examines L2 acquisition of Japanese reflexives. The L1 Korean and L1 Chinese learners of L2 Japanese results will be presented together. To review, the following are the research questions raised in Study 4:

- a. Will specific binding patterns (i.e., local vs. LD binding) emerge according to the binding constraints (subject orientation or locality constraints) of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, or will results show contradicting patterns?
- b. Will case and the predicate play a role in resolving ambiguity?

- c. Will L2 learners successfully be able to reset their parameters to the target language, or will they transfer their L1 parameter values to the L2?

Table 34 and Table 35 show the overall accuracy scores by the L1 Korean and L1 Chinese for multi-clausal sentences divided by case markers (nominative, accusative, genitive, and dative) and local and LD binding of each reflexive. To review, the totals are reported by the mean accuracies per group (not individually), and the percentages provided in each cell represents the number of correct interpretations based on the context given. The n-size for each cell for L1 Korean is 18 and for L1 Chinese is 40.

Overall, the results show similar binding patterns not only between the two L2 learner groups but also compared with the L1 Japanese group. Both L2 learner groups accepted more sentences when *zibun* was bound to the LD subject over the local, and local binding over LD for *zibun-zisin* and *kare/kanozyo-zisin*. Among the L1 Koreans, they accepted 69.4% of the sentences when forced an LD binding interpretation of *zibun* and 51.4% of the sentences for local binding. For *zibun-zisin*, the L1 Koreans accepted 73.6% of the sentences when local-bound as opposed to 43.1% when LD-bound. For *kare/kanozyo-zisin*, they accepted substantially more LD-bound (75.0%) sentences than local-bound (19.4%). Among the L1 Chinese, they accepted 63.8% of the sentences when forced an LD binding interpretation of *zibun* and 58.9% when locally bound. For *zibun-zisin*, the L1 Chinese accepted 70.0% of the local-bound sentences and 48.1% when LD-bound. Finally, they accepted 66.3% of local-bound sentences with *kare/kanozyo-zisin* and 31.9% when LD bound. These results indicate that L2 learners of Japanese interpreted sentences with *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* similar to how L1 speakers of Japanese did. In particular, the L1 Chinese demonstrated more similar binding patterns, percentage-wise, to the L1 Japanese than the L1 Koreans did.

Table 34. L1 Korean accuracy rates for local/LD binding by case in the truth-value judgment task

<u>Reflexive</u>	<u>Binding</u>	<u>Total</u>	<u>Nominative</u>	<u>Accusative</u>	<u>Genitive</u>	<u>Dative</u>
<i>Zibun</i>	Local	51.4% (9.25)	72.2% (13)	38.9% (7)	61.1% (11)	33.3% (6)
	LD	69.4% (12.5)	50.0% (9)	88.9% (16)	77.8% (14)	61.1% (11)
<i>Zibun-zisin</i>	Local	73.6% (13.25)	94.4% (17)	88.9% (16)	55.6% (10)	55.6% (10)
	LD	43.1% (7.75)	27.8% (5)	55.6% (10)	44.4% (8)	44.4% (8)
<i>Kare/</i>	Local	75.0% (13.5)	66.7% (12)	77.8% (14)	88.9% (16)	66.7% (12)
<i>kanozyo-zisin</i>	LD	19.4% (3.5)	16.7% (3)	16.7% (3)	22.2% (4)	22.2% (4)

Table 35. L1 Chinese accuracy rates for local/LD binding by case in the truth-value judgment task

<u>Reflexive</u>	<u>Binding</u>	<u>Total</u>	<u>Nominative</u>	<u>Accusative</u>	<u>Genitive</u>	<u>Dative</u>
<i>Zibun</i>	Local	58.9% (23.5)	60.0% (24)	47.5% (19)	75.0% (30)	52.5% (21)
	LD	63.8% (25.5)	32.5% (13)	80.0% (32)	62.5% (25)	80.0% (32)
<i>Zibun-zisin</i>	Local	70.0% (28)	77.5% (31)	75.0% (30)	62.5% (25)	65.0% (26)
	LD	48.1% (19.25)	20.0% (8)	55.0% (22)	60.0% (24)	57.5% (23)
<i>Kare/</i>	Local	66.3% (26.5)	47.5% (19)	60.0% (24)	90.0% (36)	65.0% (26)
<i>kanozyo-zisin</i>	LD	31.9% (12.75)	30.0% (12)	32.5% (13)	35.0% (14)	27.5% (11)

In examining these results by case, the L1 Koreans accepted more local than LD subjects when *zibun* was marked by the nominative case (13 local to 9 LD), but more LD than local subjects for the other case markers (16 LD to 7 local for accusative, 14 LD to 11 local for genitive, and 11 LD to 6 local for dative). For *zibun-zisin*, they accepted more local than LD subjects across all case markers (17 local to 5 LD for nominative, 16 local to 10 LD for

accusative, 10 local to 8 LD for genitive, and 10 local to 8 LD for dative), and also for *kare/kanozyo-zisin* (12 local to 3 LD for the nominative case, 12 to 3 for the accusative, 16 to 4 for the genitive, and 12 to 4 for the dative).

On the other hand, the L1 Chinese exhibited slightly different patterns with *zibun*, and accepted more local, as opposed to LD, subjects when *zibun* was marked by the nominative (24 local to 13 LD) and genitive (30 local to 25 LD) cases. However, they accepted more LD subjects than local with accusative (32 LD to 19 local) and dative (32 LD to 21 local) cases. In turn, the binding results for *zibun-zisin* and *kare/kanozyo-zisin* showed similarities to the L1 Korean results. The L1 Chinese accepted local binding more than LD with these two reflexives regardless case marking. However, it should also be pointed out that the L1 Chinese also bind *zibun-zisin* with the LD subject over 50% of the time for accusative (55.0%), genitive (60.0%), and dative (57.5%).

Overall, case appears to play a role with the interpretation of *zibun* among L2 learners of Japanese just as it did with the L1 Japanese speakers, as there were specific patterns in accepted sentences between local and LD binding based on case markers, particularly with *zibun*. These results were submitted to ANOVA to test for statistical significance between local and LD accuracy based on case. For L1 Koreans, the differences between local and LD were significant with a case effect for *zibun*, $F(1, 17) = 11.537$, $p = .003$, but no case effect was found for *zibun-zisin* and *kare/kanozyo-zisin*. However, local and LD binding was significant for both *zibun-zisin*, $F(1, 17) = 18.204$, $p = .001$, and *kare/kanozyo-zisin*, $F(1, 17) = 65.385$, $p > .001$, without case as a factor. For L1 Chinese, the differences between local and LD were significant with a case effect for *zibun*, $F(1, 39) = 19.849$, $p > .001$, and *zibun-zisin*, $F(1, 39) = 9.863$, $p = .003$. No case effect was found for *kare/kanozyo-zisin*, but there was a significant bias for local binding

without case as a factor, $F(1, 47) = 29.094$, $p > .001$. Thus, the L1 Koreans and L1 Chinese significantly accepted more sentences with LD-bound *zibun* over local, and more local-bound *zibun-zisin* and *kare/kanozyo-zisin* than LD.

These results were submitted to another ANOVA to test for statistical significance between L1 background. The differences in local and LD binding of *zibun* were not significant with L1 as a factor, $F(1, 56) = 1.788$, $p = .187$, or with case as a factor, $F(1, 56) = .008$, $p = .929$. The ANOVA results of *zibun-zisin* were also not significant with L1 as a factor, $F(1, 56) = .657$, $p = .421$, or with case as a factor, $F(1, 56) = .013$, $p = .911$. However, the ANOVA results of *kare/kanozyo-zisin* revealed a difference in local and LD binding with L1 as a factor $F(1, 56) = 4.008$, $p = .050$, but a weak observed power, .503. A case effect was not found with *kare/kanozyo-zisin* between the two L2 learner groups, $F(1, 56) = .000$, $p = .988$. These results further indicate that both L1 Korean and L1 Chinese learners of L2 Japanese groups had similar interpretations of reflexives in multi-clausal sentences.

Table 36. Bonferroni post-hoc tests for multiple comparisons for local and LD binding

<u>L1 Korean</u>	<u>Case</u>	<u>Mean Difference</u>	<u>Binding Effect</u>	<u>Std. Error</u>	<u>p</u>
<i>Zibun</i>	Nominative	.222	None	.152	.163
	Accusative	-.500*	LD	.121	.001
	Genitive	-.167	None	.167	.331
	Dative	-.278	None	.158	.096
<i>Zibun-zisin</i>	Nominative	.667*	Local	.114	.000
	Accusative	.333*	Local	.140	.029
	Genitive	.111	None	.159	.495
	Dative	.111	None	.159	.495
<u>L1 Chinese</u>					
<i>Zibun</i>	Nominative	.275*	Local	.101	.010
	Accusative	-.325*	LD	.104	.003
	Genitive	.125	None	.120	.303
	Dative	-.275*	LD	.113	.020
<i>Zibun-zisin</i>	Nominative	.575*	Local	.101	.000
	Accusative	.200	None	.103	.058
	Genitive	.025	None	.121	.838
	Dative	.075	None	.090	.412

Note: The mean difference is significant at the .05 level

Table 36 shows Bonferroni post-hoc tests for multiple comparisons between local and LD binding for *zibun* and *zibun-zisin* (note that local binding was significant regardless of case for

kare/kanozyo-zisin, and Bonferroni post-hoc tests confirmed all case markers have a local bias). To review, a positive main difference indicates a bias for local binding and a negative main difference indicates LD binding. For the L1 Koreans, there were no main effects for binding when the nominative, $p = .163$, genitive, $p = .331$, and dative, $p = .096$, cases marked *zibun*, and when the genitive and dative cases, $p = .111$, marked *zibun-zisin*. The remaining results found a reliable interaction between case and local or LD binding: LD binding was significant with accusative case-marked *zibun* and local binding for nominative and accusative case-marked *zibun-zisin*. In turn, for the L1 Chinese, there were main effects for local binding when the nominative case marked *zibun*, $p = .010$, and *zibun-zisin*, $p > .001$, and also for LD binding when the accusative and dative cases marked *zibun*, $p = .003$, and $p = .020$, respectively. These results indicate that within *zibun*, L1 Korean and L1 Chinese demonstrate some differences in binding patterns based on the case particle that marks *zibun*. Figure 16 and Figure 17 illustrate these results from the multi-clausal sentences.

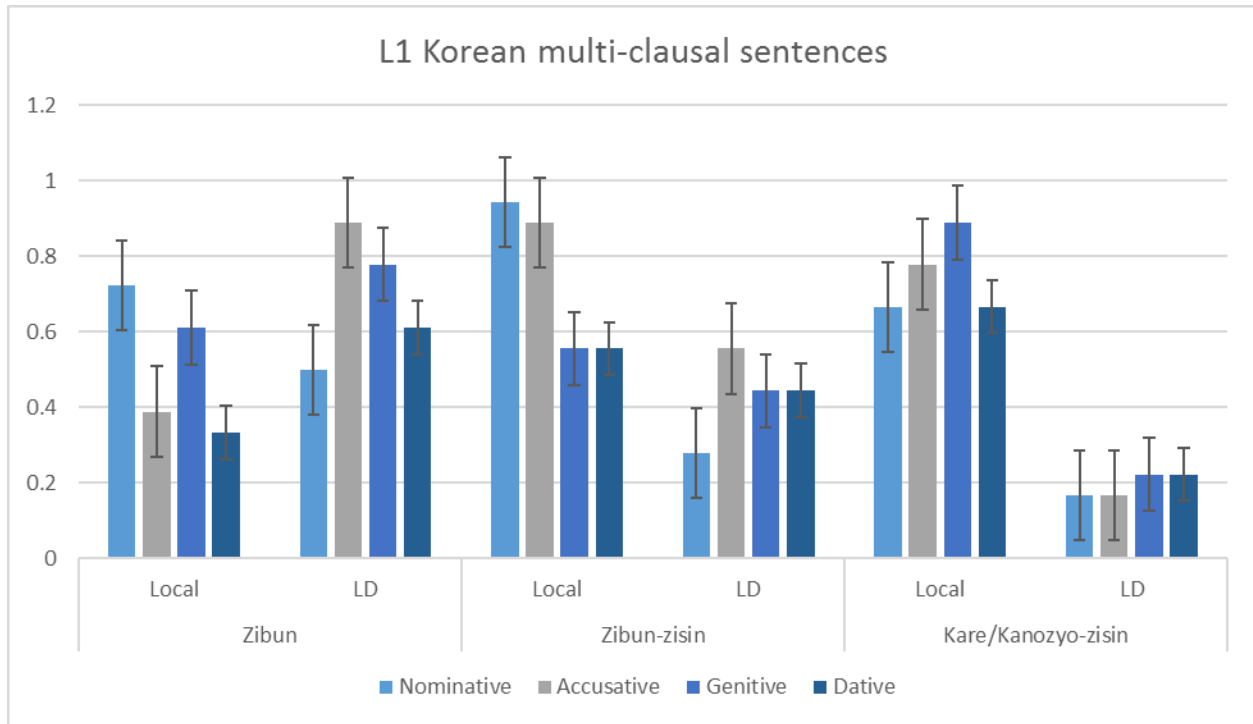


Figure 16. Illustration of L1 Korean results from multi-clausal sentences

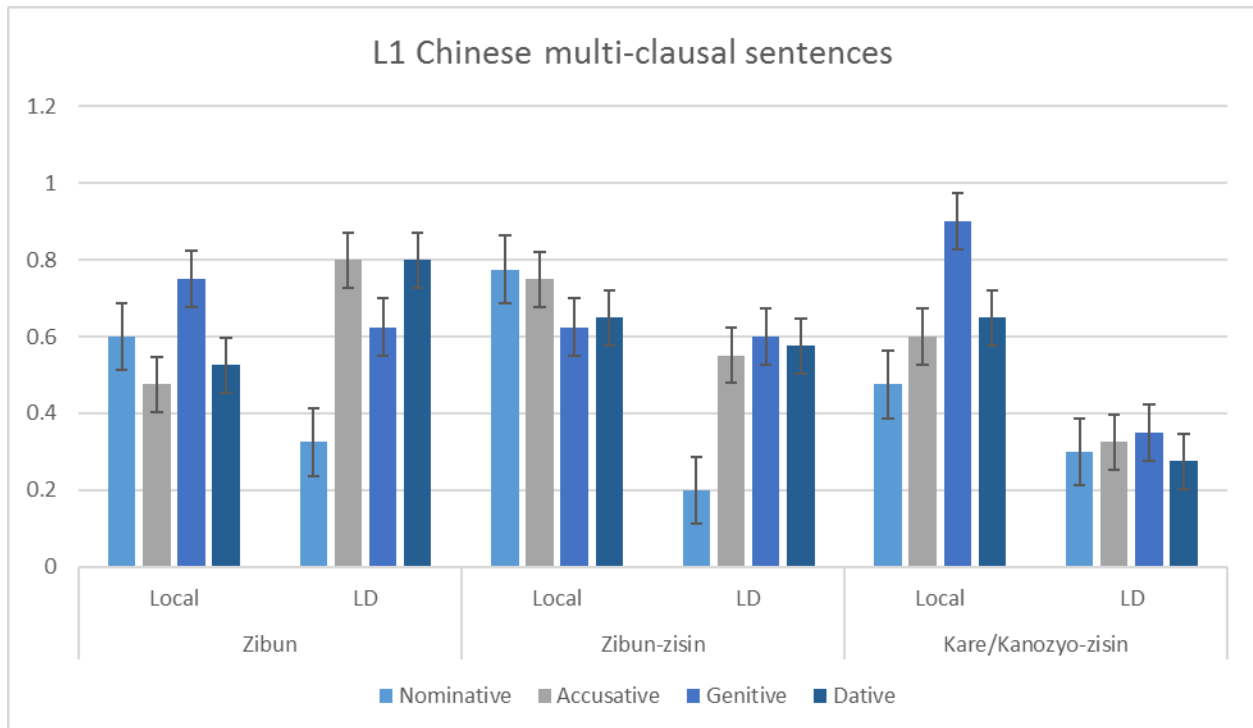


Figure 17. Illustration of L1 Chinese results from multi-clausal sentences

Next, the results were further examined by predicate type for each sentence, as shown in Table 37 and Table 38 (see Appendix D n-sizes of Table 37). Once again, most local and LD binding biases overlapped between the predicate and case-marked reflexive, but the predicate *zihusiteiru* (lit. believed) resulted in a substantial local binding bias across all three reflexives. As the L1 Japanese did, the majority of both L1 Korean and L1 Chinese participants rejected sentences when *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* were LD-bound and the object of *zihusiteiru* which indicates that the participants of the L2 learner groups not only demonstrate an understanding of the various binding properties of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, but also correctly identify which predicates block binding.

Table 37. L1 Korean predicate effects from Table 34

<u>L1 Korean</u>		<u>Zibun</u>		<u>Zibun-zisin</u>		<u>Kare/kanozyo-zisin</u>	
<u>Predicate</u>	<u>Case</u>	<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>
Showed	Nom	4 (50%)	7 (70%)	9 (90%)	5 (63%)	3 (38%)	3 (30%)
Believed	Nom	9 (90%)	2 (25%)	8 (100%)	0 (0%)	9 (90%)	0 (0%)
Blamed/criticized	Acc	4 (50%)	10 (100%)	9 (90%)	4 (50%)	9 (90%)	2 (25%)
Praised	Acc	3 (30%)	6 (75%)	7 (88%)	6 (60%)	5 (63%)	1 (10%)
Showed	Gen	3 (38%)	8 (80%)	5 (50%)	4 (50%)	8 (80%)	3 (38%)
Returned/went	Gen	8 (80%)	6 (75%)	5 (63%)	4 (40%)	8 (100%)	1 (10%)
Ordered	Dat	3 (38%)	6 (60%)	6 (60%)	4 (50%)	6 (75%)	2 (20%)
Bought	Dat	3 (30%)	5 (63%)	4 (50%)	4 (40%)	6 (60%)	2 (25%)

Table 38. L1 Chinese predicate effects from Table 35

<u>L1 Chinese</u>		<u>Zibun</u>		<u>Zibun-zisin</u>		<u>Kare/kanozyo-zisin</u>	
<u>Predicate</u>	<u>Case</u>	<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>
Showed	Nom	10 (50%)	11 (55%)	17 (85%)	7 (35%)	6 (30%)	10 (50%)
Believed	Nom	13 (65%)	2 (10%)	14 (70%)	2 (10%)	13 (65%)	3 (15%)
Blamed/criticized	Acc	9 (45%)	14 (70%)	14 (70%)	12 (60%)	17 (85%)	9 (45%)
Praised	Acc	10 (50%)	16 (80%)	17 (85%)	11 (55%)	7 (35%)	4 (20%)
Showed	Gen	14 (70%)	12 (60%)	12 (60%)	12 (60%)	19 (95%)	7 (35%)
Returned/went	Gen	15 (75%)	13 (65%)	14 (70%)	13 (65%)	17 (85%)	7 (35%)
Ordered	Dat	15 (75%)	15 (75%)	17 (85%)	12 (60%)	11 (55%)	6 (30%)
Bought	Dat	9(45%)	17(85%)	11 (55%)	13 (65%)	16 (80%)	5 (25%)

Next, Table 39 and Table 40 shows the overall accuracy scores for mono-clausal sentences divided by sentence type.⁵⁴ To clarify, the totals are the mean accuracies of the responses as a group. Once again, the accuracy scores were consistently high for subject binding

⁵⁴ N-sizes for Table 39:

L1 Korean:

Subject: Type A = 8, Type B = 10, Type C = 10, Type D = 8

Object: Type A = 9, Type B = 9, Type C = 9, Type D = 9

L1 Chinese:

Subject: Type A = 25, Type B = 19, Type C = 15, Type D = 21

Object: Type A = 15, Type B = 21, Type C = 25, Type D = 19

across all reflexives; however, the L1 Koreans and L1 Chinese rejected more sentences of object-bound *zibun* than the L1 Japanese did. When the reflexives referred to the subject in the mono-clausal sentences, L1 Koreans accepted 88.9% of the sentences with *zibun*, 91.7% of the sentences with *zibun-zisin*, and 86.1% of the sentences with *kare/kanozyo-zisin*. The majority of L1 Chinese also accepted subject-bound mono-clausal sentences: 82.5% of the sentences with *zibun*, 77.5% of the sentences with *zibun-zisin*, and 68.8% of the sentences with *kare/kanozyo-zisin*. When the reflexives referred to the object in the mono-clausal sentences, the L1 Koreans accepted only 16.7% of the sentences with *zibun*, 11.1% of the sentences with *zibun-zisin*, but 52.8% of the sentences with *kare/kanozyo-zisin*. The L1 Chinese also demonstrated similar binding patterns as the L1 Koreans for object-bound sentences, as they accepted only 17.5% of the sentences with *zibun*, 15.0% of the sentences with *zibun-zisin*, but 43.8% of the sentences with *kare/kanozyo-zisin*. These results suggest that L2 learners of Japanese exhibit L1 transfer effects of restricting binding *zibun* with only the subject, as they consistently rejected the sentences that involved object binding of *zibun*.

Table 39. L1 Korean results of mono-clausal sentences from the truth-value judgment task

<u>Reflexive</u>	<u>Binding</u>	<u>Total</u>	<u>Type A</u>	<u>Type B</u>	<u>Type C</u>	<u>Type D</u>
<i>Zibun</i>	Subject	88.9% (8)	100% (8)	100% (10)	70.0% (7)	87.5% (7)
	Object	16.7% (1.5)	22.2% (2)	22.2% (2)	0.0% (0)	22.2% (2)
<i>Zibun-zisin</i>	Subject	91.7% (8.25)	100% (8))	100% (10)	90.0% (9)	75.0% (6)
	Object	11.1% (1)	33.3% (3)	11.1% (1)	0.0% (0)	0.0% (0)
<i>Kare/</i>	Subject	86.1% (7.75)	75.0% (6)	100% (10)	100% (10)	62.5% (5)
<i>kanozyo-zisin</i>	Object	52.8% (4.75)	66.7% (6)	22.2% (2)	55.6% (5)	66.7% (6)

Table 40. L1 Chinese results of mono-clausal sentences from the truth-value judgment task

<u>Reflexive</u>	<u>Binding</u>	<u>Total</u>	<u>Type A</u>	<u>Type B</u>	<u>Type C</u>	<u>Type D</u>
<i>Zibun</i>	Subject	82.5% (16.5)	80.0% (20)	94.7% (18)	73.3% (11)	81.0% (17)
	Object	17.5% (3.5)	20.0% (3)	4.8% (1)	16.0% (4)	31.6% (6)
<i>Zibun-zisin</i>	Subject	77.5% (15.5)	64.0% (16)	89.5% (17)	80.0% (12)	81% (17)
	Object	15.0% (3)	20% (3)	23.8% (5)	0.0% (0)	21.1% (4)
<i>Kare/</i>	Subject	68.8% (13.8)	64.0% (16)	73.7% (14)	80.0% (12)	61.9% (13)
<i>kanozyo-zisin</i>	Object	43.8% (8.8)	60.0% (9)	9.5% (2)	56.0% (14)	52.6% (10)

Sentence type did not seem to have an effect in the interpretation of mono-clausal sentences for L2 learners as well, with one exception. Both L1 Korean and L1 Chinese groups substantially rejected object binding of *kare/kanozyo-zisin* in Type B (L1 Koreans accepted 22.2% of object-bound Type B sentences, and only 9.5% for L1 Chinese). This was a similar pattern that was found among L1 Japanese, which indicates that placement of the reflexive in scrambled structures has an effect in the interpretation of *kare/kanozyo-zisin* (recall that Type B is the only structure where the reflexive appears after the subject DP and before the object DP).

The total results from Table 39 and Table 40 were submitted to ANOVAs to test for statistical significance between subject and object binding accuracy between the different reflexives, and the differences were significant for both L1 Koreans, $F(1, 17) = 11.486$, $p = .003$ and L1 Chinese, $F(1, 39) = 16.530$, $p < .001$. Bonferroni post-hoc tests for multiple comparisons, as shown in Table 41, indicate that there is a significant preference for subject binding for all three reflexives with both L2 learner groups. These results show that both L1 Korean and L1 Chinese learners of L2 Japanese participants exhibited a significant bias for subject binding with all reflexives; however, it should be noted that the raw numbers showed that over 50% of the

Korean participants bound *kare/kanozyo-zisin* with the object, and almost half of the L1 Chinese participants (43.8%) did so as well. Figure X illustrates the results from mono-clausal sentences.

Table 41. Bonferroni post-hoc tests for multiple comparisons for subject-object binding (L1 Korean)

<u>L1 Korean</u>	<u>Reflexive</u>	<u>Mean Difference</u>	<u>Std. Error</u>	<u>p</u>
Subject vs. object	<i>Zibun</i>	1.611*	.205	.000
	<i>Zibun-zisin</i>	1.667*	.187	.000
	<i>Kare/kanozyo-zisin</i>	.778*	.226	.001
<u>L1 Chinese</u>				
Subject vs. object	<i>Zibun</i>	1.300*	.137	.000
	<i>Zibun-zisin</i>	1.250*	.126	.000
	<i>Kare/kanozyo-zisin</i>	.500*	.156	.003

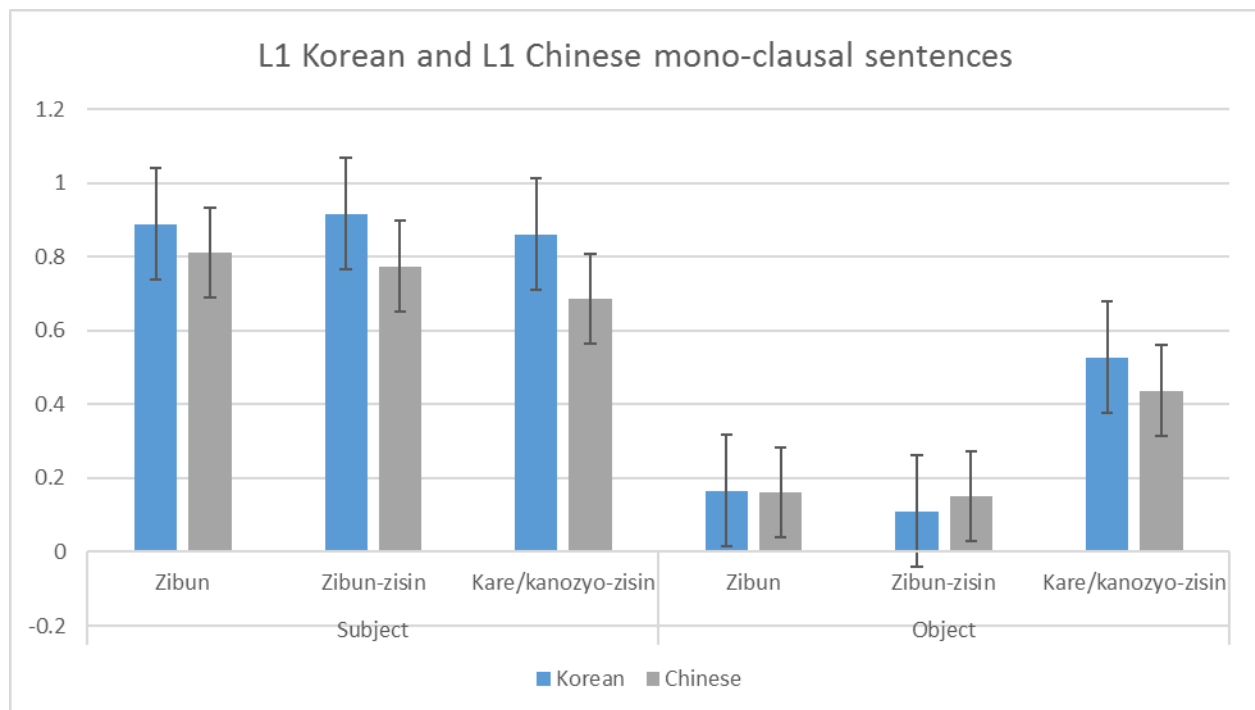


Figure 18. Illustration of L1 Korean and L1 Chinese results from multi-clausal sentences

Finally, the results from the mono-clausal sentences were submitted to an ANOVA to test for statistical significance between subject and object binding accuracy with L1 and reflexive type as factors. The differences were not significant with L1, $F(1, 56) = 3.722$, $p = .059$, and reflexive type, $F(1, 56) = .066$, $p = .789$, as factors. These results suggest that both L1 Korean and L1 Chinese have similar binding behavior in mono-clausal sentences.

Overall, the results from multi- and mono-clausal sentences showed similar binding patterns among the L1 Korean and L1 Chinese participants, which, as mentioned earlier, suggests that L1 background does not play a significant role in acquisition and interpretation of Japanese reflexives.

8.2 STUDY 5

Study 5 examines how L2 learners process ambiguous sentences by analyzing reading profiles from the SPR task. The objective is to examine how L2 learners process ambiguity in Japanese, and whether L2 learners demonstrate sentence processing behavior that is similar to or different from L1 speakers, not if they are as faster or slower than L1 speakers. The research questions that were raised in Study 5 are repeated below:

- a. Will processing differ between *zibun*, *zibun-zisin*, and *kare/kanozoyo-zisin*?
- b. Will certain case-marked reflexives induce longer processing times than other case markers?
- c. Will scrambling induce longer processing times of reflexives?

Among the participants, 8 L1 Korean, and 20 L1 Chinese took the truth-value judgment task on Linger. However, because there were only 4 Korean participants for each test form, their

data were not included for the SPR analysis. Reading profiles were once again converted to residual reading times in order to reduce individual differences in overall reading speed. Before residual reading times were calculated, the same data trimming procedures were conducted for the L2 data. Response times that were two deviations removed from the mean response time within their L1s were eliminated. In total, 3.78% of the L1 Chinese data were removed for the final analysis.

The results for this section are divided between multi-clausal sentences and mono-clausal sentences, just as the L1 Japanese results were, in order to examine for case and scrambling effects. First, Table 42 (*zibun*), Table 43 (*zibun-zisin*), and Table 44 (*kare/kanozyo-zisin*) present the residual reading times of multi-clausal sentences divided by local and LD binding. The regions of interest for this analysis are the critical region, spillover region, and wrap-up regions. To review, the critical region for all sentences was located in region (3) and the spillover region was located in region (4), and the wrap-up regions are in regions (5) through (8) (see Section 3.2.2.2 for how the wrap-up regions were divided based on sentence type). The objective of examining these regions were to examine whether the L2 learners are able to demonstrate similar processing strategies in disambiguating sentences with anaphoric elements in the target language.

Table 42. Residual reading times of multi-clausal sentences with *zibun* (ms)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	-32.3	114.1	233.8	-53.2	-75.3	-194.6	-141.3
	Believed	59	-95.3	247.3	-61	112.9		
Acc	--	-42.3	50.8	279.7	-161.6			
Gen	Showed	-33.3	-115.9	262.1	-54.9	-85.9	16.6	-105.6
	Returned	-25.8	-117.3	8	-75.9	-109.8		
Dat	--	-177.2	34.4	-50.3	19.4	-221.5		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	-96.2	415.1	87.9	24.3	-122	96.1	-133.6
	Believed	252.9	144.1	639.4	356.8	89.2		
Acc	--	-11.7	162.2	-56.3	-38.6			
Gen	Showed	-58.8	355.2	1.7	-65.6	58.7	42.6	45.9
	Went	-65.6	-126.6	48	155.6	-110.3		
Dat	--	-126.6	8.6	-128.8	-70.1	155.3		

Table 43. Residual reading times of multi-clausal sentences with *zibun-zisin* (ms)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	67.8	-41.6	-123.3	-141.5	-35.4	-210.1	-275.3
	Believed	-76.3	-162.4	156.1	210.9	60.1		
Acc	--	16.9	-77.5	102.4	-142.6			
Gen	Showed	1.9	128.8	521	112.7	88.4	30.8	-216.8
	Returned	-55.3	-6.5	68	-57.2	-66.6		
Dat	--	-53.1	61.2	-67.9	-172.8	-205.1		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	-11.4	46.2	-101.8	88	12.7	-133.5	-197.1
	Believed	283.2	121.8	162.6	-19	-116	283.2	121.8
Acc	--	138.4	119.0	37.0	10.0			
Gen	Showed	-84.5	498.2	99.1	101.7	-30.4	72	64.2
	Went	-47.6	-87.6	-205.9	-13.6	-184.8		
Dat	--	-159.0	52.8	-94.1	212.5	-201.2		

Table 44. Residual reading times of multi-clausal sentences with *kare/kanozyo-zisin* (ms)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	52.2	339.1	202.1	-110.3	213.3	-26.5	-122.8
	Believed	-46	25.1	164.6	-45.9	35.2		
Acc	--	-101.2	149.0	305.8	-243.7			
Gen	Showed	276.7	-98	-6.8	-137.1	130.2	26.5	0.5
	Returned	-151.2	259.6	-5.1	-219.8	-303.3		
Dat	--	-17.3	361.9	208.5	-102.6	-187.4		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	191.9	376	-29.5	-182.3	104.2	-135	-299
	Believed	19.6	496.3	-219.6	-90.6	-134.6		
Acc	--	25.8	316.0	1.9	-120.5			
Gen	Showed	29.9	651.2	242.8	107.9	40.4	105.7	-72.5
	Went	65.3	410.8	-102.8	-111.3	-231.6		
Dat	--	-31.5	463.1	261.7	157.3	-311.0		

Overall, the results show that the L1 Chinese exhibited more increased reading times in the spillover and wrap-up regions, as opposed to the critical region, in sentences with *zibun* and *zibun-zisin*, but *kare/kanozyo-zisin* induced considerably more critical region effects compared to the other regions. In sentences with *zibun*, increased reading times occurred in the critical region when *zibun* was marked by the nominative case in both local- and LD-bound sentences, and also when *zibun* was marked by the genitive case but only in LD-bound sentences. In addition, the accusative case induced increased reading times for *zibun* in the spillover region when local-

bound, and in the critical region when LD-bound. In short, the results from *zibun* shows much variability in where the main effects occurred, but there were more main effects in LD-bound sentences with *zibun* as opposed to local-bound.

In the sentences with *zibun-zisin*, there were surprisingly less instances of increased reading times than *zibun*. Critical region effects were detected only in sentences with genitive case-marked *zibun-zisin* and when the VP was *hihansita*; reading profiles from the same sentence but with nominative case-marked *zibun-zisin* did not incur any increased reading times. Some main effects can be found in other regions; however, overall, the L1 Chinese appeared to have more ease in processing sentences with *zibun-zisin* than *zibun*.

Finally, sentences with *kare/kanozyo-zisin* induced a substantial amount of main effects in the critical region. Overall, critical region effects were found in all LD bound sentences with *kare/kanozyo-zisin* and all but two sentence types that were locally bound. In the two sentences that did not incur a critical region effect, main effects occurred in the spillover and wrap-up regions. These results with *kare/kanozyo-zisin* clearly show that L1 Chinese displayed considerable processing slowdown at the critical region, especially when these sentences were LD-bound. In many cases, they also showed sustained increased reading times throughout the remaining segments of the sentences; e.g., dative case marked *kare/kanozyo-zisin* showed increased reading times in the spillover region.

In summarizing the results from *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* in multi-causal sentences together, the results showed that L1 Chinese had most difficulty in processing sentences with *kare/kanozyo-zisin* over *zibun* and *zibun-zisin*. In addition, these results indicate that L1 Chinese demonstrated different processing strategies with *kare/kanozyo-zisin* – more main effects were found in the critical regions in sentences with *kare/kanozyo-zisin* than in

sentences with the other two reflexives, which mainly induced main effects in the spillover and wrap-up regions.

Next, Table 46 and Table 47 presents the residual reading times from the mono-clausal sentences. Again, these sentences are divided by subject- and object-bound sentences in order to analyze scrambling effects. To review, the regions of interest are the critical, spillover, and wrap-up regions. Table 45 below shows how the regions were divided by sentence type:

Table 45. Example stimuli of mono-clausal sentences divided by regions used in SPR task

<u>Sentence Type</u>	<u>Initial (1)</u>	<u>Pre-critical (2)</u>	<u>Critical (3)</u>	<u>Spillover (4)</u>	<u>Wrap-up (5)</u>
A (Standard)	DP-TOP	DP-DAT	<i>Self</i> -GEN	DP-ACC	VP
C	DP-DAT	DP-TOP	<i>Self</i> -GEN	DP-ACC	VP
	<u>Initial (1)</u>	<u>Critical (2)</u>	<u>Spillover (3)</u>	<u>Wrap-up (4)</u>	<u>Wrap-up (4)</u>
B	DP-TOP	<i>Self</i> -GEN	DP-ACC	DP-DAT	VP
D	DP-DAT	<i>Self</i> -GEN	DP-ACC	DP-TOP	VP

To review, Type A and Type C have similar structures where the reflexive appears after the subject DP and object DP, but Type C is scrambled because the object DP appears before the subject DP. In Type B and Type D, the reflexives appear between the subject DP and object DP. Thus, the critical region is in region 3 for Type A and Type C, and in region 2 for Type B and Type D. The spillover and wrap-up regions are the same for Type A and Type C. In Type B, the object DP appears in region 4, whereas the subject DP appears in the same region in Type D.

First, let us examine the results from subject-bound mono-clausal sentences. The results from sentences with *zibun* show no critical region effects in any of the sentence types but increased reading times occurred in the wrap-up region of Type D. In sentences with *zibun-zisin*, increased reading times occurred in the critical regions of Type B and Type C and a slight

spillover effect in Type D. Critical region effects occurred in all sentence types with *kare/kanozyo-zisin*, and another spike in reading time was detected in the wrap-up region (4) of Type D. Overall, the results from subject-bound sentences show that L1 Chinese demonstrated similar binding patterns as L1 Japanese did when the reflexive was *zibun*, but increased reading times were more prevalent when the reflexives were *zibun-zisin* and *kare/kanozyo-zisin*.

In the results from object-bound mono-clausal sentences, the L1 Chinese displayed more processing breakdowns than they did in subject-bound sentences. In sentences with *zibun*, the L1 Chinese participants again exhibited increased reading times in the wrap-up regions of Type D sentences, but also increased reading times in Type A (critical region) and Type C (pre-critical, critical, and wrap-up region). These reading profiles from *zibun* alone suggest that L1 Chinese had considerable difficulty in processing object-bound mono-clausal sentences in Japanese.

Processing difficulties persisted in sentences with *zibun-zisin* and *kare/kanozyo-zisin* as increased reading times were detected in a number of regions. Going through these sentences in order of reflexive and sentence types, in sentences with *zibun-zisin*, Type A induced increased reading times in the wrap-up region, Type B had a marginal spillover region effect, and Type C and Type D had recurring up and down reading times from the initial through wrap-up regions. The reading times in sentences with *kare/kanozyo-zisin* were more straightforward, for which maximum reading times occurred in the critical regions for all sentence types. These results indicate that L1 Chinese demonstrated processing slowdown upon encountering *kare/kanozyo-zisin*, but had more difficulty in processing sentences as a whole with *zibun-zisin*.

In summarizing the results from mono-clausal sentences, the L1 Chinese participants clearly had more difficulty in processing object-bound sentences as opposed to subject-bound, and more processing breakdowns occurred in sentences with polymorphic reflexives as

opposed to monomorphemic. In general, they showed similar processing patterns as L1 Japanese with subject-bound sentences with *zibun*, but major processing breakdowns occurred in a number of different regions in sentences with *zibun-zisin* and *kare/kanozyo-zisin*. They particularly exhibited processing difficulties in sentences with *zibun-zisin* as increased reading times were prevalent across multiple regions. Finally, critical regions effects were found in almost all sentences, both subject- and object-bound, with *kare/kanozyo-zisin*.

Table 46. Residual reading times of subject-bound mono-clausal sentences (ms)

<u>Reflexive</u>	<u>Sentence</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
<i>Zibun</i>	A	-143.4	-98.2	61.8	-111.2	-164.4
	B	-206.8	-130.7	-213.9	61.6	-40.5
	C	-4.8	89.4	40.4	80.6	-118.5
	D	80.9	-61.2	-56.7	358.5	213.8
<i>Zibun-zisin</i>	A	-105.6	-7.2	39.1	-179.0	-218.6
	B	-78.5	171.8	-128.8	-104.7	-67.9
	C	-110.5	-44.0	187.4	-46.5	-273.0
	D	0.4	3.8	133.4	-20.9	117.9
<i>Kare/</i>	A	88.4	26.9	171.2	44.5	-226.3
<i>Kanozyo-zisin</i>	B	-215.4	267.7	-188.9	39.4	-279.5
	C	95.3	24.2	362.3	-192.1	-141.7
	D	-69.1	151.2	122.1	282.1	4.0

Table 47. Residual reading times of object-bound mono-clausal sentences (ms)

<u>Reflexive</u>	<u>Sentence</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
<i>Zibun</i>	A	-125.7	-22.3	379.6	-56.9	-294.6
	B	-55.8	7.5	16.9	-238.5	-252.1
	C	44.8	209.7	125.2	-134.1	129.7
	D	42.6	-24.7	36.4	349.0	448.2
<i>Zibun-zisin</i>	A	41.4	-161.5	-90.6	-74.6	172.3
	B	52.1	63.7	118.7	-99.2	-248.8
	C	100.2	152.2	186.0	1.4	72.9
	D	196.8	74.9	324.5	342.8	156.1
<i>Kare/</i>	A	-115.6	-86.1	903.8	-185.6	74.7
<i>Kanozyo-zisin</i>	B	-134.7	556.0	-13.9	10.4	-286.9
	C	70.2	142.6	270.3	-100.3	-108.1
	D	46.5	484.7	-2.6	163.2	387.3

8.3 STUDY 6

Study 6 examines how L2 learners select reflexives when describing situations from a picture description task, and whether any local and LD binding patterns emerge based on the reflexive.

To review, the following the research question was raised in Study 6:

- a. Which reflexives will L2 learners use to describe situations that require local and LD binding?

Table 48 shows the overall results from the picture description task. The results for *kare/kanozyo-zisin* were again combined for this table. Overall, the majority of the patterns of reflexive selection by L2 learners were similar from L1 speakers. All L2 participants selected *zibun* the most (41.7% by L1 Korean, and 41.7% by L1 Chinese), followed by *kare/kanozyo-zisin* (31.4% by L1 Korean, and 29.2% by L1 Chinese), and *zibun-zisin* (25.0% by L1 Korean, and 20.8% by L1 Chinese).

Table 48. Overall L2 results from the Picture Description Task

Reflexive	<u>Korean (n = 108)</u>	<u>Chinese (n = 240)</u>
<i>Zibun</i>	45 (41.7%)	100 (41.7%)
<i>Zibun-zisin</i>	27 (25.0%)	50 (20.8%)
<i>Kare/kanozyo-zisin</i>	34 (31.4%)	70 (29.2%)
<i>Kare-zisin</i>	17 (15.7%)	37 (15.4%)
<i>Kanozyo-zisin</i>	17 (15.7%)	33 (13.8%)
Other/no reflexive	20 (8.3%)	2 (1.9%)

Next, the results were examined by picture type. Pictures A and B were compared together (Table 49), as were Pictures C and D (Table 50) and Pictures E and F (Table 51). First, Table 49 shows the results from Picture A and B. The results from Picture A show that the L1 Korean participants selected *zibun* the most (61.1%), followed by *zibun-zisin* and *kare-zisin* (both selected at 16.7%). In turn, the L1 Chinese participants used the pronoun-reflexive form, *kanozyo-zisin* the most to describe Picture A (50.0%), followed by *zibun* (32.5%), and finally *zibun-zisin* (5.0%). This was an interesting pattern because among the three L1 groups the L1

Koreans rejected object-bound sentences of *zibun* the most in the truth-value judgment tasks, but *zibun* was selected the most in the free production task.

Table 49. L2 Picture A and B results

Picture A: Yuji showed Natsuko a photograph of <i>self</i> . (Object binding)				
Picture B: Natsuko showed her friend at the library a photograph of <i>self</i> . (Subject binding)				
	<u>Picture A</u>		<u>Picture B</u>	
<u>Reflexive</u>	<u>Korean</u>	<u>Chinese</u>	<u>Korean</u>	<u>Chinese</u>
<i>Zibun</i>	11 (61.1%)	13 (32.5%)	8 (44.4%)	14 (35.0%)
<i>Zibun-zisin</i>	3 (16.7%)	2 (5.0%)	2 (11.1%)	13 (32.5%)
<i>Kare-zisin</i>	1 (5.6%)	1 (2.5%)	0 (0%)	2 (5.0%)
<i>Kanozyo-zisin</i>	3 (16.7%)	20 (50.0%)	8 (44.4%)	8 (20.0%)
Other	0 (0%)	4 (10.0%)	0 (0%)	3 (7.5%)

The results from Picture B show that all L2 learners used a variety of reflexives to refer to the subject ‘Natsuko,’ but the patterns differed between the two learner groups. The L1 Korean used *zibun* and *kanozyo-zisin* equally the most (44.4%), followed by *zibun-zisin* (11.1%). On the other hand, the L1 Chinese also used *zibun* (35.0%) the most, but also *zibun-zisin* (32.5%) at a comparable rate. *Kanozyo-zisin* was selected the least (20.0%), which contradicts not only with the L1 Korean group, but also with the L1 Japanese group that selected *zibun* and *kanozyo-zisin* the most in their descriptions of Picture B.

Table 50. L2 Picture C and D results

Picture C: Alice told her friend that Shinji bought a Nintendo DS for *self*. (Local binding)

Picture D: Manami told her friend that Keisuke bought an iPad for *self*. (LD binding)

	<u>Picture C</u>		<u>Picture D</u>	
<u>Reflexive</u>	<u>Korean</u>	<u>Chinese</u>	<u>Korean</u>	<u>Chinese</u>
<i>Zibun</i>	4 (22.2%)	14 (35.0%)	11 (61.1%)	19 (72.5%)
<i>Zibun-zisin</i>	7 (38.9%)	11 (27.5%)	1 (5.6%)	2 (5.0%)
<i>Kare-zisin</i>	7 (38.9%)	12 (30.0%)	0 (0%)	1 (2.5%)
<i>Kanozyo-zisin</i>	0 (0%)	1 (2.5%)	5 (27.8%)	4 (10.0%)
Other	0 (0%)	2 (5.0%)	1 (5.6%)	4 (10.0%)

Turning our attention to local and LD binding, Table 50 shows the results from Picture C and Picture D. Picture C (local binding) shows that both L1 Korean and L1 Chinese participants used a range of reflexives for local binding descriptions, but with different frequencies. The L1 Korean selected both *kare-zisin* and *zibun-zisin* equally the most (38.9%), followed by *zibun* (22.2%). In turn, the L1 Chinese selected *zibun* (35.0%) the most, followed by *kare-zisin* (30.0%) and *zibun-zisin* (27.5%). Though the patterns of selection slightly vary, the results show that L2 learners still used a variety of reflexives for local binding, as was demonstrated by the L1 Japanese. In turn, the results from Picture D (LD binding) show that all L2 learners used *zibun* the most when referring to the LD antecedent (61.1% by L1 Korean and 72.5% by L1 Chinese). While the L1 Koreans used *kanozyo-zisin* (27.8%) more than the L1 Chinese (10.0%), the overall results from Picture D show that *zibun* is the preferred reflexive for describing LD binding situations, just as what the L1 Japanese demonstrated in Picture D.

In Table 51, the results from Picture E (local binding) show some different patterns in reflexive usage from Picture C, but Picture F (LD binding) shows very similar patterns as Picture D. In Picture E, *zibun-zisin* was selected the most by L1 Korean (72.2%) and followed by *kare-zisin* (27.8%). *Zibun* was not selected by any of the L1 Korean participants. In turn, L1 Chinese used *kare-zisin* at the highest rate (40.0%), followed by *zibun-zisin* (32.5%), and *zibun* (17.5%). In Picture F, both L2 learner groups selected *zibun* the most when referring to the LD antecedent (77.8% for L1 Korean and 57.5% for L1 Chinese). *Zibun-zisin* was used by 11.1% of the L1 Korean and 22.5% of the L1 Chinese, and finally *kare-zisin* was selected by 11.1% of L1 Korean, and 12.5% of L1 Chinese. The overall results from Picture E and Picture F confirmed that L2 learners use a variety of reflexives for local binding, but select *zibun* substantially more than the other reflexives for LD binding.

Table 51. L2 Picture E and F results

Picture E: Yuji told Natsuko that Keisuke voted for <i>self</i> . (Local binding)				
Picture F: Shinji told Taro that Yuji voted for <i>self</i> . (LD binding)				
	<u>Picture E</u>		<u>Picture F</u>	
<u>Reflexive</u>	<u>Korean</u>	<u>Chinese</u>	<u>Korean</u>	<u>Chinese</u>
<i>Zibun</i>	0 (0%)	7 (17.5%)	14 (77.8%)	23 (57.5%)
<i>Zibun-zisin</i>	13 (72.2%)	13 (32.5%)	2 (11.1%)	9 (22.5%)
<i>Kare-zisin</i>	5 (27.8%)	16 (40.0%)	2 (11.1%)	5 (12.5%)
<i>Kanozyo-zisin</i>	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Other	0 (0%)	4 (10.0%)	0 (0%)	3 (7.5%)

These results show that for the most part the L1 Korean and L1 Chinese learners of L2 Japanese selected reflexives appropriately to describe local and LD binding situations. They used

zibun more than the other reflexives in LD binding situations and used the other reflexives more often in local binding. However, these were some instances from the results in Picture D and Picture F where the choice of reflexives violated the Japanese grammar. For example, L1 Koreans selected *kanozyo-zisin* 27.8% of the time for LD binding in Picture D and selected *kare-zisin* 11.1% of the time in Picture F. The L1 Chinese were slightly more accurate, as they selected *kanozyo-zisin* only 10% of the time in Picture D, and 12.5% in Picture F. It should also be noted, though, that the ‘other’ category also consisted of *kare/kanozyo* forms as well, but these were of incorrect forms (such as, *kare-zibun* or *kanozyo-zibun*), and thus were categorized as ‘other’.

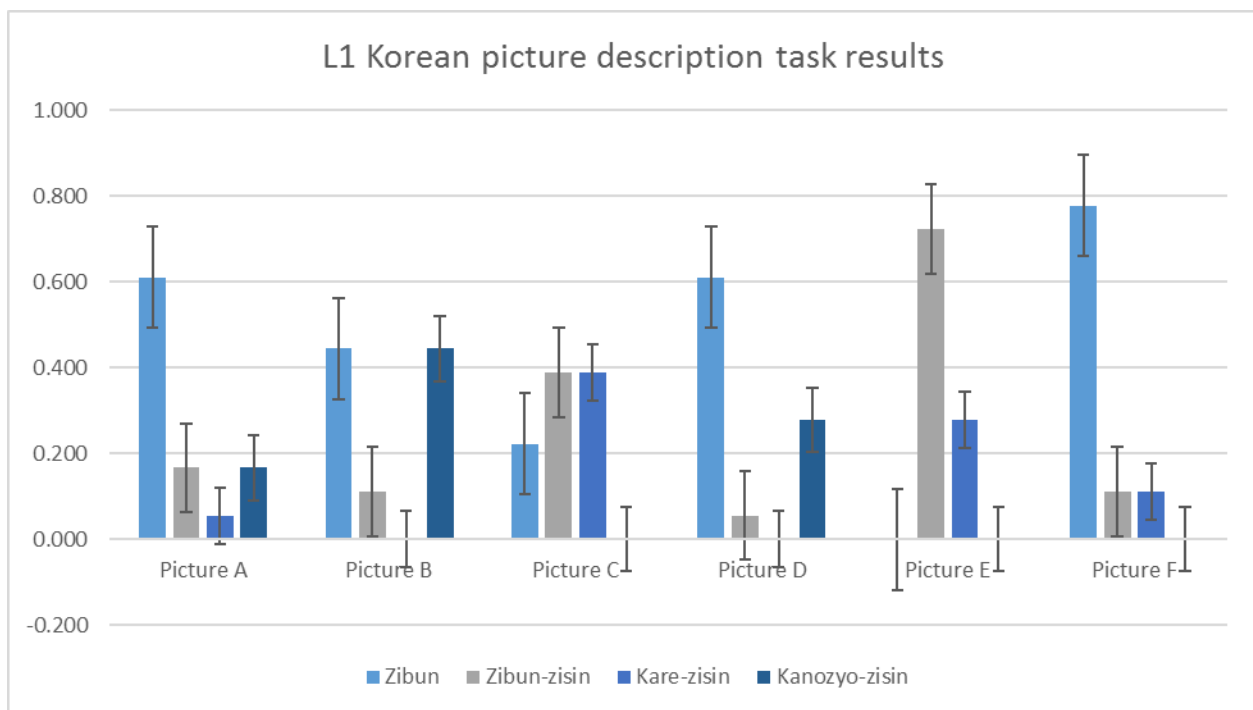


Figure 19. Illustration of L1 Korean results from the picture description task

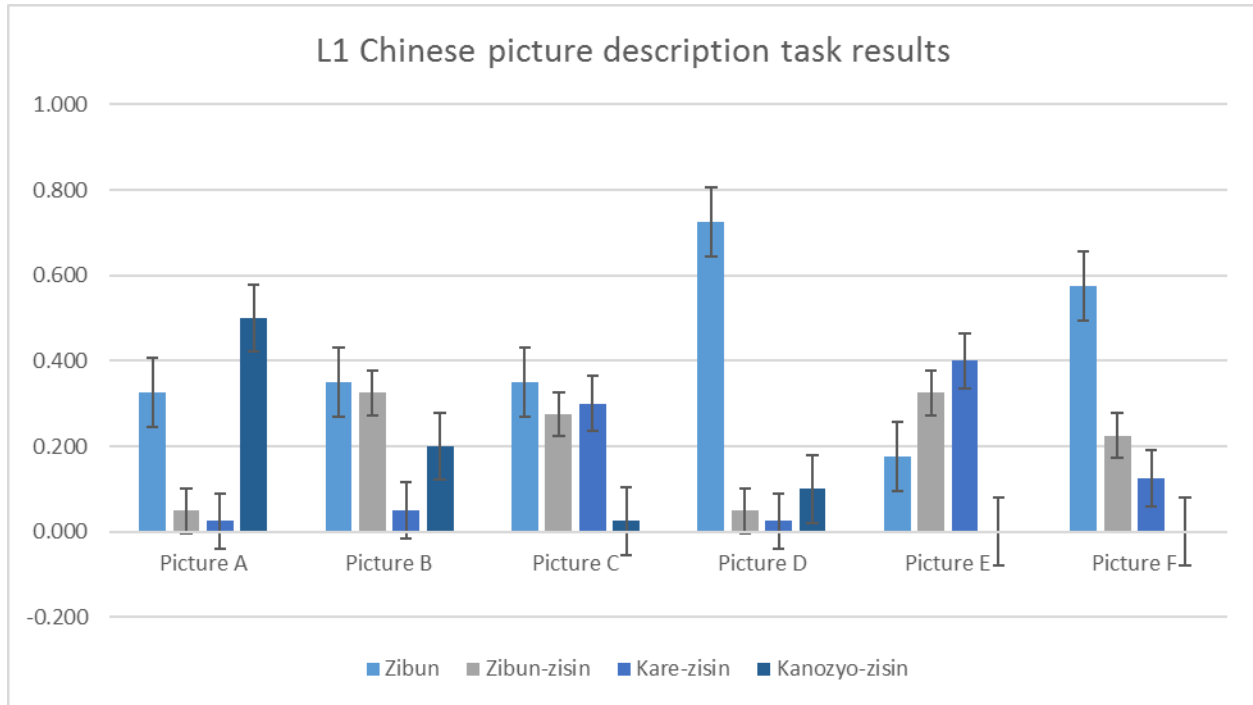


Figure 20. Illustration of L1 Chinese results from the picture description task

Figure 19 and Figure 20 illustrate the results from the picture description task. These figures clearly exhibit the differences in selection of reflexives between local (Picture C and Picture E) and LD (Picture D and Picture F). The results from Table 49, Table 50, and Table 51 were submitted to chi-squared analysis to test for statistical significance of reflexive use. For the L1 Koreans, the difference in reflexive use in Pictures A and B was not significant, $X^2(2, N=18) = 2.007, p = .367$, but were significant between Pictures C and D, $X^2(2, N=18) = 23.352, p < .001$, and Pictures E and F $X^2(2, N=18) = 11.995, p < .005$. The results for L1 Chinese were significant for all three picture sets: $X^2(2, N=40) = 11.995, p < .005$ for Pictures A and B, $X^2(2, N=40) = 14.976, p < .001$ for Pictures C and D, and $X^2(2, N=40) = 15.012, p < .001$ for Pictures E and F. These results show that while both L1 Korean and L1 Chinese have similar patterns in reflexive selection between local and LD binding descriptions, L1 Korean show less bias of reflexive selection for subject-object binding situations.

9.0 DISCUSSION OF THE L2 RESULTS

The discussion of the data, in relation to the research questions, are organized by the following. First, the results from the truth-value judgment task in Study 4 are discussed, followed by the results from the SPR task in Study 5, and the picture description task in Study 4. The discussion will focus on how L2 learners of Japanese interpret, process, and use *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, and whether they successfully acquired binding in Japanese reflexives. As a reminder, the discussion on the SPR data will only include the L1 Chinese group, but discussions of the truth-value judgment task and picture description task will include analysis of both L1 Korean and L1 Chinese groups. These results are compared to the L1 results (see Section 4.0 for L1 results) when necessary.

9.1 TRUTH-VALUE JUDGMENT TASK

The results from the truth-value judgment task show both L2 learner groups demonstrate interpretations of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* that are in many ways similar to the way L1 Japanese speakers interpret these reflexives. While the exact percentages slightly differ, in multi-clausal sentences, both L1 Korean and L1 Chinese groups accept more LD-bound, as opposed to local-bound, sentences with *zibun*, and more local-bound sentences with *zibun-zisin* and *kare/kanozyo-zisin*. They also correctly reject object binding *zibun-zisin* and for the most

part accept both subject and object binding of *kare/kanozyo-zisin*. However, they significantly reject object-bound sentences with *zibun*, which happens to be the only, but crucial, difference between L1 speakers and L2 learners of Japanese.

Within the multi-clausal sentences, the data from *zibun* show that case plays a role in L2 interpretations of local and LD binding. While L1 Koreans exhibit less reliable effects of case than L1 Chinese, the raw percentages show that L1 Koreans display the same patterns as the L1 Japanese – they accept more LD binding than local of *zibun* when the accusative, genitive, and dative cases mark the reflexive, but more local with the nominative case. The L1 Chinese also display similar patterns; even though they reject more LD than local sentences when the genitive case marks *zibun*, the difference is not significant. Thus, the evidence from *zibun* in multi-clausal sentences shows that case plays an important role in the interpretation of *zibun*-binding.

While case does not play as significant a role in *zibun-zisin* and *kare/kanozyo-zisin*, which is as expected, the data show that both L2 groups accept LD binding of *zibun-zisin* and significantly reject LD binding of *kare/kanozyo-zisin*. The patterns from *kare/kanozyo-zisin* are not surprising, given that similar patterns exist in their L1. However, LD binding of *zibun-zisin* is an indication of successful acquisition of the properties of *zibun-zisin*, as such behavior cannot be explained for by L1 transfer as *caki-casin* (the Korean counterpart of *zibun-zisin* has a local binding preference), and no such equivalent form exists in Chinese. This indicates the availability of UG in L2 binding and resetting parameters to an appropriate setting to permit LD binding of *zibun-zisin*.

Further evidence of UG can be found in the predicate data (see Table 37 for the results by predicate). While there are a number of similar patterns between the L2 learners and L1 speakers (e.g., *miseta* (lit. showed) and *semeta/hihansita* (blamed/criticized)), the VP *zihusiteiru* (lit.

believed) shows a clear local binding bias regardless of reflexive type, as the majority of both L1 Korean and L1 Chinese participants reject LD-bound sentences with *zihusiteiru*. These binding behaviors, along with the evidence from case-marked *zibun*, further buttress the availability of UG in L2 binding of Japanese, because it is virtually unlikely that throughout the course of language acquisition L2 learners were instructed that 1) certain case-marked reflexives should lead to either local or LD co-reference, and 2) a sentence that contains a reflexive and the VP *zihusiteiru* can only take a local antecedent and cannot refer to the LD antecedent. Such an understanding of only permitting local co-reference when the predicate is *zihusiteiru*, or demonstrating binding patterns based on case marking that resembles the L1 data cannot be accounted for by Shallow Structure or Fundamental Difference approaches. Thus, the observation from the L2 data in multi-clausal sentences indicate that both L1 Korean and L1 Chinese groups demonstrate successful acquisition *zibun-zisin*, and *kare/kanozyo-zisin*, but perhaps not *zibun* as the mono-clausal sentence results indicate otherwise.

In the mono-clausal sentences, both L2 groups show binding patterns with *zibun-zisin* and *kare/kanozyo-zisin* which closely emulate the L1 Japanese results; however, the results from *zibun* do not. While they correctly accept the majority of subject-bound sentences with *zibun*, they significantly reject object-bound sentences with *zibun*, thus showing little evidence of accepting such sentences. Within the 36 object-bound mono-clausal sentences presented to the L1 Koreans, they only accept 6 (16.7% as a group) of these sentences, and within the 80 presented to L1 Chinese, they only accept 14 (17.5% as a group) of these sentences (recall that L1 Japanese accept 44.8% of object-bound mono-clausal sentences with *zibun*). Scrambling also did not affect their interpretation with *zibun*, as they show a substantial bias for subject binding in all sentence types.

As mentioned above, this is a critical gap in the acquisition of Japanese reflexives that the L2 learners fail to capture. The implication is that they have yet to successfully acquire *zibun* as a logophor, and consequently, the overall results show that L2 learners of Japanese treat both *zibun* and *zibun-zisin* similarly. This is evinced by both L2 learner groups accepting both local and LD binding of *zibun* and *zibun-zisin*, but reject object binding with these two reflexives. In other words, the evidence suggests that both L2 learner groups transferred their L1 binding parameters for *zibun* from *ziji* (Chinese) and *caki* (Korean). These behavioral patterns of treating both *zibun* and *zibun-zisin* similarly also appear in the SPR data, which will be discussed in Section 9.2 below.

Thus, the overall data show that while L2 learners are able to acquire the correct syntactic properties of *zibun-zisin*, they also display L1-L2 transfer effects in binding of *zibun*. Nonetheless, the data also show evidence of L2 learners using case information as cues for local and LD binding interpretations, an important indication of L2 learners deploying similar sentence processing mechanisms as L1 speakers. Finally, as alluded to earlier, scrambled structures also seem to have an effect in the interpretation, especially with *kare/kanozyo-zisin*. The following section takes a closer look the effect of scrambling in L2 Japanese before discussing the data from the SPR task and picture description task.

9.1.1 Scrambling effects in L2 Japanese

To recap, both L2 learner groups significantly accept more subject-bound sentences with *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* than object-bound, but they show a good amount of evidence that they also accept object-bound *kare/kanozyo-zisin* (52.8% for L1 Korean, 42.8% with L1 Chinese). However, within sentences with *kare/kanozyo-zisin*, scrambling appears to play a role

in the interpretation object binding. The scrambled sentence types are shown in (49) for review, this time with *kare-zisin*:

49. *Type A*

Taro-wa Keiji-ni *zibun-no* syasin-o miseta.

Taro-TOP Keiji-DAT *self-GEN* photograph-ACC showed

Type B

Taro-wa *zibun-no* syasin-o Keiji-ni miseta.

Taro-TOP *self-GEN* photograph-ACC Keiji-DAT showed

Type C

Keiji-ni Taro-wa *zibun-no* syasin-o miseta.

Keiji-DAT Taro-TOP *self-GEN* photograph-ACC showed

Type D

Keiji-ni *zibun-no* syasin-o Taro-wa miseta.

Keiji-DAT *self-GEN* photograph-ACC Taro-TOP showed.

Recall that scrambling also played a role with the L1 Japanese, who accepted more object-bound sentences in Type A and Type D (when the object DP appeared directly before *kare/kanozyo-zisin*), but rejected more object-bound sentences in Type B and Type D (when the subject DP appeared before *kare/kanozyo-zisin*). Within the L2 learner groups, they accept both subject and object antecedents in Type A, Type C, and Type D (L1 Koreans accept 75.0% subject- and 66.7% object-bound sentences for Type A, 100% subject and 55.6% object for Type C, and 62.5% subject and 66.7% object for Type D; L1 Chinese accept 64.0% subject and 60.0% object-bound sentences for Type A, 80.0% subject and 56.0% object for Type C, and 61.9% and 52.6% for Type D). However, in Type B, where the object DP appears after *kare/kanozyo-zisin*,

L1 Korean accept 100% of the subject-bound sentences, but only 22.0% of the object-bound sentences. The L1 Chinese also show similar patterns, as they accept 73.7% of the subject-bound sentence, but only 9.5% of the object-bound ones (L1 Japanese accept 87.0% of the subject-bound sentences and 44.0% of the object-bound one for Type B). These results clearly show that both L1 speakers and L2 learners process “Taro-wa *kare-zisin-no syasin-o...*” and “Hanako-wa *kanozyo-zisin-no syasin-o...*” as a single entity and do not consider a potential DP that may appear later in the clause as a potential antecedent of *kare/kanozyo-zisin*. Thus, the position of where the reflexive and DPs, especially the object DPs, are located in the clause have a major impact in processing, and that L2 learners of Japanese also incrementally process DPs and establish co-reference among them before the VP is processed. If the reading profiles from the L2 data are able to demonstrate these behaviors, the data will serve as crucial evidence that L2 learners of Japanese utilize parsing strategies that L1 speakers deploy.

9.1.2 Summary of the L2 truth-value judgment task

In answering the research questions set for Study 2, L2 learners of Japanese show binding patterns that are representative of how L1 speakers bind *zibun-zisin*, and *kare/kanozyo-zisin*. In addition, the current data indicate that L1 background does not play a role in the acquisition of L2 binding, as both L1 Korean and L1 Chinese learners of L2 Japanese exhibit similar binding patterns across all Japanese reflexives. The data also show that as a whole the L2 learners are more accurate with LD binding as opposed to local (cf. Yoshimura et al., 2012, 2013) and L2 learners do not demonstrate any particular difficulties in acquiring LD binding in Japanese, given their response rates were similar to the L1 data. Thus, the current results show that L2 learners are able to demonstrate similar binding patterns as L1 speakers, use case and the predicate as

cues in resolving ambiguity in reflexive-antecedent binding, and abilities to incremental process DPs, as shown in how they process scrambled sentence structures. However, the lack of object binding of *zibun* in the data show that L2 learners have yet to acquire *zibun* as a logophor and still treat it as a subject oriented reflexive that permits both local and LD binding.

9.2 SPR TASK

The SPR task was designed with the objective of examining how L2 learners of Japanese process *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* and whether they are able to demonstrate similar processing strategies as L1 speakers of Japanese. Though the results only include L1 Chinese learners of L2 Japanese, the results serve as a preliminary analysis for future research within this domain.

Recall that in the L1 data, L1 Japanese speakers demonstrate specific processing patterns based on the sentence type. In multi-clausal sentences, L1 Japanese process *zibun* and *zibun-zisin* similarly in local binding situations, but *zibun-zisin* and *kare/kanozyo-zisin* similarly in LD binding situations. In subject binding of mono-clausal sentences, they treat *zibun* and *zibun-zisin* similarly, but *zibun-zisin* and *kare/kanozyo-zisin* similarly in object binding.

9.2.1 L2 reading profiles of multi-clausal sentences

First, let us examine the reading profiles from multi-clausal sentences. The data show that the L1 Chinese group exhibit increased reading times in the critical regions of almost all sentences with *kare/kanozyo-zisin*, as well as sustained increased reading times in over half of the same

sentences. In turn, there are very few critical region effects with *zibun* and *zibun-zisin*. This suggests that L1 Chinese process *kare/kanozyo-zisin* differently from *zibun* and *zibun-zisin* during the parse, which is exactly what was found in the L1 Japanese data. However, there are also some differences in how L1 Chinese process local and LD binding of *zibun* and *zibun-zisin*. In local-bound sentences with *zibun*, the reading profiles show no critical region effects but some increased reading times occur in the spillover regions. The exact opposite pattern occurs in LD-bound sentences with *zibun*, as there are more critical region effects but only two instances of increased reading times in the wrap-up region. However, because increased reading times in the sentence with the VP *zihusiteiru* occurs in *all* sentences, and not just LD-bound *zibun*, main effects in this particular instance is not a representative example with LD binding of *zibun*. Thus, the overall patterns indicate that the majority of main effects occur in the spillover region of local-bound sentences with *zibun*, but in the critical region of LD-bound sentences with *zibun*.

While there are some similar patterns found in sentences with *zibun-zisin*, the overall reading profiles show fewer instances of increased reading times in sentences with *zibun-zisin* compared to *zibun*. This is rather surprising for number of reasons. First, the reading profiles from L1 Japanese showed that polymorphemic reflexives, *zibun-zisin* included, induce more critical region effects than monomorphemic. It would be logical to expect this to occur with L2 learners as well, yet L1 Chinese show almost no difficulties in parsing sentences with *zibun-zisin*. Second, Chinese does not have an equivalent form of *zibun-zisin* in their L1 (recall that the system of Chinese reflexives includes only *ziji* (which is often referred to as the equivalent of *zibun*) and *taziji* (a gender neutral counterpart of *kare/kanozyo-zisin*)), which would suggest that they would be less familiar with *zibun-zisin* over the other reflexive forms in Japanese. Even if they were able to acquire *zibun-zisin* over the course of L2 acquisition, they would have likely

created a new lexical category for *zibun-zisin* to distinguish itself from *zibun*, as L2 learners generally assign one meaning to one form in acquisition (Sugaya & Shirai, 2007). However, the results from the truth-value judgment task show that L1 Chinese interpret *zibun* and *zibun-zisin* similarly, as they accept local and LD binding with both reflexives. In this case, the logical assumption would be that they process *zibun* faster than *zibun-zisin*, as it is a simplex morpheme, and *zibun* is, reportedly, the most representative and frequent reflexive form in Japanese (Aikawa, 2002; Ying, 1999).⁵⁵ Nevertheless, the exact opposite pattern occurs in the L2 reading profiles, and we are left wondering how the L1 Chinese learners acquired *zibun-zisin* and the LD binding patterns of *zibun-zisin* that were previously unknown in the literature.

Finally, as mentioned above, L1 Chinese demonstrate a number of processing breakdowns with *kare/kanozyo-zisin*. The L1 Chinese exhibit slowdown in the critical regions of all LD-bound sentences and also in all but two local-bound sentences. As the L1 reading profiles also showed similar processing difficulties with *kare/kanozyo-zisin*, in consolidating the L1 and L2 data, the results clearly suggest that *kare/kanozyo-zisin* induces a great amount of processing problems no matter who the Japanese speaker is.

Overall, the reading profiles from multi-clausal sentences suggest that L1 Chinese learners of L2 Japanese treat *zibun* and *zibun-zisin* similarly in both local and LD binding, but have difficulty in processing sentences with *kare/kanozyo-zisin*. While there are some differences in how L1 Chinese process reflexivity in Japanese, the current results indicate that L1 Chinese are able to show retrieval and processing strategies that emulate L1 processing, especially in

⁵⁵ In general, high frequency words are generally accessed faster than low frequency ones (e.g., Balota & Chumbley, 1984; Forster, 1976),

sentences with *zibun* and local-binding of *zibun-zisin*. Furthermore, processing breakdowns at the critical regions of *kare/kanozyo-zisin* does not indicate that L1 Chinese process ambiguity at shallower levels – L1 Japanese demonstrated similar processing problems with *kare/kanozyo-zisin*. As mentioned earlier, L2 processing is not going to always be the same as L1 processing, but minor differences in how *zibun-zisin* is processed among L1 speakers and L2 learners should not be an indication of fundamentally different processing (Dekydtspotter, Schwartz, & Sprouse, 2006).

9.2.2 L2 reading profiles of mono-clausal sentences

While the results from multi-clausal sentences show that L1 Chinese show similarities in processing *zibun* and *zibun-zisin*, but not *kare/kanozyo-zisin*, the data from mono-clausal sentences suggest otherwise.

To review, the data from L1 Japanese showed processing similarities between *zibun* and *zibun-zisin* in subject binding, but similar processing behavior between *zibun-zisin* and *kare/kanozyo-zisin* in object binding. The reading profiles from L1 Chinese, however, do not display any of these patterns, as they process *zibun-zisin* and *kare/kanozyo-zisin*, but not *zibun*, similarly in subject-bound sentences, and exhibit a substantial amount of processing breakdowns in all object-bound sentences regardless of reflexive type.

First, let us examine the sentences with subject binding. The reading profiles show that the L1 Chinese actually demonstrate the exact same processing patterns for *zibun* as the L1 Japanese. They do not exhibit any considerable increased reading times in all sentences, both standard and scrambled, except in Type D, for which they slowed down in the wrap up region (region 4). This is exactly the same region where L1 Japanese also displayed a spike in reading

times. Thus, it appears that non-canonical positioning of the subject DP plays a crucial role in processing Japanese. While word orders are flexible and scrambling is widespread, late arrival of the subject DP causes reanalysis for both L1 speakers and L2 learners. Nonetheless, such processing patterns show that the L1 Chinese participants are able to show similar processing strategies for subject-binding of *zibun*.

However, the remaining results from subject-bound mono-clausal sentences show more processing breakdowns in sentences with both *zibun-zisin* and *kare/kanozyo-zisin*. While the results from the truth-value judgment task show that the L1 Chinese correctly bind *zibun-zisin* and *kare/kanozyo-zisin* with the subject (recall that all sentence types had an accuracy score of 60% or better in all sentence types), they exhibit a number of increased reading times in several regions in sentences with *zibun-zisin*. While they processed Type A (standard word order) without delay, the L1 Chinese display a number of processing breakdowns in the critical and wrap-up regions in Type B, Type C, and Type D (scrambled word orders). This shows that L1 Chinese have difficulty in processing non-canonical word orders in Japanese when the sentences involve a polymorphic reflexive. Similar processing breakdowns occur with *kare/kanozyo-zisin* as well, but notice that the initial spikes in reading times with *kare/kanozyo-zisin* always occur at the critical region. Overall, the reading profiles from subject-bound mono-clausal sentences show that while L1 Chinese are able to process monomorphemic reflexives without delay, they have difficulty in processing polymorphic reflexives.

On the other hand, L1 Chinese display processing breakdowns in almost all object-bound mono-clausal sentences, regardless of reflexive or sentence type. In sentences with *zibun* and *zibun-zisin*, they exhibit increased reading times that sporadically occur across a number of regions, from the critical through the wrap-up regions, without any discernable patterns.

Although increased times also occur in all sentences with *kare/kanozyo-zisin*, the initial spike in reading times again all happen at the critical regions, as was the case in subject-bound sentences with *kare/kanozyo-zisin*.

Thus, the overall reading profiles from mono-clausal sentences show a great amount of variability, as increased reading times are spread across various segments in all sentences, with exception to subject binding of *zibun* that showed the least amount of processing breakdowns. What is to make of the remaining mono-clausal sentences? First, the clearest patterns lie with *kare/kanozyo-zisin*. In both subject- and object-bound sentences, L1 Chinese always exhibit substantial slowdown only at the critical region in all sentences with *kare/kanozyo-zisin* (standard or scrambled). Further, they demonstrate the same effects in the majority of multi-clausal sentences in both local and LD binding. These patterns were also found in the L1 Japanese data, in which the L1 Japanese demonstrated increased reading times only at the critical regions in both multi- and mono-clausal sentences *kare/kanozyo-zisin*. Therefore, the data show that while L1 Chinese are subject to similar processing breakdowns as L1 Japanese, in doing so they demonstrate similar processing strategies with *kare/kanozyo-zisin* as their L1 speaking counterparts. Any shallower levels of processing would have likely induced more processing breakdowns during the parse, which did not happen with the L1 Chinese learners of L2 Japanese.

However, the remaining data from mono-clausal sentences with *zibun* and *zibun-zisin* are not as straightforward as *kare/kanozyo-zisin*. What can be taken from the reading profiles is that they treat object-bound sentences with *zibun* and *zibun-zisin* similarly. Given how they accept both LD binding and reject object binding of *zibun* and *zibun-zisin*, the data suggest that the L1 Chinese interpret both *zibun* and *zibun-zisin* as the same reflexive type instead of distinguishing *zibun* as a logophor.

Nonetheless, the question remains as to why L1 Chinese face more difficulty in processing sentences that are structurally *less* ambiguous than those that induce more ambiguity (i.e., mono-clausal vs. multi-clausal)? The most plausible explanation for this is, as mentioned earlier, that more possible interpretations of an ambiguous sentence makes reanalysis easier than sentences with less ambiguity and more information. This is because if alternative possibilities are likely to be inaccurate, reanalysis becomes more laborious (Inoue & Fodor, 1995). In object-bound mono-clausal sentences, the results from the truth-value judgment task show that L1 Chinese interpret sentences with *zibun* and *zibun-zisin* as having only one possibility and consistently reject object binding with both reflexives. Therefore, the appearance of a subject oriented anaphor in object-bound sentences causes processing breakdowns, as the L1 Chinese participants were probably expecting a reflexive that can bind with an object to appear instead of an anaphor. Such processing behaviors and interpretations of *zibun* and *zibun-zisin* also show that the L1 Chinese participants for this study did not completely reset their binding parameters to the appropriate settings for Japanese. Thus, while the results from the truth-value judgment task seem to show that the L1 Chinese successfully acquired LD binding of *zibun-zisin*, the reading profiles confirm that they do not always demonstrate a distinction between *zibun* and *zibun-zisin* during processing, which indicates that the L1 Chinese participants for this study have yet to acquire *zibun* as a logophor.

9.3 PICTURE DESCRIPTION TASK

The overall L2 results from the picture description task show a number of similarities not only between the L2 learners but also to the L1 Japanese. In total, both L1 Korean and L1 Chinese

learners of L2 Japanese use *zibun* the most, followed by *kare/kanozyo-zisin*, and *zibun-zisin*. The gap between *zibun* and *zibun-zisin* is not very surprising, given that previous research in Korean has shown that *caki* is used more frequently than *caki-casin*, and there is not an equivalent *zibun-zisin* form in Chinese. However, the frequent usage of *kare/kanozyo-zisin* is surprising, given the previous research on *kare/kanozyo-zisin* stated, as mentioned earlier, that these forms are not frequently used. These reflexive forms, as mentioned earlier, are not taught explicitly in language courses. This omission means that the L2 learners would have acquired the uses of *kare/kanozyo-zisin* through the input in their natural learning environment. Given that other L1 Japanese speakers also use *kare/kanozyo-zisin* at a highly frequent rate based on the picture description task, it is plausible that the L2 learners of Japanese acquired these forms from the environment they were immersed in Osaka and Tokyo.

In examining these results in detail by picture types, the L2 learners show some variance between the two learner groups. First, in Picture A (object binding) and Picture B (subject binding), the L1 Korean speakers use *zibun* the most for Picture A and both *zibun* and *kanozyo-zisin* at the same rates for Picture B. The L1 Chinese use *kanozyo-zisin* the most for Picture A and both *zibun* and *zibun-zisin* at almost equal rates for Picture B. These patterns are rather surprising because object reference with *caki* in Korean is blocked for the same reasons that *zibun* was thought to be, but also because the majority of L1 Koreans rejected object-bound sentences with *zibun* from the interpretation task. The L1 Chinese also show evidence that they bind *zibun* with the object as it was the second most used reflexive for Picture A, but the majority of them also rejected object-bound sentences with *zibun*. Therefore, the results from the truth-value judgment task and picture description task for mono-clausal sentences do not quite match. In interpretation, L1 Korean and L1 Chinese both reject object reference of *zibun*;

however, they use *zibun* more freely to refer to the subject or object in production. One argument could be the availability of using any reflexive during the picture description task led some of the participants to use the simplex morpheme over the complex morpheme; however, if that were the case, it still does not explain why they would not treat *zibun* similarly in the truth-value judgment task.⁵⁶

In turn, the remaining pictures that require selecting reflexives for local and LD binding situations show very similar results between the L2 learner groups and L1 speakers. While some of the frequencies and percentages may vary, the overall patterns show that L2 learner groups use a variety of reflexives for local binding descriptions, and show a clear preference for *zibun* in LD binding. In the pictures that require local binding, both L1 Koreans and L1 Chinese use all three reflexives for Picture C and Picture E, except the L1 Koreans, who do not use *zibun* at all for Picture E, and selection *zibun* was the lowest out of the three in Picture C. In the LD binding pictures, both L1 Koreans and L1 Chinese select *zibun* substantially more than the other two reflexives in Picture D and Picture F.

These patterns further show that L1 Koreans and L1 Chinese have a LD binding preference for *zibun*, which, especially for the Koreans, is a direct result of L1 transfer. In Korean, *caki* is the preferred reflexive for LD binding and *caki-casin* for local. The patterns that the L1 Koreans exhibit in local and LD binding directly resembles how they would use the two reflexives in their L1. However, the L1 Koreans also demonstrate binding *zibun* with the object, which cannot be explained by L1 transfer of *caki*. Given that the overall study only included 18

⁵⁶ Perhaps the use of *zibun* in the production task indicates incipient acquisition whereas the interpretation task is a more accurate reflection of their grammatical competence.

L1 Korean participants, as opposed to 40 L1 Chinese, testing with more L1 Koreans would be necessary to obtain a clearer understanding of how L1 Koreans interpret and use *zibun*.

Similar arguments can be made for L1 Chinese as well. While they exhibit more similarities to L1 Japanese than the L1 Korean learner group did in the picture description task, there is still a disconnect between interpretation and production. Perhaps the limited number of subject- and object-bound sentences also influenced their selection of reflexives, and future research should explore more samples of mono-clausal sentences in free-production tasks. Nonetheless, the L1 Chinese at least demonstrated abilities to use *zibun* for object reference and *zibun-zisin* for LD binding (more so in Picture F than Picture D), which suggests that, at least in production, that they were able that they were able acquire the correct binding properties of *zibun* and *zibun-zisin*.

However, both L2 learner groups, as mentioned earlier, show evidence of using *kare/kanozyo-zisin* in LD binding descriptions in Picture D and Picture F. Recall that both L1 Koreans and L1 Chinese significantly reject LD binding of *kare/kanozyo-zisin* and had lower acceptance rates than the L1 Japanese group did. This would lead us to assume that they would also select other reflexives over *kare/kanozyo-zisin* in LD binding descriptions. They do in terms of difference in percentages; however, the data indicates that some L2 learners still have yet to grasp the correct binding properties of *kare/kanozyo-zisin*, at least in multi-clausal sentences. This does not seem to be the case, though, for mono-clausal sentences, as they use these forms legally in subject and object binding descriptions. Thus, the L2 learners demonstrate that while they may have an understanding of the correct binding properties of *kare/kanozyo-zisin* in interpretation, they only show a partial understanding of its constraints in production, particularly in multi-clausal sentences, for which they permit LD binding of *kare/kanozyo-zisin*.

9.4 SUMMARY OF L2 ACQUISITION OF REFLEXIVES

The current data shows that L2 learners are able to acquire some of the binding properties of Japanese reflexives, but crucially fail at acquiring *zibun* as a logophor. This should not be considered as the L2 learners failing to acquire binding in Japanese as a whole, as they were able to correctly interpret LD binding of *zibun-zisin*. However, this still raises the question of how L2 learners acquired this particular property in Japanese. While one plausible explanation, as mentioned earlier, is the availability of UG in SLA, as the data indicate that the L1 Koreans and L1 Chinese were able to reset their binding parameters to the appropriate setting in Japanese for *some* reflexives, but not *all*. However, there are other possibilities to consider. One is that the L2 learners were fairly advanced in their proficiency of Japanese, to the point where they are able to take regular university-level courses in Japanese. Thus, their understanding of Japanese can be considered to be much more advanced than the traditional classroom student's. In addition, the L2 learners were all recruited from environments where they are immersed in the target language environment. It is not surprising to find that L2 learners who are in input-rich environments are able to produce the target language in ways that L1 speakers do (see also Li & Shirai, 2015; Pliatsikas & Marinis, 2013). This would explain why L2 learners were able to demonstrate usage of some of the newly discovered properties of *zibun-zisin* without formal input of the grammar (to my knowledge, *zibun*, *zibun-zisin*, and *kare/kanozoyo-zisin* are not explicitly taught as a grammatical structure in any L2 Japanese language course. Because they are not taught, it is also unlikely that teaching materials contain very much input). Partially successful acquisition of reflexives supports a good number of previous studies that have also found that L2 learners were able to acquire some, but not all, of the binding properties of the target language. Overall, this study on L2 acquisition of Japanese reflexives shows that testing of all reflexive forms, and not

just *zibun*, is necessary to attain a clearer understanding of how L2 learners of Japanese interpret, process, and use *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*.

10.0 CONCLUSION

This dissertation investigated how L1 speakers of Japanese interpret, process, and use Japanese reflexives by examining *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*, and how learners acquire these properties as an L2. This dissertation was distinct from previous studies of Japanese reflexives for a number of reasons. First, experimental research on *zibun-zisin* and *kare/kanozyo-zisin* had not been conducted extensively in the field. This study provides important empirical data in how L1 Japanese interpret and process these reflexives in multiple sentences types. Such studies remain even more sparse in the L2 domain. Second, the roles of case and the predicate in reflexive antecedent binding were explored as previous analysis of *zibun* showed that L1 Japanese generally accept both local and LD binding at similar rates, yet certain constructions, such as *zibun-ga* (self-NOM) and *zibun-ni* (self-DAT) require different predicates, which lead to different binding interpretations. Third, scrambling of sentences with anaphoric elements was examined in mono-clausal sentences. The idea was based on the notion that if non-canonical word orders were derived from transformation, scrambling of DPs would lead to increased ambiguity. Finally, this dissertation proposed a working hypothesis for sentence processing in Japanese that suggested that syntactic structures are incrementally constructed upon processing case-marked DPs, theta roles are simultaneously licensed upon processing case, and if necessary, DPs are accessible and covertly retrievable at any point of the parse to satisfy the argument structure of the verb.

The L1 study revealed that a major syntactic shift in the properties ascribed to Japanese reflexives has taken place. In the truth-value judgment task, the results showed that L1 Japanese bind *zibun* to any local or LD antecedent, subject or object, *zibun-zisin* to any subject antecedent, local or LD, and *kare/kanozyo-zisin* to only local subject or object antecedents. The SPR data confirmed the interpretation results, showed that L1 Japanese treated *zibun* as a logophor, *zibun-zisin* as a subject-oriented reflexive that permits LD binding, and *kare/kanozyo-zisin* as a locally-bound reflexive that permits subject and object binding. These patterns were further confirmed in the picture description task, where they demonstrated similar selection of reflexives in production according to these newly uncovered properties. While previous research has noted that object-binding is possible in Japanese, LD binding of *zibun-zisin* has not been discussed and no previous study, to my knowledge, has reported such robust results on the complete system of Japanese reflexives. Table 52 summarizes the new properties of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* that were found from the studies conducted in this dissertation.

Table 52. Summary of the new properties of Japanese reflexives based on the L1 results

<u>Ontological category</u>	<u><i>Zibun</i></u>	<u><i>Zibun-zisin</i></u>	<u><i>Kare/kanozyo-zisin</i></u>
Local binding	Yes	Yes	Yes
LD binding	Yes	Yes	No
Subject binding	Yes	Yes	Yes
Object binding	Yes	No	Yes
New categorization	Logophor	Subject-oriented reflexive	Locally-bound reflexive

In terms of some of the more detailed results, case played an influential role in reflexive antecedent binding, as evidenced in the local and LD binding patterns based on case-marked

zibun. The data also provided more evidence that the certain predicates that had not been previously described play a role in binding. In the SPR study, the participants demonstrated processing patterns that support the previous literature that L1 Japanese speakers deploy an incremental processing mechanism in parsing Japanese. Furthermore, the current data, such as those from local-bound sentences with *zibun* and *zibun-zisin*, provide evidence for the working CIA processing hypothesis, as the reading profiles show that L1 Japanese demonstrate slowdown in the parse where we predicted they would. Finally, the results also showed that certain non-canonical word orders of DPs induce processing breakdowns, particularly when the subject DP appears toward the end of the clause rather than the beginning, which support that non-canonical word orders in Japanese are derived from transformation.

In the L2 results, the L1 Korean and L1 Chinese learners of L2 Japanese participants demonstrated similar processing patterns of *zibun*, *zibun-zisin*, and *kare/kanozoyo-zisin* as the L1 Japanese speakers for the most part. However, they were unsuccessful in acquiring object binding of *zibun*, and further analysis of the SPR reading profiles confirmed that they treated *zibun* and *zibun-zisin* similarly, which indicates they do not distinguish *zibun* and *zibun-zisin* from one another. In other words, they failed to acquire *zibun* as a logophor, and treat both *zibun* and *zibun-zisin* as subject-oriented reflexives. While this is a critical part of the acquisition of Japanese reflexives that both L2 learner groups missed, they still showed evidence that they were successful in acquiring LD binding of *zibun-zisin*, which is surprising given that Koreans prefer local binding of *caki-casin* (the Korean equivalent of *zibun-zisin*) and no such equivalent form exists in Chinese. Thus, these results show that the L2 learners were partially successful in acquiring the system of Japanese reflexives, and in particular, a successful understanding of LD binding of *zibun-zisin* indicates that the L2 learners were able to partially reset their binding

parameters to some appropriate settings. The restriction of *zibun* for the learners as an anaphor rather than the more general logophor is interesting from an acquisition point of view, because evidence for its use as a logophor should be available from positive evidence in the input. The production task suggests that this process may be at an early stage. The resistance of the Chinese and Korean learners to the status of *zibun* as a logophor could be due to the fact that it is related to strict structural computation in the L1s. Table 53 summarizes the L2 results and their acquisition of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* as a group. “Yes” indicates that they were successful in acquisition and showed similar binding patterns as the L1 speakers, and “no” indicates that they were unsuccessful in that particular property. As indicated in the table by an asterisk, the only property that the L2 learners failed to acquire was object binding of *zibun*.

Table 53. Summary of L2 acquisition of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*

<u>Ontological category</u>	<u><i>Zibun</i></u>	<u><i>Zibun-zisin</i></u>	<u><i>Kare/kanozyo-zisin</i></u>
Local binding	Yes	Yes	Yes
LD binding	Yes	Yes	Yes
Subject binding	Yes	Yes	Yes
Object binding	No*	Yes	Yes

In the more detailed results, case played an important role in the identification of local or LD antecedents in the L2 data as well. Both L1 Koreans and L1 Chinese participants showed similar binding patterns based on case-marked *zibun*, and for the most part showed similar patterns across case-marked *zibun-zisin* and *kare/kanozyo-zisin*. Further, they also showed similar binding patterns based on the predicate, particularly with the VP *zihusiteiru* (lit. believed) for which they all rejected LD-bound sentences with this predicate. Both learner groups also showed similar processing effects in sentences where the subject DP was in a displaced non-

canonical position. These results, which arguably were not as a result from direct input of the language, provides evidence of the availability of UG in L2 acquisition of reflexives.

There were several limitations of this study to consider that have implications for future research. First, the L2 learner profiles were limited to L1 Korean and L1 Chinese, and the L1 Korean group was particularly smaller than the other two groups of the study. Additional data would be necessary to further justify the current results found from the L1 Korean participants. Furthermore, in order to have a better understanding of how L2 learners acquire Japanese reflexives, future research should consider expanding the scope of the L2 learner groups to other typologically unrelated L1 groups, such as English, French, German, Russian, etc. Such cross-linguistic analysis is pertinent and essential for syntactic research to further our understanding of language acquisition.

Second, all L1 Japanese participants were recruited from universities in the Osaka region. While some university students came from other parts of Japan, 81.25% of the participants came from the Kansai region (where Osaka is located). As alluded to earlier, certain dialects in Japan have different perceptions and uses of *zibun*, and this is particularly true for the Kansai dialect. For example, they use *zibun* as a first, second, and third person pronoun, something that is not generally found in ‘Standard Japanese’ which prescribes *zibun* only to be used in the third person (i.e., speakers of standard Japanese generally do not refer to themselves as *zibun* instead of *watashi* (lit. “I”) or *anata* (lit. “you”). Future research should consider running similar studies with L1 Japanese speakers from other regions of Japan. These may include speakers of standard Japanese (e.g., Tokyo), but it may be beneficial to also explore other regions of Japan that have speakers of other Japanese dialects, such as Kyushu (the southwest island), Tohoku (northeastern region of Japan), and Hokkaido (the northern island). Having a data set from a diverse range of

native Japanese speakers would provide an even more comprehensive view of reflexivity in Japanese.

Third, in terms of the stimuli, there were only two predicates examined per case-marked reflexive in the multi-clausal sentence set, and only one sentence scrambled into four sentence types in the mono-clausal sentence set. The number of predicates and sentence types were limited given that this dissertation was exploring four different reflexives, and it would have been unreasonable to ask participants to take a longer task than the current one. However, as the results revealed that *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin* have different binding patterns, and also considering the newly found properties of *zibun* and *zibun-zisin*, future research will do well by further examining these reflexives with other predicates and structures. The role of case in reflexive-antecedent binding should also be continued to be examined in future research.

Fourth, the psycholinguistic method of research used for the experiments of this study was a SPR task. While this method of research remains relevant and important in the field of sentence processing, newer methodology, such as real world eye-tracking and EEG, have the potential of providing additional information to how L1 speakers and L2 learners process ambiguity (e.g., Runner & Head, 2014). While the current study adopted SPR methodology for its practicality, mobility, and cost-effectiveness, future research examining Japanese reflexives would do well in using a diverse range of research tools.

Overall, this dissertation demonstrated that specific co-reference patterns occur based on a number of syntactic factors that were previously uncovered in the literature, and revealed a major syntactic shift in the system of Japanese reflexives. The results from the studies conducted in this dissertation has demonstrated the importance of conducting data analysis of behavioral tasks in order to understand how L1 speakers and L2 learners of Japanese interpret and use

reflexives, rather than assuming the binding properties of Japanese reflexives and forcing theoretical conditions onto the language. Nonetheless, incorporating formal theories as a foundation to inform research is necessary in order to discover patterns that may not be evident from surface data alone. Such analyses at a fine-grain size that included the role of case and the predicate in local and LD binding, and the role of scrambling in subject and object binding, has added to knowledge in this field by demonstrating different local and LD binding patterns based on case-marked reflexives, and the effects of scrambling and non-canonical word orders in subject and object co-reference interpretations. Finally, this dissertation also showed that an investigation of all reflexive types, and not just *zibun*, is crucial in order provide a comprehensive understanding of how L1 Japanese interpret and process reflexivity, and how learners of Japanese acquire these properties as an L2. Such an investigation has led to a crucial discovery of that informs the field of the new binding properties of *zibun*, *zibun-zisin*, and *kare/kanozyo-zisin*.

APPENDIX A

TRUTH-VALUE JUDGMENT TASK STIMULI

The following stories and statements were used in the truth value judgment task. The English translations, phonetic transcriptions, and Romanization are only made available here and were not provided to the participants. Sentence commenting on the stories appear below. Stories for local binding appear first and marked with an “A” after numbering (e.g., 1A), and stories for LD binding are marked with a “B.” The sentences for *zibun* and *zibun-zisin* are combined for brevity.

1A. Hanako was taking selfies with her camera. The next day, she met her friend Reiko and showed her the photographs. Taro found out and told his friends about it.

花子は自撮りの写真を撮った。翌日、花子は友達の玲子に会って、撮った写真を見せた。
太郎はそれを聞いて、このことについて友達と話した。

1B. Taro is a photographer doing a photoshoot for Hanako. The next day, she picked up the prints and showed her boyfriend Keiji. Taro told his roommate about this later that day.

写真家の太郎は花子の写真撮影をしていた。翌日、花子は写真を取りに行って、彼氏の圭司に見せた。その後、太郎はルームメートにこのことについて話した。

Taro said Hanako showed photographs that self took to Reiko.

たろう はなこ じぶん じぶん じしん と しゃしん れいこ
太郎は 花子が 自分/自分自身が 撮った 写真を 玲子に
み 見せた と い 言った。

Taro-wa Hanako-ga zibun/zibun-zisin-ga totta syasin-o Reiko-ni
miseta-to itta
Taro-TOP Hanako-NOM self-NOM took photograph-ACC Reiko-DAT
showed-COMP said

2A. Keiko is a narcissist and believes she is the most beautiful student at the university. Hanako found this unattractive and told her friends about Keiko.

恵子はナルシストで、自分が大学で一番きれいだと言っている。花子はこれはみっともないと思い、友達に恵子のことについて話した。2B. Keiko believes that Hanako is the most beautiful student at the university. Hanako was flattered by this and told her parents the compliment Keiko gave her.

恵子は花子に彼女が大学で一番きれいだと言った。花子は嬉しくなって、自分の親に恵子が言ったことについて話した。

Hanako said Keiko believes herself to be the most beautiful (admires herself).

はなこ けいこ じぶん じぶん じしん いちばん じ ふ い
花子は 恵子が 自分/自分自身が 一番きれいだと言っていると言った。

Hanako-wa Keiko-ga zibun/zibun-zisin-ga itiban.kireida-to zihusiteiru-to itta
Hanako-TOP Keiko-NOM self-NOM most.beautiful-COMP believes-COMP said

3A. Hanako was taking some photographs at the park. Later, she showed her friend Reiko, but not her boyfriend Taro. Taro was annoyed by this and his friend about this.

花子は公園で写真を撮った。その写真を友達^の玲子には見せたが、彼氏^の太郎に見せなかった。太郎は不満に思い、友達にこのことについて話した。

3B. Taro was taking some photographs at the park and gave them to Hanako. Later that day, Hanako showed her friend Reiko the photographs that Taro took. Taro found out about this and told his friends.

太郎は公園で写真を撮り、花子に写真をあげた。その後、花子は太郎が撮った写真を友達^の玲子に見せた。太郎はこのことを知り、友達に話した。

Taro said Hanako showed photographs that self took to Reiko.

^{たろう}太郎は ^{はなこ}花子が ^{じぶん じぶんじしん}自分/自分自身の ^と撮った ^{しゃしん}写真を ^{れいこ}玲子に
^み見せたと ^い言った。

Taro-wa	Hanako-ga	zibun/zibun-zisin-no	totta	syasin-o	Reiko-ni
miseta-to	itta				
Taro-TOP	Hanako-NOM	self-GEN	took	photograph-ACC	Reiko-DAT
showed-COMP	said				

4A. Yuji and Ichiro work in the same company. Ichiro finished work early and went home. When their supervisor asked where Ichiro went, Yuji explained that he went home.

祐司と一郎は同じ会社に勤めている。一郎は仕事を早く終え自分の家に帰った。課長が一郎がどこに行ったか聞くと、祐司は家に帰ったと説明した。

4B. Yuji and Ichiro work in the same company. Ichiro needed to pick something up at Yuji's place and went to his house. When their supervisor asked where Ichiro went, Yuji explained.

祐司と一郎は同じ会社に勤めている。一郎は祐司の家から何かが必要となり、祐司の家に取りに行った。課長は一郎がどこに行ったかと聞いたので、祐司は説明した。

Yuji said Ichiro returned/went to self's home.

ゆうじ いちろう じぶん じぶん じしん いえ かえ いった い いった
祐司は 一郎が 自分/自分自身の 家に 帰った/行ったと 言った。

Yuji-wa Ichiro-ga zibun/zibun-zisin-no ie-ni kaetta/itta-to itta

Yuji-TOP Ichiro-NOM self-GEN house-DAT returned/went-COMP said

5A. Taro and Keiji work in the same company. Taro and his co-workers were going to order lunch, but Keiji already ordered a bento for himself. Taro told his co-workers about this.

太郎と圭司は同じ会社に勤めている。太郎と同僚はお昼を注文するところだったが、圭司はもうすでに自分のために弁当を注文してしまった。太郎は同僚にこのことについて話した。

5B. Taro and Keiji work in the same company. Taro was about to order lunch, but found out Keiji ordered a bento for him. Taro was impressed and told his other co-workers about this during a break.

太郎と圭司は同じ会社に勤めている。太郎はお昼を注文するところだったが、圭司が太郎のためにもうすでに弁当を注文してくれたと知った。それが嬉しくて、同僚にこのことについて太郎は話した。

Taro said Keiji ordered bento for self.

たろう けいじ じぶん じぶん じしん べんとう ちゅうもん い
太郎は 圭司が 自分/自分自身に 弁当を 注文したと 言った。

Taro-wa Keiji-ga zibun/zibun-zisin-ni bentō-o tyūmonsita-to itta

Taro-TOP Keiji-NOM self-DAT bentō-ACC ordered-COMP said

6A. Keiko went to the department store to buy an iPad for herself. She went home and showed Yuji her new iPad. The next day, Yuji told his friends what Keiko did yesterday.

恵子はデパートでアイパッドを自分用に買った。家に帰ると祐司に新しいアイパッドを見せた。翌日、祐司は友達に昨日恵子がしたことについて話した。

6B. Keiko went to the department store to buy an iPad for her boyfriend Yuji. She went home and gave Yuji his new iPad. Delighted, Yuji told his friends the next day what Keiko did.

恵子は彼氏の祐司のためにアイパッドを買いにデパートに行った。そして家に帰って祐司にアイパッドをあげた。祐司は喜んで、友達に恵子がしてくれたことについて話した。

Yuji said Keiko bought an iPad for self.

ゆうじ けいこ じぶん じぶん じしん アイパッドを か い
祐司は 恵子が 自分/自分自身に アイパッドを 買ったと 言った。

Yuji-wa Keiko-ga zibun/zibun-zisin-ni aipaddo-o katta-to itta

Yuji-TOP Keiko-NOM self-DAT iPad-ACC bought-COMP said

7A. Sato had made a big mistake at work. He was disappointed and was blaming himself. Suzuki, his coworker, witnessed this and told his friends about this after work.

佐藤は仕事で大失敗してしまい、落ち込んで自分自身を責めた。同僚の鈴木はこれを見て、仕事の後、友達にこのことについて話した。

7B. Suzuki had made a big mistake at work. His supervisor, Sato, noticed and severely criticized him. Suzuki was disappointed and told his friends about this after work.

鈴木は仕事で大失敗してしまい、佐藤課長にひどく叱られて、責められた。鈴木は落ち込んで、友達にそのことを話した。

Suzuki said Sato blamed/criticized self.

すずき 鈴木は	さとう 佐藤が	じぶん じぶん じしん 自分/自分自身を	せ へはん 責めた/批判したと	い 言った。
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Suzuki-wa	Sato-ga	zibun/zibun-zisin-o	semeta/hihansita-to	itta
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Suzuki-TOP	Sato-NOM	self-ACC	blamed/criticized-COMP	said
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Suzuki said Sato criticized self.

すずき 鈴木は	さとう 佐藤が	かれ じしん か の じょ じしん 彼自身/彼女自身を	ひはん 批判したと	い 言った。
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Suzuki-wa	Sato-ga	kare-zisin/kanozyo-zisin-o	hihansita-to	itta
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Suzuki-TOP	Sato-NOM	self-ACC	criticized-COMP	said
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Kimura said Nakata praised self.

8. Nakata was giving a speech at the student council elections. Afterwards, Nakata was proud of his speech and was praising himself. Kimura was there and told his friends about this the next day.

中田は学級委員選挙の演説をした。中田は自分の演説が気に入り、得意になった。木村はこれを見て、翌日友達にこのことについて話した。

8B. Kimura was giving a speech at the student council elections. Afterwards, Nakata was impressed with his speech and praised him. That afternoon, Kimura told his parents that Nakata had praised him.

木村は学級委員選挙の演説をした。友達の中田は演説に感心して、彼を褒めた。その後、木村は親に中田が褒めてくれたことを話した。

Kimura said Nakata praised self.

きむら は なかた が じぶん じぶん じしん 自分/自分自身を ほ めたと い 言った。

Kimura-wa Nakata-ga zibun/zibun-zisin-o hometa-to itta

Kimura-TOP Nakata-NOM self-ACC praised-COMP said

きむら は なかた が かれじしん かのじょじしん かれじしん 彼自身/彼女自身彼自身を ほ めたと い 言った。

Kimura-wa Nakata-ga kare-zisin/kanozyo-zisin-o hometa-to itta

Kimura-TOP Nakata-NOM self-ACC praised-COMP said

9A. (Object binding) Taro is a photographer doing a photoshoot for Hanako. After doing some editing, he met Hanako at a café a few days later. There, he showed Hanako the photographs.

写真家の太郎は花子の写真撮影をした。写真を編集して、数日後喫茶店で花子に撮った写真を見せた。

9B. (Subject binding) Taro is a photographer and took some self-portraits of himself. After doing some editing, he showed his girlfriend Hanako the photographs that he took.

写真家の太郎は自撮りの写真を撮った。写真を編集して、彼女の花子に撮った写真を見せた。

Taro showed Hanako photographs of self.

たろう 太郎は	はなこ 花子に	じぶん じぶん じしん 自分/自分自身の	しゃしん 写真を	み 見せた。
Taro-wa	Hanako-ni	zibun/zibun-zisin -no	syasin-o	miseta
Taro-TOP	Hanako-DAT	self-GEN	photograph-ACC	showed
たろう 太郎は	じぶん じぶん じしん 自分/自分自身の	しゃしん 写真を	はなこ 花子に	み 見せた。
Taro-wa	zibun/zibun-zisin -no	syasin-o	Hanako-ni	miseta
Taro-TOP	self-GEN	photograph-ACC	Hanako-DAT	showed
はなこ 花子に	たろう 太郎は	じぶん じぶん じしん 自分/自分自身の	しゃしん 写真を	み 見せた。
Hanako-ni	Taro-wa	zibun/zibun-zisin -no	syasin-o	miseta
Hanako-DAT	Taro-TOP	self-GEN	photograph-ACC	showed
はなこ 花子に	じぶん じぶん じしん 自分/自分自身の	しゃしん 写真を	たろう 太郎は	み 見せた。
Hanako-ni	zibun/zibun-zisin-no	syasin-o	Taro-wa	miseta
Hanako-DAT	self-GEN	photograph-ACC	Taro-TOP	showed

10A. Keiji was taking photographs with his camera. The next day, he met his brother Yuji and showed him his pictures, but not to his roommate Taro. He was annoyed by this and told his girlfriend about it.

圭司はカメラで写真を撮った。翌日、圭司は弟の祐司に会って、撮った写真を見せたが、ルームメートの太郎には見せなかった。太郎は不満に思い、彼女にこのことについて話した。

10B. Taro is a photographer doing a photoshoot for Keiji. The next day, Keiji picked up the photographs and showed his brother Yuji the photographs the next day. Taro found out about this a told his girlfriend about it.

写真家の太郎は圭司の写真撮影をしていた。翌日、圭司は写真を取りに行って、弟の祐司に見せた。太郎はこのことについて彼女と話した。

Taro said Keiji showed the photographs that self took to Yuji

たろう 太郎は けいじ 圭司が かれじしん 彼自身が と 撮った しゃしん 写真を ゆうじ 祐司に
み 見せたと い 行った。

Taro-wa	Keiji-ga	kare-zisin-ga	totta	syasin-o	Yuji-ni
miseta-to	itta				
Taro-TOP	Keiji-NOM	self-NOM	took	photograph-ACC	Yuji-DAT
showed-COMP	said				

11A. Yuji is a narcissist and believes he is the best looking student at the university. Taro found this despicable and told his friends about Yuji.

祐司はナルシストで、自分が大学で一番かっこいいと自負している。太郎はこれはみっともないと思い、友達に祐司のことについて話した。

11B. Yuji believes that Taro is the best looking guy at the university. Taro was pretty excited about this and told his friends about the compliment Yuji gave him.

一郎は圭司に彼が大学で一番かっこいいと言った。圭司は嬉しくなって、自分の親に一郎が言ったことについて話した。

Taro said Yuji believes himself to be the best looking (admires himself).

たろう 祐司が かれじしん 一番かつ じふ い
太郎は 祐司が 彼自身が 一番かつ 自負していると 言った。

Taro-wa Yuji-ga kare-zisin-ga itiban.kakkoiito zihusiteiru-to itta

Taro-TOP Yuji-NOM self-NOM most.handsome-COMP believes-COMP said

12A. Keiji was taking some photographs at the park. Later, he showed one of his brothers, Yuji, the photographs, but not Taro. The next day, Taro was talking with his girlfriend and told her about this.

圭司は公園で写真を撮った。その写真を弟の祐司に見せたが、太郎には見せなかった。

翌日、太郎は彼女にこのことについて話した。

12B. Taro was taking some photographs at the park and gave them to Keiji. Later that day, Keiji showed his friend Yuji the photographs that Taro took. Taro found out about this and told his roommate.

太郎は公園で写真を撮り、圭司に写真をあげた。その後、圭司は太郎が撮った写真を友達
の祐司に見せた。太郎はこのことを知り、ルームメートに話した。

Taro said Keiji showed the photographs that self took to Yuji.

たろう けいじ がれじしん と しゃしん ゆうじ
太郎は 圭司が 彼自身の と撮った 写真を 祐司に

み い
見せたと 言った。

Taro-wa Keiji-ga kare-zisin-no totta syasin-o Yuji-ni

miseta-to itta

Taro-TOP Keiji-NOM self-GEN took photograph-ACC Yuji-DAT

showed-COMP said

13A. Yuji and Ichiro work in the same company. Ichiro finished work early and went home.

When their supervisor asked where Ichiro went, Yuji explained that he went home.

祐司と一郎は同じ会社に勤めている。一郎は仕事を早く終え自分の家に帰った。課長が一郎がどこに行ったか聞くと、祐司は家に帰ったと説明した。

13B. Yuji and Ichiro work in the same company. Ichiro needed to pick something up at Yuji's place and went to his house. When their supervisor asked where Ichiro went, Yuji explained.

祐司と一郎は同じ会社に勤めている。一郎は祐司の家から何かが必要となり、祐司の家に取りに行った。課長は一郎がどこに行ったかと聞いたので、祐司は説明した。

Yuji said Ichiro returned/went to self's home.

ゆうじ いちろう かれじしん いえ かえ い い
祐司は 一郎が 彼自身の 家に 帰った/行くと 言った。

Yuji-wa Ichiro-ga kare-zisin-no ie-ni kaetta/itta-to itta

Yuji-TOP Ichiro-NOM self-GEN house-DAT returned/went-COMP said

14A. Taro and Keiji work in the same company. Taro and his co-workers were going to order lunch, but Keiji already ordered a bento for himself. Taro told his co-workers about this.

太郎と圭司は同じ会社に勤めている。太郎と同僚はお昼を注文するところだったが、圭司はもうすでに自分のために弁当を注文してしまった。太郎は同僚にこのことについて話した。

14B. Taro and Keiji work in the same company. Taro was about to order lunch, but found out Keiji ordered a bento for him. Taro was impressed and told his other co-workers about this during a break.

太郎と圭司は同じ会社に勤めている。太郎はお昼を注文するところだったが、圭司が太郎のためにもうすでに弁当を注文してくれたと知った。それが嬉しくて、同僚にこのことについて太郎は話した。

Taro said Keiji ordered bento for self.

たろう 圭司が 彼自身に 弁当を 注文したと 言った。

Taro-wa Keiji-ga kare-zisin-ni bentō-o tyūmonsita-to itta

Taro-TOP Keiji-NOM self-DAT bentō-ACC ordered-COMP said

15A. Ichiro went to the department store to buy an iPad for himself. He went home and showed his roommate Yuji his new iPad. The next day, Yuji told his girlfriend what Ichiro did yesterday.

一郎はデパートでアイパッドを自分用に買った。家に帰ると祐司に新しいアイパッドを見せた。翌日、祐司は彼女に昨日一郎がしたことについて話した。

15B. Ichiro went to the department store to buy an iPad for his brother Yuji. He went home and gave Yuji his new iPad. Delighted, Yuji told his friends the next day what Ichiro did.

一郎は弟の祐司のためにアイパッドを買いにデパートに行った。そして家に帰って祐司にアイパッドをあげた。祐司は喜んで、友達に一郎がしてくれたことについて話した。

Yuji said Ichiro bought an iPad for self.

ゆうじ 一郎が 彼自身に アイパッドを 買ったと 言った。

Yuji-wa Ichiro-ga kare-zisin-ni aipaddo-o katta-to itta

Yuji-TOP Ichiro-NOM self-DAT iPad-ACC bought-COMP said

16A. (Object binding) Taro is a photographer doing a photoshoot for Keiji. After doing some editing, he met Keiji at a café a few days later. There, he showed Keiji the photographs.

写真家の太郎は圭司の写真撮影をした。写真を編集して、数日後喫茶店で圭司に撮った写真を見せた。

16B. (Subject binding) Taro is a photographer and took some self-portraits of himself. After doing some editing, he showed his friend Keiji the pictures that he took.

写真家の太郎は自撮りの写真を撮った。写真を編集して、友達の圭司に撮った写真を見せた。

Taro showed Keiji photographs of self.

たろう 太郎は	けいじ 圭司に	かれじしん 彼自身の	しゃしん 写真を	み 見せた。
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Taro-wa	Keiji-ni	kare-zisin-no	syasin-o	miseta
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Taro-TOP	Keiji-DAT	self-GEN	photograph-ACC	showed
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たろう 太郎は	かれじしん 彼自身の	しゃしん 写真を	けいじ 圭司に	み 見せた。
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Taro-wa	kare-zisin-no	syasin-o	Keiji-ni	miseta
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Taro-TOP	self-GEN	photograph-ACC	Keiji-DAT	showed
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けいじ 圭司に	たろう 太郎は	かれじしん 彼自身の	しゃしん 写真を	み 見せた。
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Keiji-ni	Taro-wa	kare-zisin-no	syasin-o	miseta
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Keiji-DAT	Taro-TOP	self-GEN	photograph-ACC	showed
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けいじ 圭司に	かれじしん 彼自身の	しゃしん 写真を	たろう 太郎は	み 見せた。
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Keiji-ni	kare-zisin-no	syasin-o	Taro-wa	miseta
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Keiji-DAT	self-GEN	photograph-ACC	Taro-TOP	showed
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17A. Keiko was taking selfies with her camera. The next day, she met her sister Natsuko and showed her the photographs, but not to her roommate Hanako. She was annoyed by this and told her boyfriend about it.

恵子は自撮りの写真を撮った。翌日、恵子は妹の夏子に会って、撮った写真を見せたが、ルームメートの花子は見せなかった。花子は不満に思い、彼氏にこのことについて話した。

17B. Hanako is a photographer doing a photoshoot for Keiko. The next day she picked up the photographs and showed her friend Natsuko. Hanako found out about this and told her roommate about it later that day.

写真家の夏子は花子の写真撮影をしていた。翌日、花子は写真を取りに行って、友達の玲子に見せた。その後、夏子はルームメートにこのことについて話した。

Hanako said Keiko showed the photographs that self took to Natsuko.

はなこ 花子は	けいこ 恵子が	かのじょじしん 彼女自身が	と 撮った	しゃしん 写真を	なつこ 夏子に
Hanako-wa	Keiko-ga	kanozyo-zisin-ga	totta	syasin-o	Natsuko-ni
Hanako-TOP	Keiko-NOM	self-NOM	took	photograph-ACC	Natsuko-DAT
み 見せたと	い 言った。				
miseta-to	itta				
showed-COMP	said				

18A. Yuko is a narcissist and believes she is the most beautiful at the university. Hanako found this unattractive and told her friends about Yuko.

裕子はナルシストで、自分が大学で一番きれいだと自負している。花子はこれはみつともないと思い、友達に裕子のことについて話した。

18B. Yuko believes that Hanako is the most beautiful student at the university. Hanako was flattered by this and told her parents the compliment Yuko gave her.

裕子は花子に彼女が大学で一番きれいだと言った。花子は嬉しくなって、自分の親に裕子が言ったことについて話した。

Hanako said Yuko believes herself to be the most beautiful (admires herself).

はなこ ゆうこ かのじょじしん いちばん じふ い
花子は 裕子が 彼女自身が 一番きれいだと 自負していると 言った。

Hanako-wa Yuko-ga kanozyo-zisin-ga itiban.kireida-to zihusiteiru-to itta

Hanako-TOP Yuko-NOM self-NOM most.beautiful-COMP believes-COMP said

19A. Keiko was taking some photographs at the park. Later, she showed one of her sisters, Natsuko, the photographs, but not Hanako. The next day, Hanako was talking with her boyfriend and told him about this.

恵子は公園で写真を撮った。その写真を妹の夏子に見せたが、花子には見せなかった。

翌日、花子は彼氏にこのことについて話した。19B. Hanako was taking some photographs at the park and gave them to Keiko. Later that day, Keiko showed her friend Natsuko the photographs that Hanako took. Hanako found out about this and told her roommates.

夏子は公園で写真を撮り、花子に写真をあげた。その後、花子は夏子が撮った写真を友達玲子に見せた。夏子はこのことを知り、ルームメートに話した。

Hanako said Keiko showed the photographs that self took to Natsuko

はなこ 花子は	けいこ 恵子が	かのじょじしん 彼女自身の	と 撮った	しゃしん 写真を	なつこ 夏子に
Hanako-wa	Keiko-ga	kanozyo-zisin-no	totta	syasin-o	Natsuko-ni
Hanako-TOP	Keiko-NOM	self-GEN	took	photograph-ACC	Natsuko-DAT
み 見せた	い 言った。				
miseta-to	itta				
showed-COMP	said				

20A. Yuko and Natsuko work in the same company. Natsuko finished work early and went home.

When their supervisor asked where Natsuko went, Yuko explained that she went home.

裕子と夏子は同じ会社に勤めている。夏子は仕事を早く終え自分の家に帰った。課長が夏子がどこに行ったか聞くと、裕子は家に帰ったと説明した。

20B. Yuko and Natsuko work in the same company. Natsuko needed to pick something up at Yuko's place and went to her house. When their supervisor asked where Natsuko went, Yuko explained.

裕子と夏子は同じ会社に勤めている。夏子は裕子の家から何かが必要となり、裕子の家に取りに行った。課長は夏子がどこに行ったかと聞いたので、裕子は説明した。

Yuko said Natsuko returned/went to self's home.

ゆうこ 裕子は	なつこ 夏子が	かのじょじしん 彼女自身の	いえ 家に	かえ 帰った/行ったと	い 言った。
Yuko-wa	Natsuko-ga	kanozyo-zisin-no	ie-ni	kaetta/itta-to	itta
Yuko-TOP	Natsuko-NOM	self-GEN	house-DAT	returned/went-COMP	said

21A. Hanako and Keiko work in the same company. Hanako and her co-workers were going to order lunch, but Keiko already ordered a bento for herself. Hanako told her co-workers about this.

花子と恵子は同じ会社に勤めている。花子と同僚はお昼を注文するところだったが、恵子はもうすでに自分のために弁当を注文してしまった。花子は同僚にこのことについて話した。

21B. Hanako and Keiko work in the same company. Hanako was about to order lunch, but found out Keiko ordered a bento for her. Hanako was impressed and told her other co-workers about this during a break.

夏子と恵子は同じ会社に勤めている。夏子はお昼を注文するところだったが、恵子が夏子のためにもうすでに弁当を注文してくれたと知った。それが嬉しくて、同僚にこのことについて夏子は話した。

Hanako said Keiko ordered bento for self.

はなこ けいこ かのじょじしん べんとう ちゅうもん い
花子は 恵子が 彼女自身に 弁当を 注文したと 言った。

Hanako-wa Keiko-ga kanozyo-zisin-ni bentō-o tyūmonsita-to itta

Hanako-TOP Keiko-NOM self-DAT bentō-ACC ordered-COMP said

22A. Natsuko went to the department store to buy an iPad for herself. She went home and showed her roommate Yuko her new iPad. The next day, Yuko told her boyfriend about what Natsuko did yesterday.

夏子はデパートでアイパッドを自分用買った。家に帰ると裕子に新しいアイパッドを見せた。翌日、裕子は彼氏に昨日夏子がしたことについて話した。

22B. Natsuko went to the department store to buy an iPad for her sister Yuko. She went home and gave Yuko her new iPad. Delighted, Yuko told her friends the next day what Natsuko did.

恵子は妹の裕子のためにアイパッドを買いにデパートに行った。そして家に帰って裕子にアイパッドをあげた。裕子は喜んで、友達に恵子がしてくれたことについて話した。

Yuko said Natsuko bought an iPad for self.

ゆうこ なつこ かのじょじしん アイパッドを か い
裕子は 夏子が 彼女自身に アイパッドを 買ったと 言った。

Yuko-wa Natsuko-ga kanozyo-zisin-ni aipaddo-o katta-to itta

Yuko-TOP Natsuko-NOM self-DAT iPad-ACC bought-COMP said

23A. (Object binding) Hanako is a photographer doing a photoshoot for Keiko. After doing some editing, she met Keiko at a café a few days later. There, she showed Keiko the photographs.

写真家の花子は恵子の写真撮影をしていた。写真を編集して、数日後喫茶店で恵子に撮った写真を見せた。

23B. (Subject binding) Hanako is a photographer and took some self-portraits of herself. After doing some editing, she showed her friend Keiko the photographs that he took.

Hanako showed Keiko photographs of self.

はなこ けいこ かのじょじしん しゃしん み
花子は 恵子に 彼女自身の 写真を 見せた。

Hanako-wa Keiko-ni kanozyo-zisin-no syasin-o miseta

Hanako-TOP Keiko-DAT self-GEN photograph-ACC showed

はなこ かのじょじしん しゃしん けいこ み
花子は 彼女自身の 写真を 恵子に 見せた。

Hanako-wa kanozyo-zisin-no syasin-o Keiko-ni miseta

Hanako-TOP self-GEN photograph-ACC Keiko-DAT showed

けいこ はんこ かのじょじしん しゃしん み
恵子に 花子は 彼女自身の 写真を 見せた。

Keiko-ni Hanako-wa kanozyo-zisin-no syasin-o miseta

Keiko-DAT Hanako-TOP self-GEN photograph-ACC showed

けいこ かのじょじしん しゃしん はんこ み
恵子に 彼女自身の 写真を 花子は 見せた。

Keiko-ni kanozyo-zisin-no syasin-o Hanako-wa miseta

Keiko-DAT self-GEN photograph-ACC Hanako-TOP showed

FALSE SENTENCES (FILLERS)

23. Taro made pasta for dinner but Hanako was not feeling well. She decided not to eat the pasta.

The next day, Hanako's parents asked Taro how she was doing and whether she had eaten, and Taro explained.

夕食に太郎はパスタを調理したが、花子は具合が悪くて夕食を食べないことにした。翌日、花子の親が太郎に花子のことについて聞き、食事をとっているか聞いたので、太郎は説明した。

Taro said Hanako ate the pasta he prepared.

たろう はんこ じぶん じぶんじしん つく 食べた い
太郎は 花子が 自分/自分自身が 作った パスタを 食べたと言った。

Taro-wa Hanako-ga zibun/zibun-zisin-ga tukutta pasuta-o tabeta-to itta

Taro-TOP Hanako-NOM self-NOM made pasta-ACC ate-COMP said

24. Natsuko had made a big mistake at work but did not admit it. Jiro noticed and confronted her but she still did not admit it. Later that day Jiro told his supervisor about this.

夏子は仕事で大失敗をしたが、否を認めなかった。次郎は気づいて、彼女を責めたが、夏子は認めなかった。その後、次郎は課長にこのことを話した。

Jiro said Natsuko admitted self's mistake

じろう なつこ じぶん じぶん じしん ひ みと い
次郎は 夏子が 自分/自分自身の 否を 認めたと言った。

Jiro-wa Natsuko-ga zibun/zibun-zisin-no hi-o mitometa-to itta

Jiro-TOP Natsuko-NOM self-GEN mistake-ACC admitted-COMP said

25. Ichiro went to the department store to buy a gift for his sister Reiko. Later he told his girlfriend Hanako that he bought a sweater for Reiko. Hanako thought this was nice and told her friends about this.

一郎は妹の玲子へのお土産を買うためにデパートに行った。その後、彼女の花子に自分が玲子にセーターを買ってあげたと言った。花子は嬉しくなって、友達にこのことを話した。

Hanako said Ichiro bought a present for self.

はなこ いちろう じぶん じぶん じしん みやげ か い
花子は 一郎が 自分/自分自身に お土産を 買ったと言った。

Hanako-wa Ichiro-ga zibun-ni omiyage-o katta-to itta

Hanako-TOP Ichiro-NOM self-DAT gift-ACC bought-COMP said

26. Kato and Yamada are on the same baseball team. Kato had made a huge error during the game, and eventually their team lost. Many thought it his error was detrimental, but Kato did not blame himself. Yamada told his friends about the game later that night.

加藤と山田は同じ野球チームに入っていた。試合中加藤は大きなエラーをしてしまい、チームは負けてしまった。多くの人が加藤のエラーが試合を決定した思ったが、加藤は自分を責めなかった。その晩、山田は友達にゲームのことについて話した。

Yamada said Kato blamed himself.

やまだ 山田は かとう 加藤が じぶん 自分/自分自身/彼自身/彼女自身を せ 責めたと い 言った。

Yamada-wa Kato-ga zibun/zibun-zisin/kare-zisin/kanozyo-zisin-o semeta-to itta

Yamada-TOP Kato-NOM self-ACC blamed-COMP said

27. Taro made pasta for his family for dinner, but his brother Ichiro was not feeling well. He decided not to eat the pasta. The next day, Ichiro's girlfriend was asking how he was doing, and Taro explained.

夕食に太郎はパスタを調理したが、弟の一郎は具合が悪くて夕食を食べないことにした。翌日、一郎の彼女が太郎に一郎のことについて聞き、食事をとっているか聞いたので、太郎は説明した。

Taro said Ichiro ate the pasta he prepared.

太郎は 一郎が 彼自身が 作った パスタを 食べたと言った。

Taro-wa Itiro-ga kare-zisin-ga tukutta pasuta-o tabeta-to itta

Taro-TOP Ichiro-NOM self-NOM made pasta-ACC ate-COMP said

28. Yuji had made a big mistake at work but did not admit it. Jiro noticed and confronted him but he still did not admit it. Later that day Jiro told his supervisor about this.

祐司は仕事で大失敗をしたが、否を認めなかった。次郎は気づいて、彼を責めたが、祐司は認めなかった。その後、次郎は課長にこのことを話した。

Jiro said Yuji admitted self's mistake.

次郎は 祐司が 彼自身の 否を 認めたと言った。

Jiro-wa Yuji-ga kare-zisin-no hi-o mitometa-to itta

Jiro-TOP Yuji-NOM self-GEN mistake-ACC admitted-COMP said

29. Ichiro went to the department store to buy a gift for his brother Jiro. Later he told his friend Keiji that he bought a jacket for Jiro. Keiji thought this was nice and told his parents about this.

一郎は弟の次郎へのお土産を買うためにデパートに行った。その後、友達の圭司に自分が次郎にジャンパーを買ってあげたと言った。圭司は嬉しくなって、友達にこのことを話した。

Keiji said Ichiro bought a present for self.

圭司は 一郎が 彼自身に お土産を 買ったと言った。

Keiji-wa Itiro-ga kare-zisin-ni omiyage-o katta-to itta

Keiji-TOP Ichiro-NOM self-DAT gift-ACC bought-COMP said

30. Hanako made pasta for her family for dinner, but Natsuko was not feeling well. She decided not to eat the pasta. The next day, Natsuko's parents asked how she was, and Hanako explained.

夕食に花子はパスタを調理したが、夏子は具合が悪くて夕食を食べないことにした。翌日、夏子の親が花子に夏子のことについて聞き、食事をとっているか聞いたので、花子は説明した。

Hanako said Natsuko ate the pasta she prepared.

花子は 夏子が 彼女自身が 作った パスタを 食べたと言った。

Hanako-wa Natsuko-ga kanozyo-zisin-ga tukutta pasuta-o tabeta-to itta

Hanako-TOP Natsuko-NOM self-NOM made pasta-ACC ate-COMP said

31. Natsuko had made a big mistake at work but did not admit it. Keiko noticed and confronted her but she still did not admit it. Later that day Keiko told her supervisor about this.

夏子は仕事で大失敗をしたが、否を認めなかった。恵子は気づいて、彼女を責めたが、
夏子は認めなかった。その後、恵子は課長にこのことを話した。

Keiko said Natsuko admitted self's mistake.

恵子は 夏子が 彼女自身の 否を 認めたと言った。

Keiko-wa Hanako-ga kanozyo-zisin-no hi-o mitometa-to itta

Keiko-TOP Hanako-NOM self-NOM mistake-ACC admitted-COMP said

32. Yuko went to the department store to buy a gift for her boyfriend. Later she told her sister Hanako that she bought a new wallet for her boyfriend. Hanako thought this was nice and told their mother about this.

裕子は彼氏へのお土産を買うためにデパートに行った。その後、妹の花子に彼氏に財布
を買ったと言った。花子は感心して、母親にこのことを話した。

Hanako said Yuko bought a present for self.

花子は 裕子が 彼女自身に お土産を 買ったと 言った。

Hanako-wa Yuko-ga kanozyo-zisin-ni omiyage-o katta-to itta

Hanako-TOP Yuko-NOM self-DAT gift-ACC bought-COMP said

RELATIVE CLAUSE SENTENCES (FILLERS)

Subject Relatives

33. Taro went over to Hanako's place. As a gift, he gave Hanako some chocolate. Delighted, Hanako told her friend about this.

太郎は花子の家に遊びに行った。お土産として、花子にチョコレートあげた。花子は喜んで、友達にこのことについて話した。

Taro gave a biscuit to Hanako.

太郎は 花子に ビスケットを あげた。

Taro-wa Hanako-ni bisuketto-o ageta

Taro-TOP Hanako-DAT biscuit-ACC gave

34. Taro gave Hanako a dog for her birthday. That day, before going to Hanako's place, the dog ate a biscuit at Taro's house.

花子の誕生日に太郎は犬をあげた。その日、花子の家に行く前に、犬は太郎の家でビスケットを食べた。

Taro gave the dog that ate a biscuit to Hanako.

太郎は 花子に [ビスケットを 食べた] 犬を あげた。

Taro-wa Hanako-ni [bisuketto-o tabeta] inu-o ageta

Taro-TOP Hanako-DAT [biscuit-ACC ate] dog-ACC gave

35. Sato went to Tokyo for a business trip for a while. Before going to Tokyo, Sato left his car at Suzuki's house, and went to the station by taxi.

佐藤はしばらく出張で東京に行った。東京に行く前に佐藤は車を鈴木の家に残けて、駅までタクシーで行った。

Sato left the car with Suzuki.

佐藤は 鈴木に 車を 預けた。

Sato-wa Suzuki-ni kuruma-o azuketa

Sato-TOP Suzuki-DAT car-ACC left

36. Sato went to Tokyo for a business trip for a while. Before going to Tokyo, Sato left his car at Suzuki's house, and left his dog with the parents.

佐藤はしばらく出張で東京に行った。東京に行く前に佐藤は車を鈴木に残けて、自分の犬は親に残けた。

Sato left the dog that made the car dirty ('dirtied the car') with Suzuki.

佐藤は 鈴木に [車を 汚した] 犬を 預けた。

Sato-wa Suzuki-ni [kuruma-o yogosita] inu-o azuketa

Sato-TOP Suzuki-DAT [kuruma-ACC dirtied] inu-ACC left

Object Relatives

37. After work, Yuji stopped by at the supermarket. There, he bought a fried chicken meal. He ate the fried chicken meal after returning home.

祐司は仕事が終わって、帰りにスーパーによった。そこで唐揚げ弁当を買った。家に帰って、その唐揚げ弁当を食べた。

Yuji bought a pizza.

祐司は ピザを 買った。

Yuji-wa piza-o katta

Yuji-TOP pizza-ACC bought

38. After work, Yuji stopped by the supermarket. There, he bought a pizza and fried chicken meal. After returning home, Keiko ate that pizza, and Yuji ate the fried chicken meal.

祐司は仕事が終わって、帰りにスーパーによった。そこでピザと唐揚げ弁当を買った。家に帰って、恵子はそのピザを食べた。祐司は唐揚げ弁当を食べた。

Yuji bought the pizza that Keiko ate.

祐司は [恵子が 食べた] ピザを 買った。

Yuji-wa [Keiko-ga tabeta] piza-o katta

Yuji-TOP [Keiko-NOM ate] pizza-ACC bought

39. Yuko really likes coffee. In the morning, she drinks coffee while watching the news. The coffee she drank was bought at Starbucks.

裕子はコーヒーが大好きだ。朝はコーヒーを飲みながらニュースを見た。そのコーヒーはスタバで買ったコーヒーだった。

Yuko drank coffee.

裕子は コーヒーを 飲んだ。

Yuko-wa kōhī-o nonda

Yuko-TOP coffee-ACC drank

40. Yuko really likes coffee. In the morning, she drinks coffee while watching the news. The coffee she drank was given to her boyfriend Shinji by his parents.

裕子はコーヒーが大好きだ。朝はコーヒーを飲みながらニュースを見た。そのコーヒーは彼氏の慎司が親からもらったコーヒーだった。

Yuko drank the coffee that Shinji bought.

裕子は [慎司が 買った] コーヒーを 飲んだ。

Yuko-wa [Sinzi-ga katta] kōhī -o nonda

Yuko-TOP [Shinji-NOM bought] coffee-ACC drank

Oblique Relatives

41. As Ichiro is going to Hokkaido next week, he was looking for a hotel. However, the hotels were too expensive, so he decided to stay at his friends.

一郎は来週北海道に行くことになって、ホテルを探していた。しかし、ホテルが高すぎて、友達の家泊まることにした。

Ichiro reserved the hotel.

一郎は ホテルを 予約した。

Itiro-wa hoteru-o yoyakusita

Ichiro-TOP hotel-ACC reserved

42. As Ichiro is going to Hokkaido next week, he was looking for a hotel. His friend Yuji recommended the Nikko Hotel at which he stayed at last month. It looked good, so Ichiro also booked that hotel.

一郎は来週北海道に行くことになって、ホテルを探していた。友達の浩司が先月自分が泊まった日航ホテルを薦めた。良さそうなので、一郎はそのホテルを予約した。

Ichiro reserved the hotel in which Koji stayed.

一郎は [浩司が 泊まった] ホテルを 予約した。

Itiro-wa [Kozi-ga tomatta] hotel-o yoyakusita

Ichiro-TOP [Koji-NOM stayed] hotel-ACC reserved

43. Natsuko was looking for a new job. She found one particular company while searching. It looked good and she did some more investigating.

夏子は新しい仕事を探していた。検索していうと、ある会社を発見した。良さそうだったので、もっと詳しく調べた。

Natsuko investigated (looked up) the company.

夏子は 会社を 調べた。

Natuko-wa kaisya-o sirabeta

Natsuko-TOP company-ACC investigated

44. Natsuko was looking for a new job. She found one particular company while searching. She asked her friend Jiro about the company. It sounded good and she did some more investigating.

夏子は新しい仕事を探していた。検索していると、ある会社を発見した。友達の次郎にその会社について聞いた。良さそうだったので、もっと詳しく調べた。

Natsuko investigated the company in which Jiro was working at.

夏子は [次郎が 勤めていた] 会社を 調べた。

Natuko-wa [Ziro-ga tutometeita] kaisya-o sirabeta

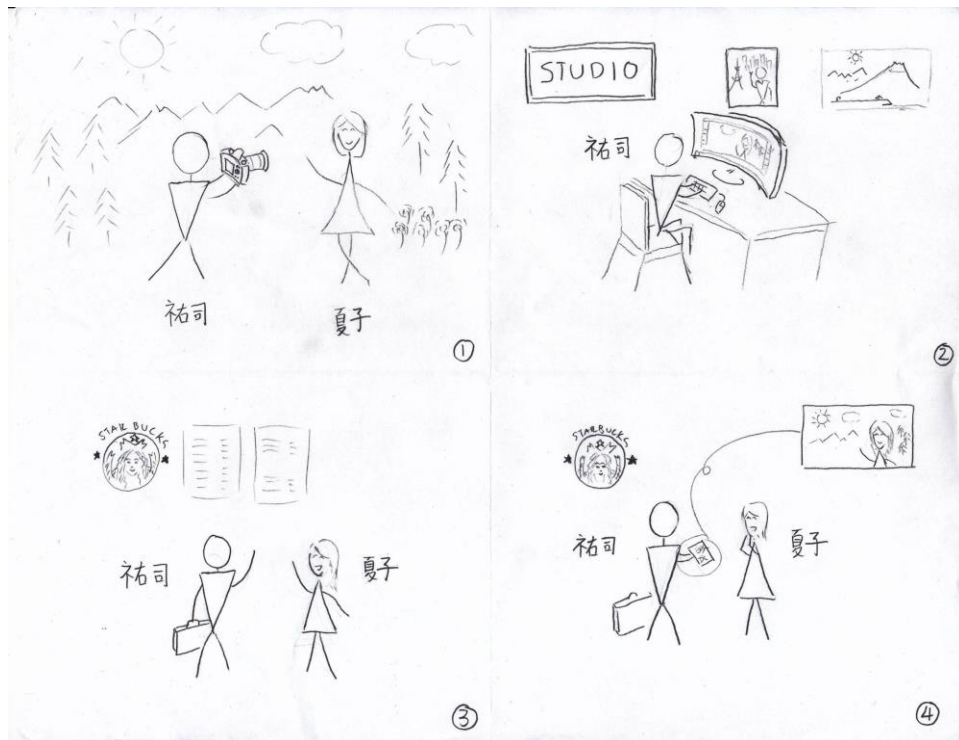
Natsuko-TOP [Jiro-NOM worked] company-ACC investigated

APPENDIX B

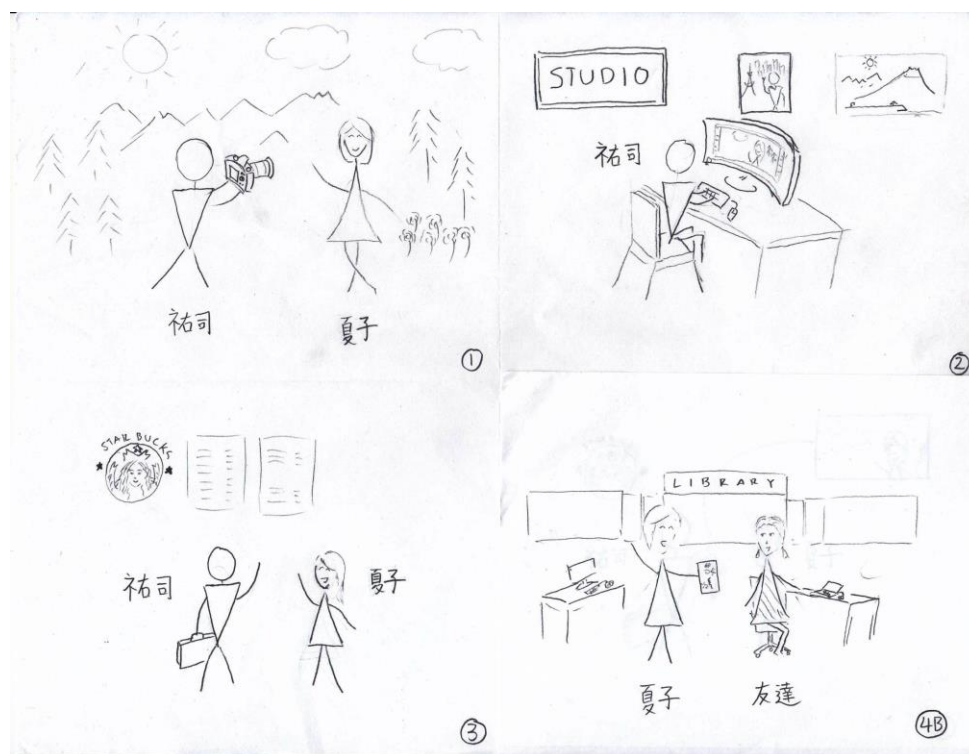
PICTURE DESCRIPTION TASK

The following are the *yonkoma manga*'s from the picture description task. Only the last scene is given in the description.

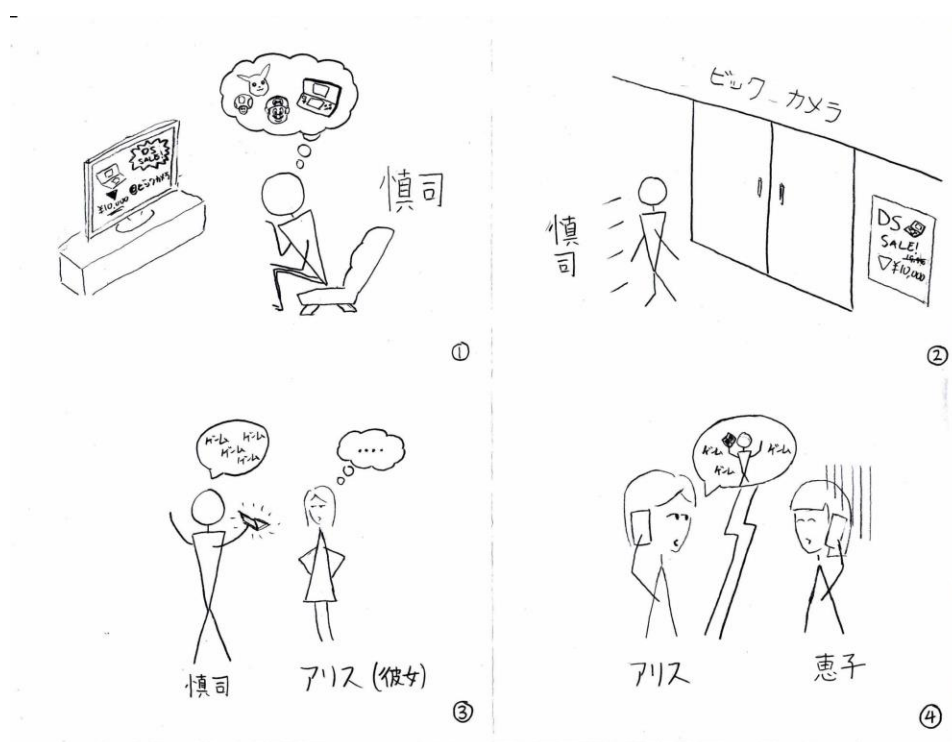
Picture A: Yuji showed Natsuko a photograph of *self*. (Local binding).



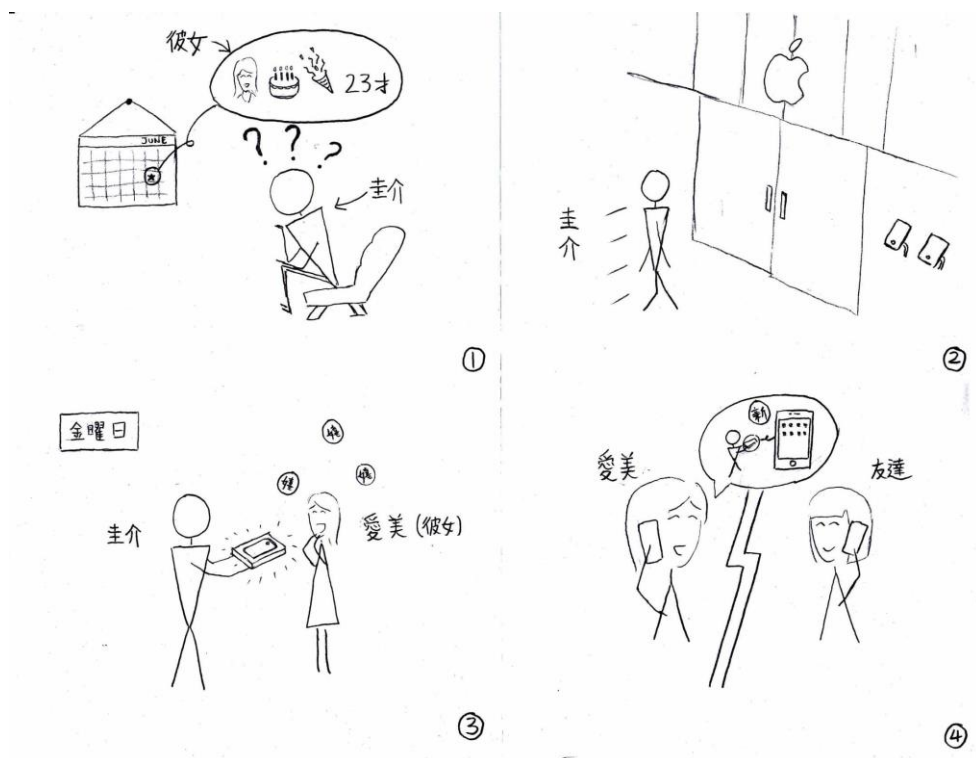
Picture B: Natsuko showed her friend at the library a photograph of *self*. (LD binding).



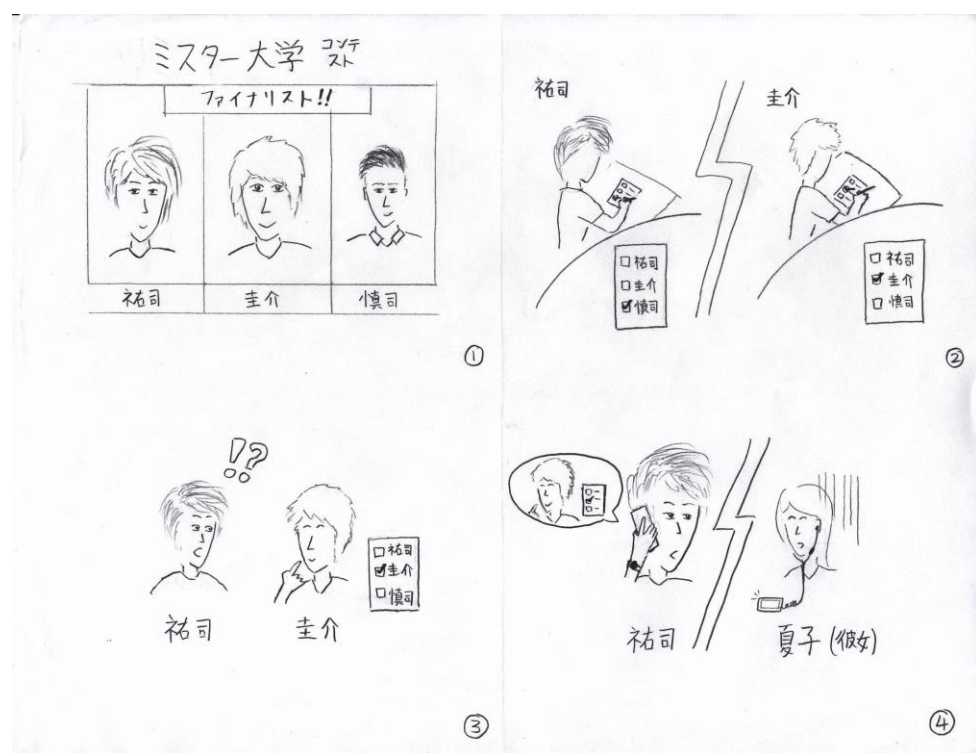
Picture C: Alice told her friend Keiko that Shinji bought a DS for *self*. (Local binding).



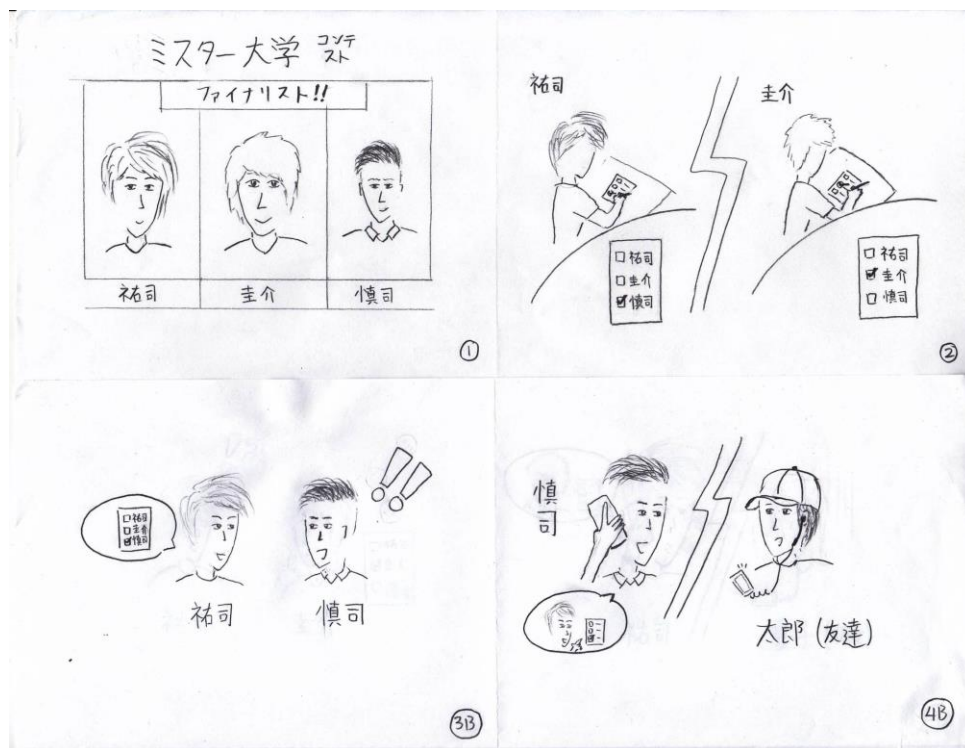
Picture D: Manami told her friend that Keisuke bought an iPad for *self*. (LD binding).



Picture E: Yuji told Natsuko that Keisuke voted for *self*. (Local binding).



Picture F: Shinji told Taro that Yuji voted for *self*. (LD binding).



APPENDIX C

TRUTH-VALUE JUDGMENT TASK FULL RESULTS

Complete results from the Truth Value Judgment task, organized by form, multi-clausal, mono-clausal, and filler sentences (relative clauses). Table are categorized by reflexives, case marker, and predicate. The numbers indicate how many participants answered True and percentages of True responses. N-sizes for L1 Japanese = 48, L1 Korean = 18, L1 Chinese = 40.

C.1 MULTI-CLAUSAL SENTENCES (*ZIBUN*)

Table 54. Results of multi-clausal sentences of *zibun* from the truth-value judgment task

<u>L1</u>	<u>VP</u>	<u>Case</u>	<u>Zibun</u>			
			<u>Local</u>		<u>LD</u>	
Japanese	Show	NOM	13	0.52	18	0.78
		GEN	12	0.48	14	0.61
Korean		NOM	4	0.50	7	0.70
		GEN	3	0.38	8	0.80
Chinese		NOM	10	0.50	11	0.55
		GEN	14	0.70	12	0.60
Japanese	Believe	NOM	18	0.78	1	0.04
Korean			9	0.90	2	0.25
Chinese			13	0.65	2	0.10
Japanese	Criticize/ blame	ACC	14	0.56	14	0.61
Korean			4	0.50	10	1.00
Chinese			9	0.45	14	0.70
Japanese	Praise	ACC	10	0.43	17	0.68
Korean			3	0.30	6	0.75
Chinese			10	0.50	16	0.80

Table 54 (continued)

Japanese	Go/return	GEN	10	0.43	19	0.76
Korean			8	0.80	6	0.75
Chinese			15	0.75	13	0.65
Japanese	Order	DAT	6	0.24	14	0.61
Korean			3	0.38	6	0.60
Chinese			15	0.75	15	0.75
Japanese	Bought	DAT	11	0.48	22	0.88
Korean			3	0.30	5	0.63
Chinese			9	0.45	17	0.85

C.2 MULTI-CLAUSAL SENTENCES (*ZIBUN-ZISIN*)

Table 55. Results of multi-clausal sentences with *zibun-zisin* from the truth-value judgment task

<u>L1</u>	<u>VP</u>	<u>Case</u>	<u>Zibun-zisin</u>			
			<u>Local</u>		<u>LD</u>	
Japanese	Show	NOM	19	0.83	13	0.52
		GEN	14	0.61	16	0.64
Korean		NOM	9	0.90	5	0.63
		GEN	5	0.50	4	0.50
Chinese		NOM	17	0.85	7	0.35
		GEN	12	0.60	12	0.60
Japanese	Believe	NOM	20	0.80	4	0.17
Korean			8	1.00	0	0.00
Chinese			14	0.70	2	0.10
Japanese	Criticize/ blame	ACC	13	0.57	14	0.56
Korean			9	0.90	4	0.50
Chinese			14	0.70	12	0.60
Japanese	Praise	ACC	17	0.68	11	0.48
Korean			7	0.88	6	0.60
Chinese			17	0.85	11	0.55

Table 55 (continued)

Japanese	Go/return	GEN	18	0.72	15	0.65
Korean			5	0.63	4	0.40
Chinese			14	0.70	13	0.65
Japanese	Order	DAT	9	0.39	15	0.60
Korean			6	0.60	4	0.50
Chinese			17	0.85	12	0.60
Japanese	Bought	DAT	18	0.72	18	0.78
Korean			4	0.50	4	0.40
Chinese			11	0.55	13	0.65

C.3 MULTI-CLAUSAL SENTENCES (*KARE/KANOZYU-ZISIN*)

Table 56. Results of multi-clausal sentences with *kare/kanozyo-zisin* from the truth-value judgment task

<u>L1</u>	<u>VP</u>	<u>Case</u>	<u>Kare/kanozyo-zisin</u>			
			<u>Local</u>		<u>LD</u>	
Japanese	Show	NOM	11	0.44	8	0.35
		GEN	14	0.61	8	0.32
Korean		NOM	3	0.38	3	0.30
		GEN	8	0.80	3	0.38
Chinese		NOM	6	0.30	10	0.50
		GEN	19	0.95	7	0.35
Japanese	Believe	NOM	20	0.87	1	0.04
Korean			9	0.90	0	0.00
Chinese			13	0.65	3	0.15
Japanese	Criticize/ blame	ACC	16	0.70	6	0.24
Korean			9	0.90	2	0.25
Chinese			17	0.85	9	0.45
Japanese	Praise	ACC	12	0.48	7	0.30
Korean			5	0.63	1	0.10
Chinese			7	0.35	4	0.20

Table 56 (continued)

Japanese	Go/return	GEN	25	1.00	7	0.30
Korean			8	1.00	1	0.10
Chinese			17	0.85	7	0.35
Japanese	Order	DAT	14	0.56	12	0.52
Korean			6	0.75	2	0.20
Chinese			11	0.55	6	0.30
Japanese	Bought	DAT	17	0.74	7	0.28
Korean			6	0.60	2	0.25
Chinese			16	0.80	5	0.25

C.4 MONO-CLAUSAL SENTENCES

Table 57. Results of mono-clausal sentences with *zibun* from the truth-value judgment task

<u>Zibun</u>					
	<u>Sentence</u>	<u>Local</u>		<u>LD</u>	
<u>L1</u>	<u>Type</u>	<u>Subject</u>		<u>Object</u>	
Japanese	A	18	0.90	10	0.36
	B	23	1.00	13	0.52
	C	25	0.89	9	0.45
	D	24	0.96	11	0.48
Korean	A	8	1.00	2	0.22
	B	10	1.00	2	0.22
	C	7	0.70	0	0.00
	D	7	0.88	2	0.22
Chinese	A	20	0.80	3	0.20
	B	18	0.95	1	0.05
	C	11	0.73	4	0.16
	D	17	0.81	6	0.32

Table 58. Results of mono-clausal sentences with *zibun-zisin* from the truth-value judgment task

<u>Zibun-Zisin</u>					
<u>L1</u>	<u>Sentence</u>	<u>Local</u>		<u>LD</u>	
	<u>Type</u>	<u>Subject</u>		<u>Object</u>	
Japanese	A	14	0.70	6	0.21
	B	17	0.74	1	0.04
	C	24	0.86	2	0.10
	D	25	1.00	3	0.13
Korean	A	8	1.00	3	0.33
	B	10	1.00	1	0.11
	C	9	0.90	0	0.00
	D	6	0.75	0	0.00
Chinese	A	16	0.64	3	0.20
	B	17	0.90	5	0.24
	C	12	0.80	0	0.00
	D	17	0.81	4	0.21

Table 59. Results of mono-clausal sentences with *kare/kanozyo-zisin* from the truth-value judgment task

<u><i>Kare/Kanozyo-zisin</i></u>					
<u>L1</u>	<u>Sentence</u>	<u>Local</u>		<u>LD</u>	
	<u>Type</u>	<u>Subject</u>		<u>Object</u>	
Japanese	A	12	0.60	22	0.79
	B	20	0.87	11	0.44
	C	15	0.54	10	0.50
	D	12	0.48	21	0.91
Korean	A	6	0.75	6	0.67
	B	10	1.00	2	0.22
	C	10	1.00	5	0.56
	D	5	0.63	6	0.67
Chinese	A	16	0.64	9	0.60
	B	14	0.74	2	0.10
	C	12	0.80	14	0.56
	D	13	0.62	10	0.53

APPENDIX D

N-SIZES FOR PREDICATE EFFECT TABLES

Table 60. N-sizes for Table 14 (L1 Japanese)

<u>Predicate</u>	<u>Case</u>	<u>Zibun</u>		<u>Zibun-zisin</u>		<u>Kare/kanozyo-zisin</u>	
		<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>
Show	Nom	25	23	25	23	25	23
Believe	Nom	23	25	23	25	23	25
Show	Gen	25	23	25	23	25	23
Return/go	Gen	23	25	23	25	23	25
Order	Dat	25	23	25	23	25	23
Buy	Dat	23	25	23	25	23	25
Blame/criticize	Acc	25	23	25	23	25	23
Praise	Acc	23	25	23	25	23	25

Table 61. N-sizes for Table 37 (L1 Korean)

<u>Predicate</u>	<u>Case</u>	<u>Zibun</u>		<u>Zibun-zisin</u>		<u>Kare/kanozyo-zisin</u>	
		<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>	<u>Local</u>	<u>LD</u>
Show	Nom	8	10	8	10	8	10
Believe	Nom	10	8	10	8	10	8
Show	Gen	8	10	8	10	8	10
Return/go	Gen	10	8	10	8	10	8
Order	Dat	8	10	8	10	8	10
Buy	Dat	10	8	10	8	10	8
Blame/criticize	Acc	8	10	8	10	8	10
Praise	Acc	10	8	10	8	10	8

APPENDIX E

STANDARD DEVIATIONS OF RESIDUAL READING TIMES

The following are the standard deviations from the residual reading times of multi- and mono-clausal sentences from the SPR task. The multi-clausal sentences are divided by case marker, and the mono-clausal sentences are divided by sentence type. Table references are provided in parentheses.

E.1 L1 JAPANESE

Table 62. L1 Japanese standard deviations for Table 17 (residual reading times of multi-clausal sentences with *zibun*)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	480.28	245.04	303.85	194.52	182.97	480.28	245.04
	Believed	297.27	96.57	214.40	262.30	113.66		
Acc	--	128.16	167.42	489.88	483.57			
Gen	Showed	331.73	480.15	173.05	341.48	236.99	431.97	237.72
	Returned	411.86	357.83	518.43	418.92	139.24		
Dat	--	318.86	323.11	344.16	240.52	450.24		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	103.86	125.55	120.62	99.20	312.29	504.21	163.79
	Believed	499.82	632.28	660.95	562.83	631.68		
Acc	--	365.59	328.73	434.98	286.92			
Gen	Showed	202.73	199.16	98.08	182.79	188.52	149.84	664.36
	Went	272.45	102.66	84.81	280.25	260.30		
Dat	--	289.90	164.33	489.22	257.67	315.72		

Table 63. L1 Japanese standard deviations for Table 18 (residual reading times of multi-clausal sentences with *zibun-zisin*)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	140.48	537.70	150.74	122.41	126.28	559.38	203.54
	Believed	164.33	499.54	193.14	145.71	142.34		
Acc	--	311.64	273.64	579.28	470.43			
Gen	Showed	279.22	277.98	130.82	104.31	184.44	162.48	349.95
	Returned	276.95	375.01	516.91	305.53	598.56		
Dat	--	172.32	388.99	174.16	134.26	357.22		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	190.74	492.64	594.52	251.45	432.50	163.45	576.32
	Believed	233.07	317.07	795.24	618.99	406.03		
Acc	--	300.56	273.45	417.24	443.14			
Gen	Showed	346.30	570.60	238.23	211.94	358.75	381.49	613.59
	Went	206.46	634.77	133.06	155.15	309.57		
Dat	--	282.28	464.05	405.24	359.00	458.00		

Table 64. L1 Japanese standard deviations for Table 19 (residual reading times of multi-clausal sentences with*kare/kanozyo-zisin)*

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	326.78	481.00	638.09	153.43	223.17	585.10	534.95
	Believed	124.05	169.94	353.73	253.38	759.56		
Acc	--	337.81	642.47	584.13	440.90			
Gen	Showed	207.43	449.55	166.29	152.70	81.00	360.60	231.65
	Returned	313.22	224.01	408.14	611.35	229.24		
Dat	--	355.23	692.22	161.73	315.63	175.27		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	164.85	353.98	97.00	173.00	178.37	277.18	276.80
	Believed	273.40	517.95	336.90	266.04	207.15		
Acc	--	346.04	401.52	554.87	216.34			
Gen	Showed	519.24	231.46	437.32	427.69	401.18	113.03	171.82
	Went	166.58	489.26	156.33	161.54	192.51		
Dat	--	363.66	522.60	695.12	297.90	391.77		

Table 65. L1 Japanese standard deviations for Table 21 (residual reading times of subject-bound mono-clausal sentences)

<u>Reflexive</u>	<u>Sentence</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
<i>Zibun</i>	A	136.31	121.10	143.18	101.22	360.03
	B	110.43	233.69	89.21	256.98	164.62
	C	168.33	420.64	324.63	141.39	145.80
	D	255.49	274.35	115.98	333.79	235.28
<i>Zibun-zisin</i>	A	117.47	95.51	190.25	151.96	325.33
	B	142.81	204.16	114.98	129.55	133.04
	C	228.11	337.36	598.65	319.65	142.95
	D	175.41	226.20	150.97	441.94	196.28
<i>Kare/</i>	A	146.92	170.08	226.71	309.58	186.39
<i>Kanozyo-zisin</i>	B	150.84	562.67	413.54	206.32	127.98
	C	189.43	150.60	696.46	123.98	232.65
	D	244.20	156.12	65.29	151.85	534.59

Table 66. L1 Japanese standard deviations for Table 22 (residual reading times of object-bound mono-clausal sentences)

<u>Reflexive</u>	<u>Sentence</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
<i>Zibun</i>	A	133.28	291.21	127.32	288.19	427.26
	B	171.36	283.98	473.10	189.05	122.38
	C	106.56	380.97	454.42	237.36	162.10
	D	151.09	126.74	146.03	326.64	560.67
<i>Zibun-zisin</i>	A	223.06	256.89	556.73	265.35	582.89
	B	112.74	175.21	132.91	122.09	321.69
	C	144.93	170.41	426.81	226.36	542.13
	D	284.94	292.54	550.18	237.74	569.07
<i>Kare/</i>	A	284.06	94.35	354.97	165.88	155.04
<i>Kanozyo-zisin</i>	B	129.53	283.57	462.09	157.58	702.18
	C	473.25	403.83	680.55	361.19	248.51
	D	219.91	561.35	682.89	367.10	223.24

E.2 L1 CHINESE

Table 67. L1 Chinese standard deviations for Table 42 (residual reading times of multi-clausal sentences with *zibun*)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	250.62	486.30	530.02	266.94	384.21	194.08	542.46
	Believed	380.18	367.17	466.76	328.63	612.66		
Acc	--	315.36	465.31	417.54	244.82			
Gen	Showed	223.76	225.51	493.44	180.99	200.19	184.59	264.30
	Returned	494.55	148.90	416.08	303.61	323.26		
Dat	--	262.50	534.78	195.5	532.71	254.14		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	129.11	621.51	210.77	480.60	223.79	735.44	301.24
	Believed	646.40	379.13	559.65	549.28	633.79		
Acc	--	428.96	560.15	411.38	534.26			
Gen	Showed	168.47	574.16	487.97	269.72	350.14	384.23	472.82
	Went	335.46	153.79	285.86	453.98	228.29		
Dat	--	252.99	347.02	186.35	307.42	697.32		

Table 68. L1 Chinese standard deviations for Table 43 (residual reading times of multi-clausal sentences with *zibun-zisin*)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	554.95	389.72	182.00	175.15	231.28	264.15	182.83
	Believed	249.45	176.94	453.12	423.42	536.13		
Acc	--	367.55	376.86	396.34	220.49			
Gen	Showed	179.76	354.14	692.98	416.47	259.03	591.54	283.84
	Returned	373.59	288.68	302.22	223.74	558.90		
Dat	--	380.56	421.17	288.00	267.67	172.87		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	313.25	286.13	159.76	626.47	366.32	268.17	239.64
	Believed	553.32	551.73	462.94	567.09	350.12		
Acc	--	538.71	503.67	543.85	457.48			
Gen	Showed	211.76	439.25	502	648.11	378.36	408.69	584.04
	Went	291.32	326.7	218.32	538.77	355.48		
Dat	--	186.86	404.02	292.63	699.06	313.43		

Table 69. L1 Chinese standard deviations for Table 44 (residual reading times of multi-clausal sentences with *kare/kanozyo-zisin*)

<u>Local</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	367.66	559.47	480.55	159.12	442.11	168.51	390.51
	Believed	527.24	691.50	317.15	273.96	621.96		
Acc	--	360.67	458.11	561.71	172.30			
Gen	Showed	149.08	320.24	305.21	124.56	121.81		
	Returned	583.79	252.8	387.96	214.01	598.61	420.14	548.19
Dat	--	439.30	486.11	678.06	358.3	286.26		
<u>LD</u>	<u>VP</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>	<u>(8)</u>
Nom	Showed	469.18	418.29	232.64	166.75	362.64	257.75	166.14
	Believed	436.11	534.33	324.75	346.19	211.83		
Acc	--	368.21	318.61	507.80	481.37			
Gen	Showed	227.56	523.83	545.07	506.56	263.27	443.60	514.47
	Went	490.23	493.38	172.04	282.52	183.69		
Dat	--	261.07	498.05	501.03	505.87	97.803		

Table 70. L1 Chinese standard deviations for Table 46 (residual reading times of subject-bound mono-clausal sentences)

<u>Reflexive</u>	<u>Sentence</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
<i>Zibun</i>	A	289.59	220.62	433.49	202.85	382.09
	B	109.45	245.33	192.36	433.82	643.88
	C	259.52	477.27	394.65	646.90	82.71
	D	178.05	174.36	195.63	385.02	368.56
<i>Zibun-zisin</i>	A	224.21	225.66	326.38	99.95	178.05
	B	287.60	320.19	118.50	262.79	270.69
	C	295.81	372.59	498.60	194.37	336.58
	D	332.15	302.07	372.89	169.71	365.16
<i>Kare/</i>	A	428.26	448.94	307.08	692.30	251.86
<i>Kanozyo-zisin</i>	B	224.13	554.16	337.02	416.27	257.08
	C	581.12	479.36	484.87	365.35	355.34
	D	223.75	546.29	693.70	619.12	480.47

Table 71. L1 Chinese standard deviations for Table 47 (residual reading times of object-bound mono-clausal sentences)

<u>Reflexive</u>	<u>Sentence</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
<i>Zibun</i>	A	180.11	302.30	764.55	571.76	217.26
	B	163.91	315.30	360.76	94.97	137.02
	C	295.11	465.98	294.39	155.27	602.93
	D	203.47	350.07	550.80	805.69	500.88
<i>Zibun-zisin</i>	A	156.57	260.86	244.44	546.59	666.84
	B	432.73	289.17	520.02	251.20	166.87
	C	236.38	463.16	416.68	522.78	345.09
	D	729.94	336.17	427.16	578.93	244.95
<i>Kare/</i>	A	314.48	298.53	550.04	550.25	547.17
<i>Kanozyo-zisin</i>	B	371.19	641.78	425.74	627.00	172.53
	C	232.06	528.23	304.61	434.56	528.79
	D	353.22	678.52	480.51	434.57	782.44

APPENDIX F

GLOBAL READING TIMES

The following are global reading times of multi- and mono-clausal sentences from the SPR task. The multi-clausal sentences are divided by case marker, and the mono-clausal sentences are divided by sentence type.

F.1 L1 JAPANESE

Table 72. L1 Japanese global reading times of multi-clausal sentences from the SPR task

<u>Multi-clausal</u>	<u>Nominative</u>	<u>Genitive</u>	<u>Dative</u>	<u>Accusative</u>
<i>Zibun</i>	5268.94	4820.91	4725.28	2410.02
<i>Zibun-zisin</i>	4820.98	5192.05	4074.45	4070.60
<i>Kare/kanozyo-zisin</i>	6474.04	5460.88	5528.09	5926.83

Table 73. L1 Japanese global reading times of mono-clausal sentences from the SPR task

<u>Mono-clausal</u>		<u>Zibun</u>	<u>Zibun-zisin</u>	<u>Kare/kanozyo-zisin</u>
Subject	Type A	3235.30	3531.40	4841.30
	Type B	3112.82	4622.64	4862.36
	Type C	3278.82	3779.73	6083.64
	Type D	3080.60	3306.30	4700.80
	Total (average)	3176.88	3810.02	5122.03
Object	Type A	2652.64	3490.00	3153.36
	Type B	2771.00	2797.90	3548.00
	Type C	2513.80	2353.00	3948.70
	Type D	2898.18	3081.55	6863.83
	Total (average)	2708.90	2930.61	4378.22

F.2 L1 CHINESE

Table 74. L1 Chinese global reading times of multi-clausal sentences from the SPR task

<u>Multi-clausal</u>	<u>Nominative</u>	<u>Genitive</u>	<u>Dative</u>	<u>Accusative</u>
<i>Zibun</i>	7191.11	6716.78	5411.91	5365.59
<i>Zibun-zisin</i>	7244.80	7435.98	5797.60	5656.81
<i>Kare/kanozyo-zisin</i>	8077.92	6485.39	6361.80	5931.71

Table 75. L1 Chinese global reading times of mono-clausal sentences from the SPR task

<u>Mono-clausal</u>		<u>Zibun</u>	<u>Zibun-zisin</u>	<u>Kare/kanozyo-zisin</u>
Subject	Type A	7995.75	5208.67	7640.25
	Type B	7463.70	9239.30	5879.00
	Type C	5973.33	6657.44	7306.00
	Type D	5357.46	5670.18	6284.36
	Total (average)	6697.56	6693.90	6777.40
Object	Type A	4604.56	5314.11	5778.56
	Type B	3835.00	4122.64	5728.73
	Type C	3093.92	4140.08	4947.58
	Type D	3751.80	3952.50	5813.10
	Total (average)	3821.32	4382.33	4455.99

APPENDIX G

SPR GRAPHS

The following are the graphs of the residual reading times. The graphs of the L1 Japanese are presented first, followed by the L1 Chinese. Within each L1 group, the multi-clausal sentences are presented first, followed by the mono-clausal. The examples given in the sentences are all with *zibun* (see Appendix A for sentences with other reflexives).

G.1 L1 JAPANESE

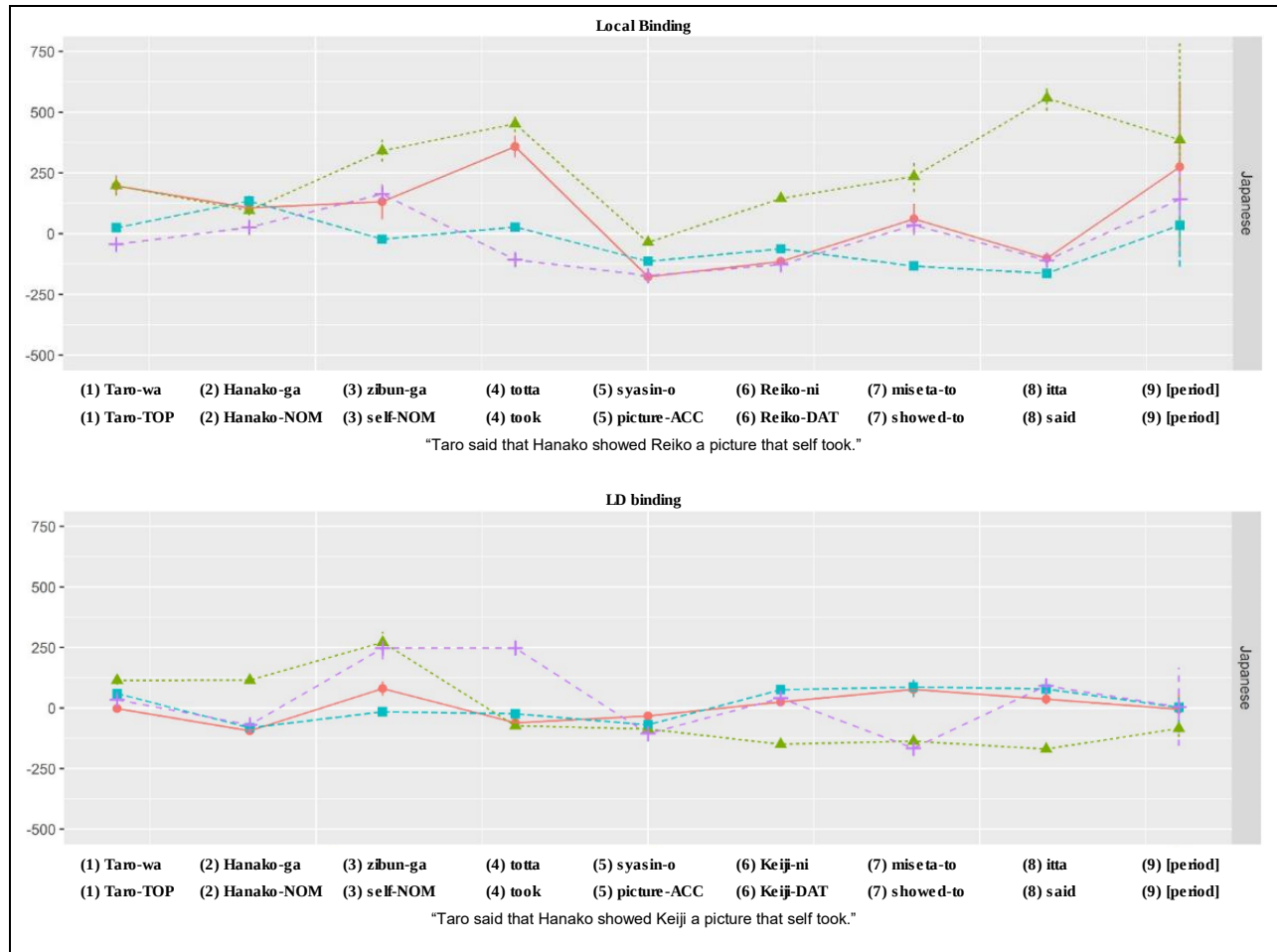


Figure 21. L1 Japanese residual reading times from multi-clausal sentences with nominative case-marked reflexives

Key: □ = *zibun* // + = *zibun-zisin* // Δ = *kare-zisin* // ○ = *kanozyo-zisin*

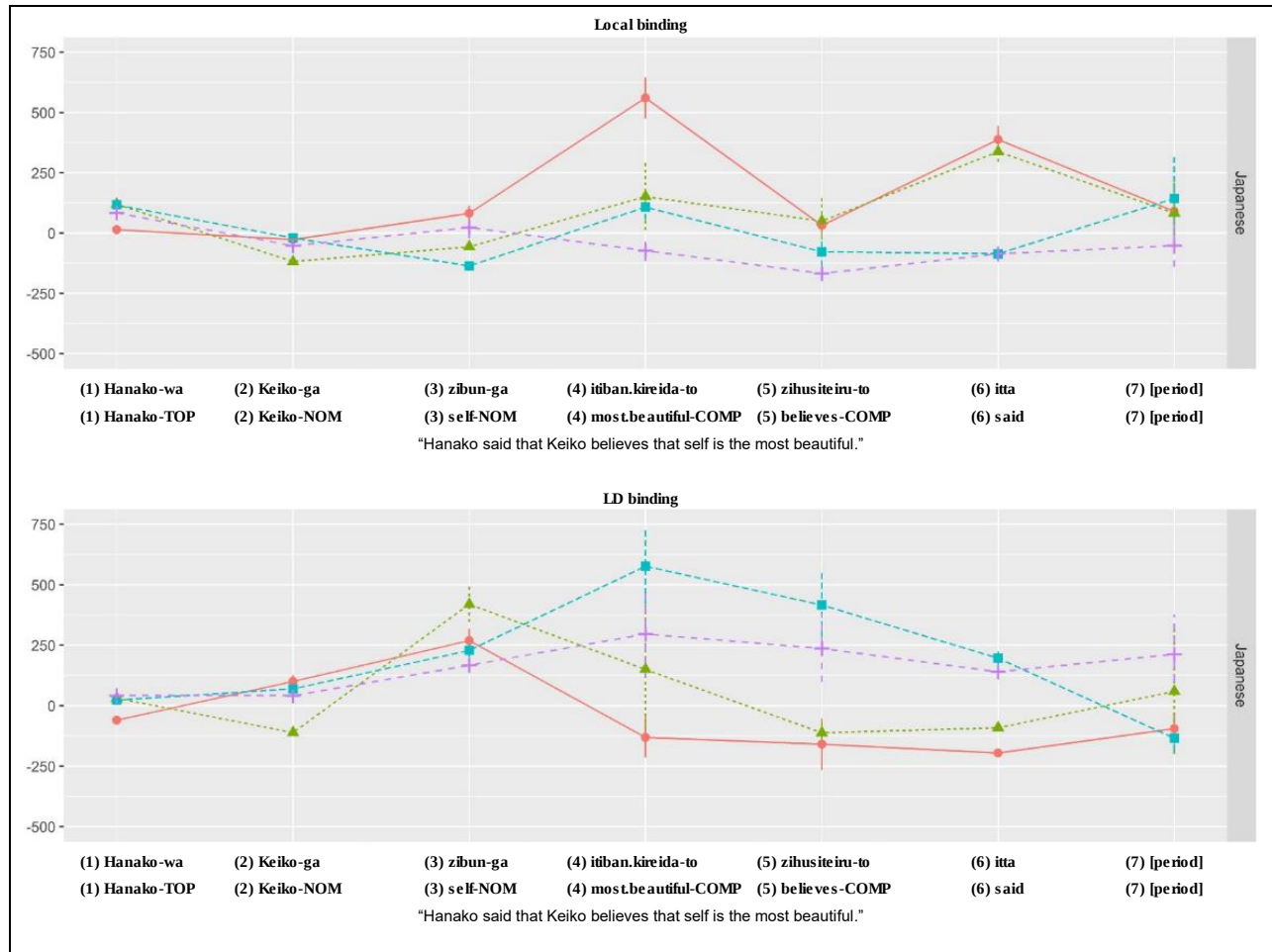


Figure 22. L1 Japanese residual reading times from multi-clausal sentences with nominative case-marked reflexives
(continued)

Key: $\square$ = *zibun* // $+$ = *zibun-zisin* // Δ = *kare-zisin* // $\circ$ = *kanozzyo-zisin*

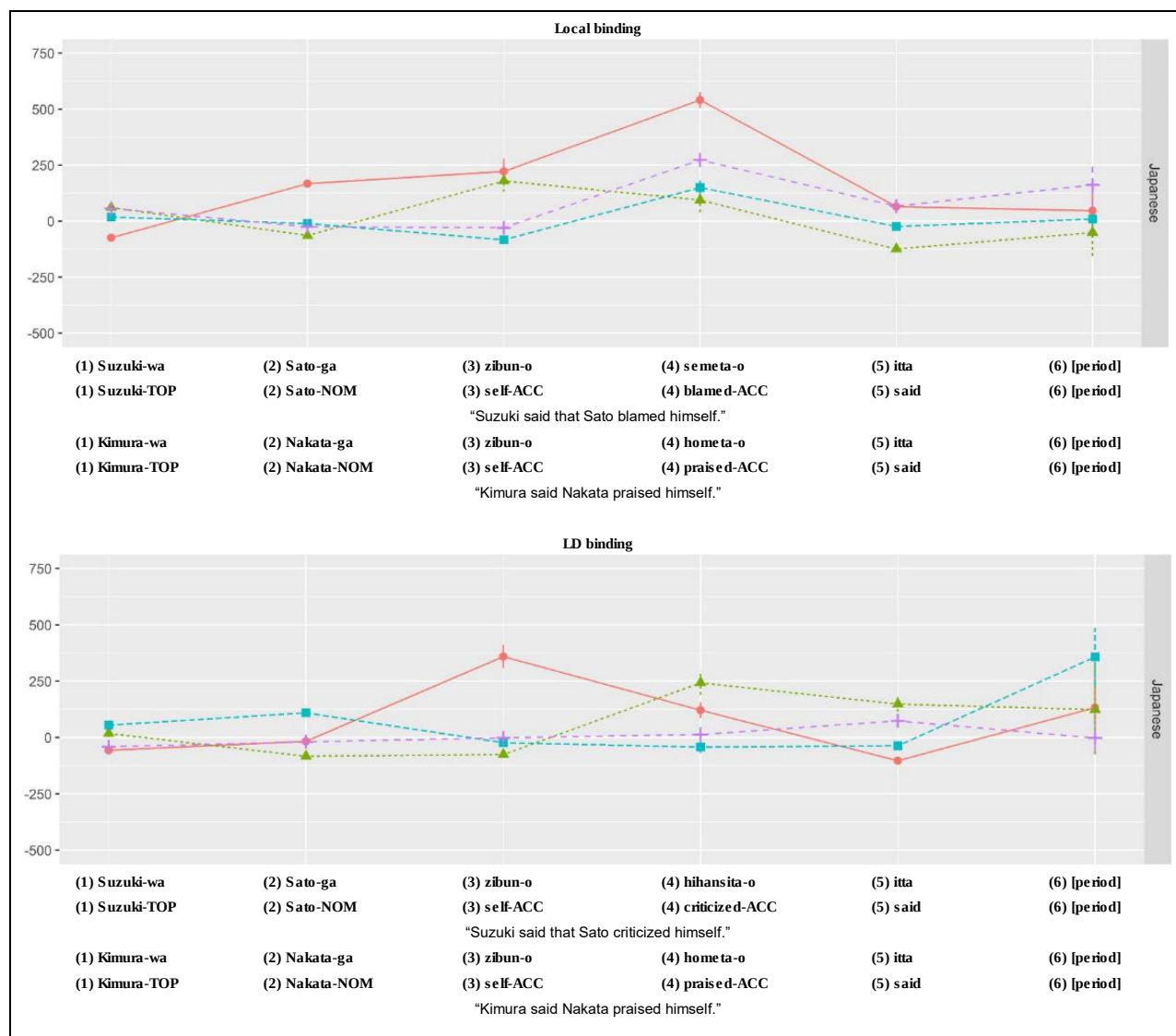


Figure 23. L1 Japanese residual reading times from multi-clausal sentences with accusative case-marked reflexives

Key: □ = *zibun* // + = *zibun-zisin* // Δ = *kare-zisin* // ○ = *kanozyo-zisin*

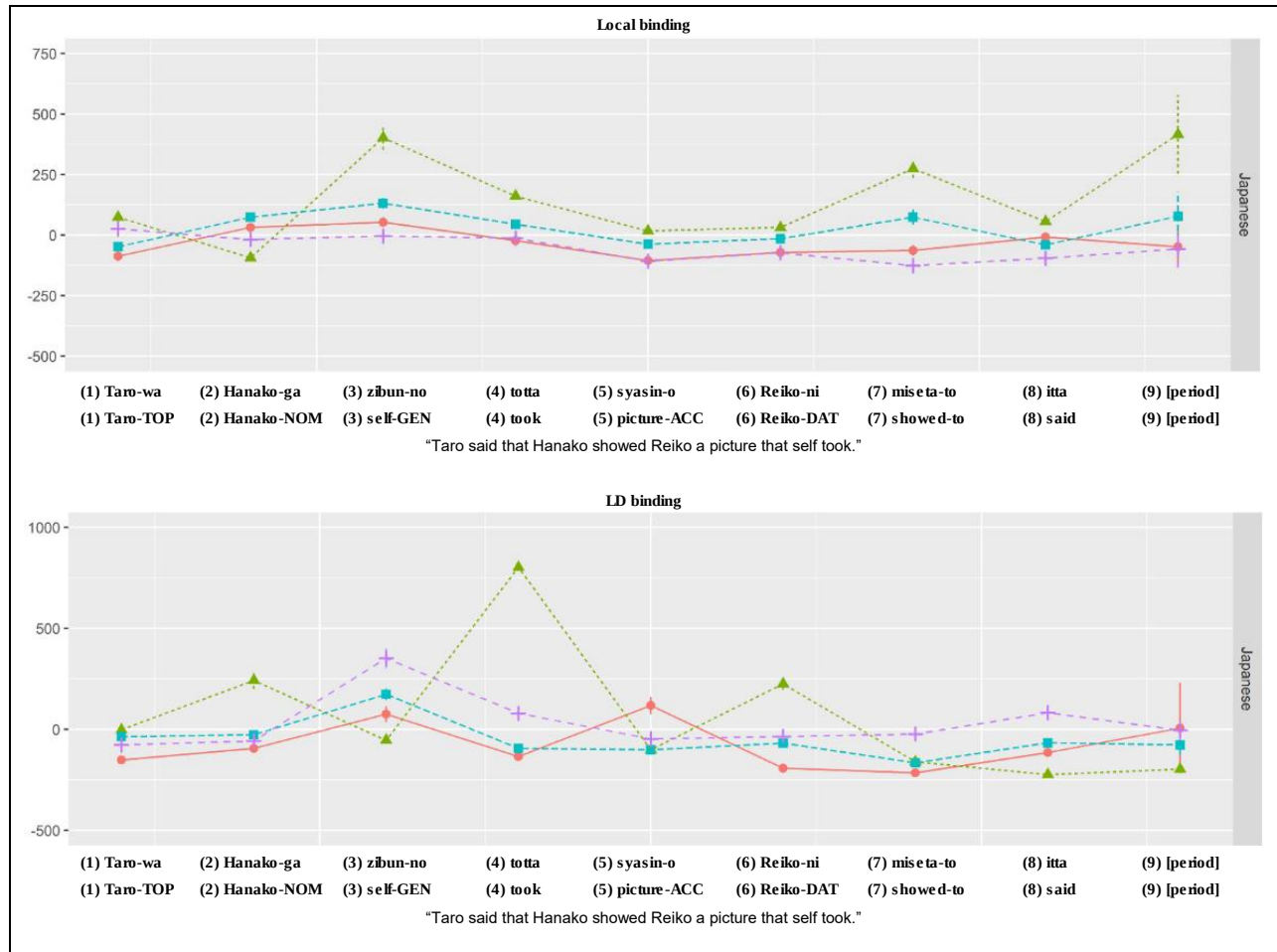


Figure 24. L1 Japanese residual reading times from multi-clausal sentences with genitive case-marked reflexives

Key: □ = *zibun* // + = *zibun-zisin* // Δ = *kare-zisin* // ○ = *kanozoyo-zisin*

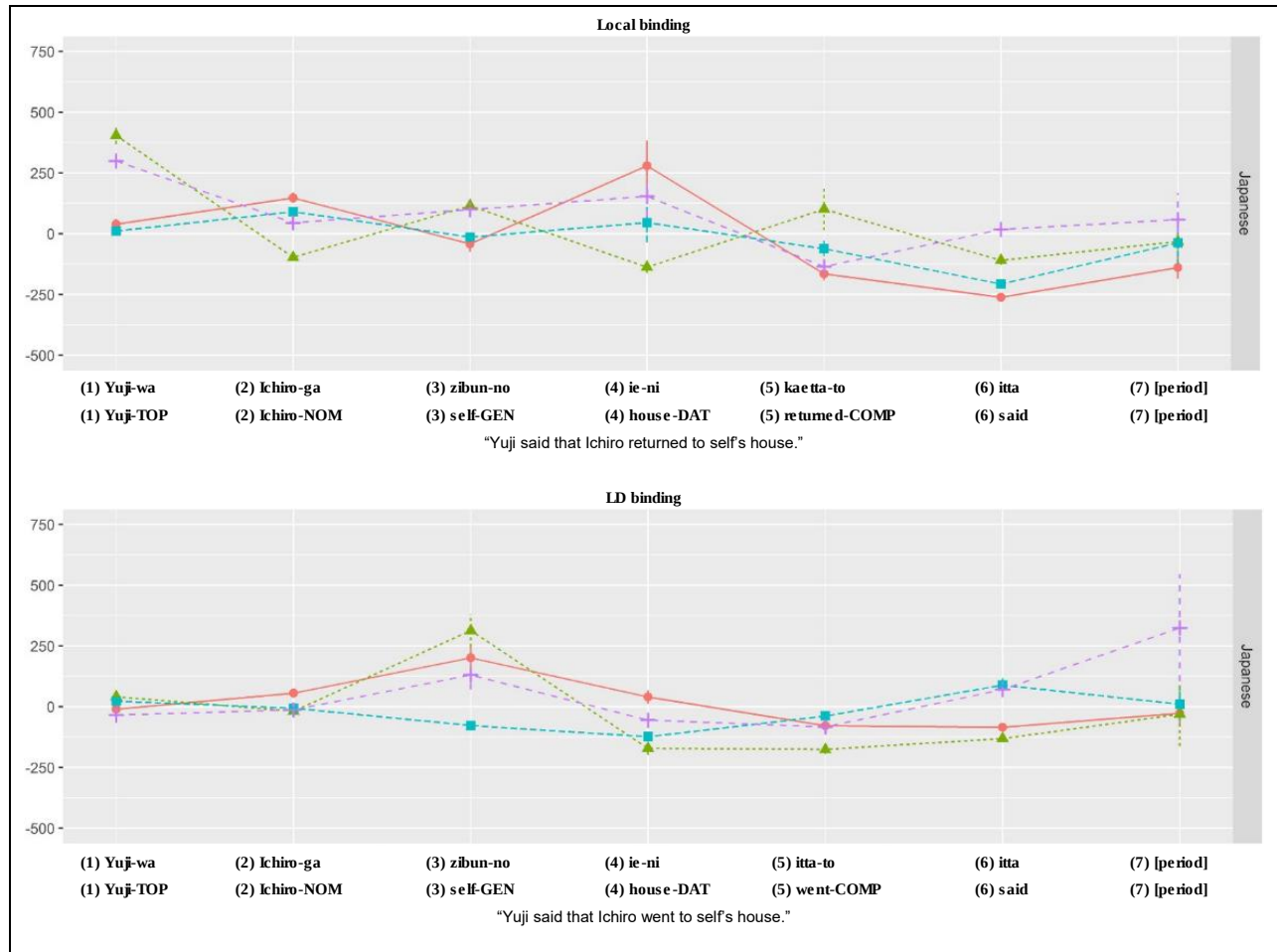


Figure 25. L1 Japanese residual reading times from multi-clausal sentences with genitive case-marked reflexives
(continued)

Key: $\square$ = *zibun* // $+$ = *zibun-zisin* // Δ = *kare-zisin* // $\circ$ = *kanozoyo-zisin*

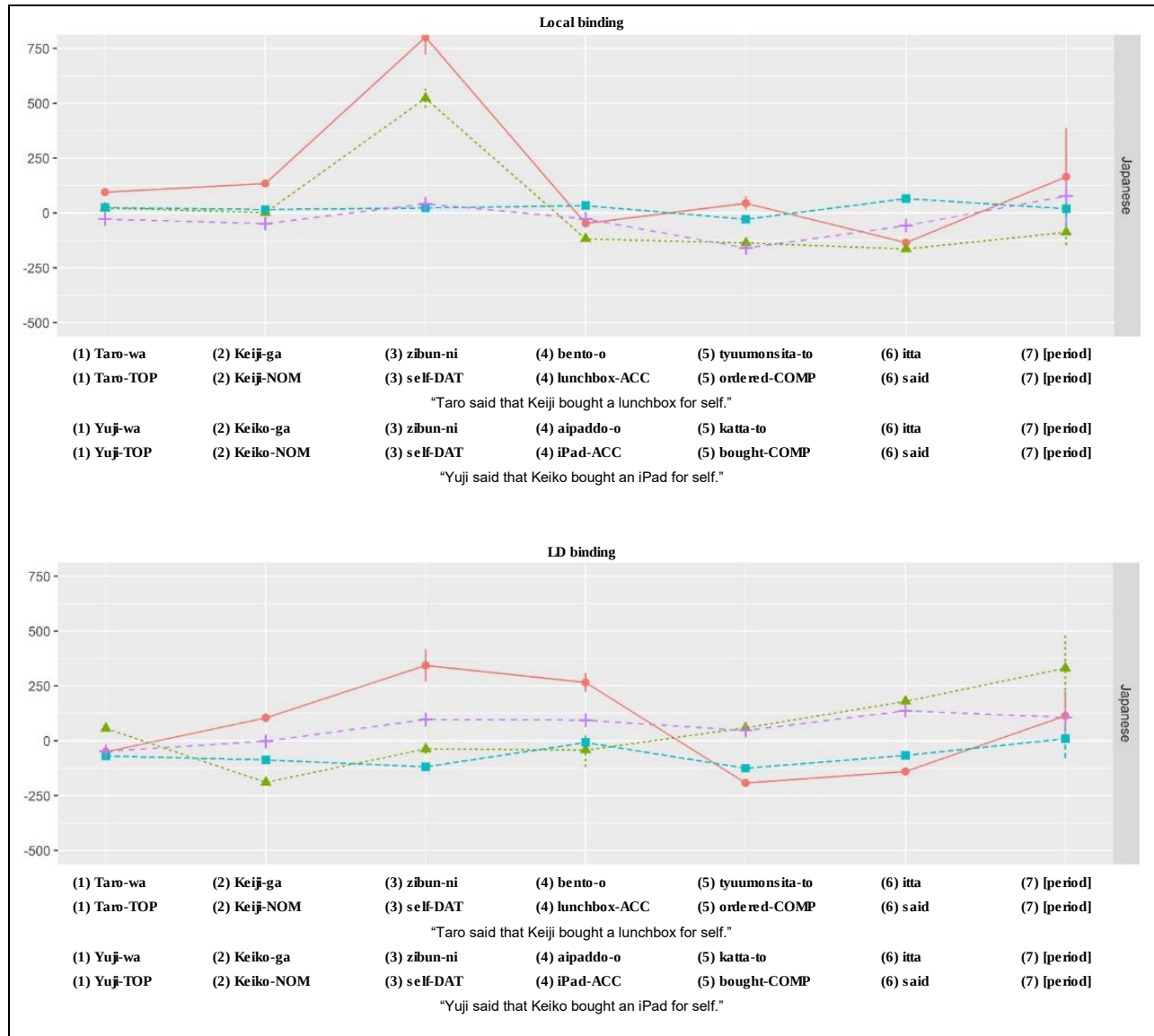


Figure 26. L1 Japanese residual reading times from multi-clausal sentences with dative case-marked reflexives

Key: □ = *zibun* // + = *zibun-zisin* // Δ = *kare-zisin* // ○ = *kanozyo-zisin*

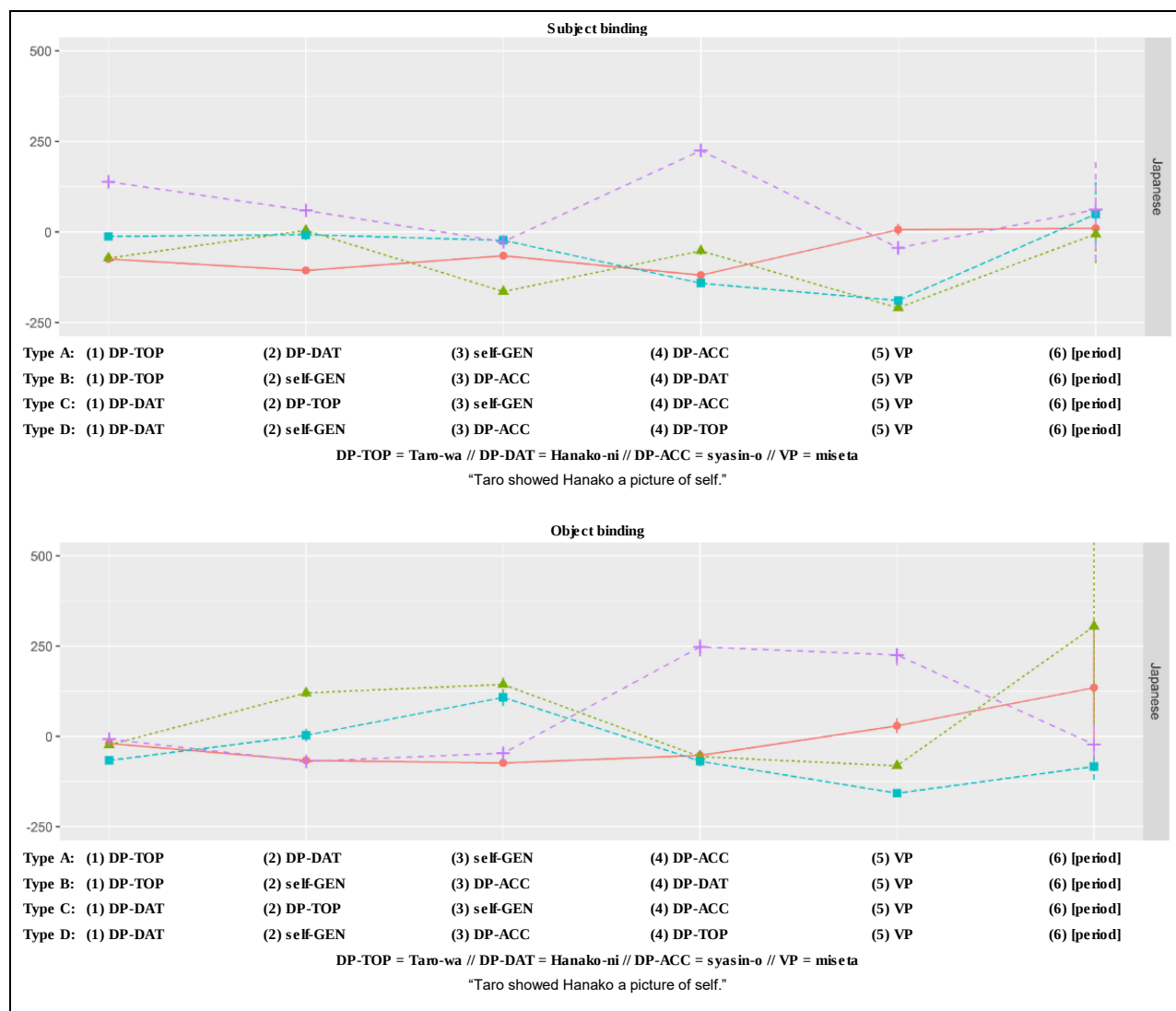


Figure 27. L1 Japanese residual reading times from mono-clausal sentences with *zibun*

Key: ○ = Type A // Δ = Type B // □ = Type C // + = Type D //

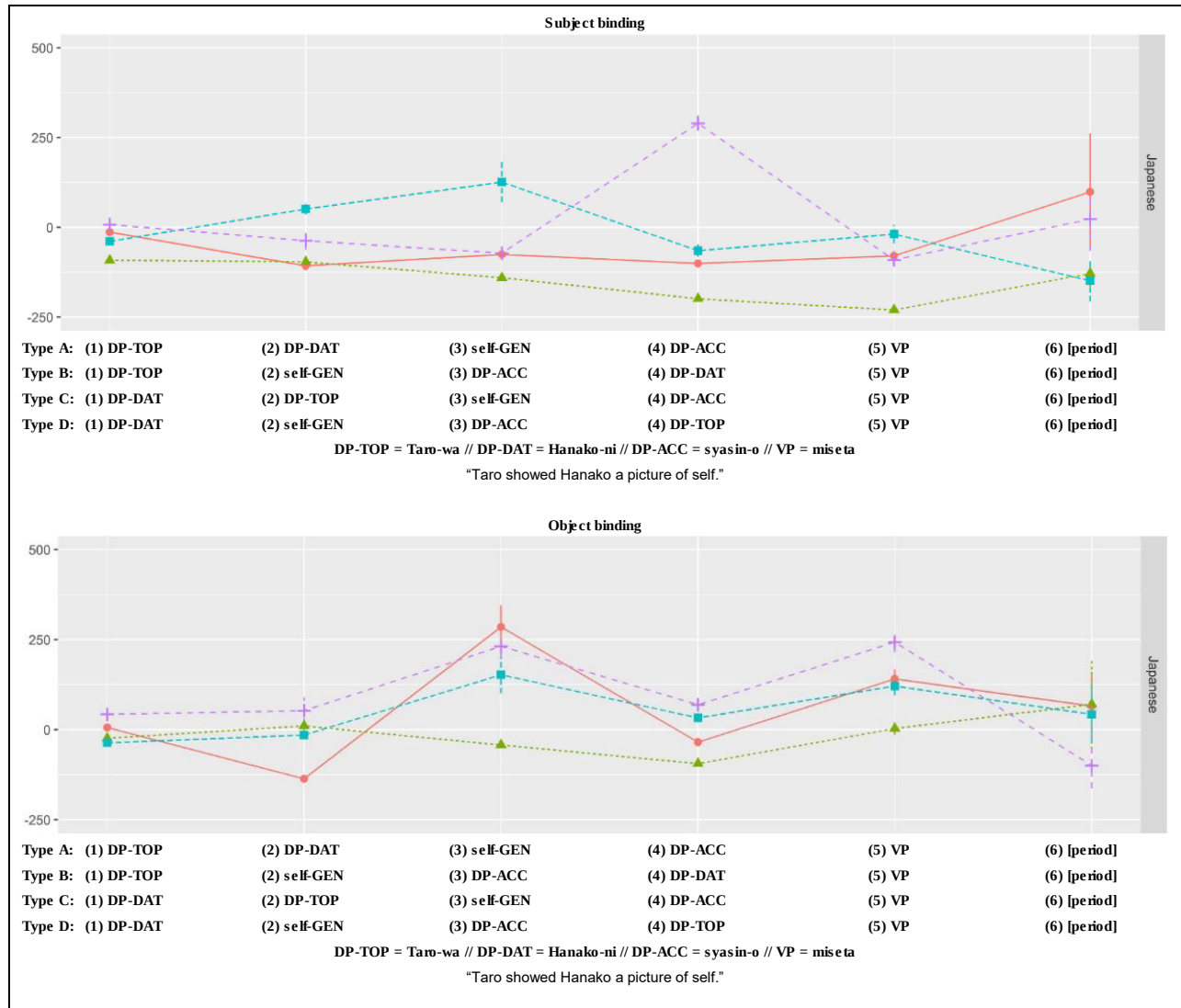


Figure 28. L1 Japanese residual reading times from mono-clausal sentences with *zibun-zisin*

Key: ○ = Type A // Δ = Type B // □ = Type C // + = Type D //

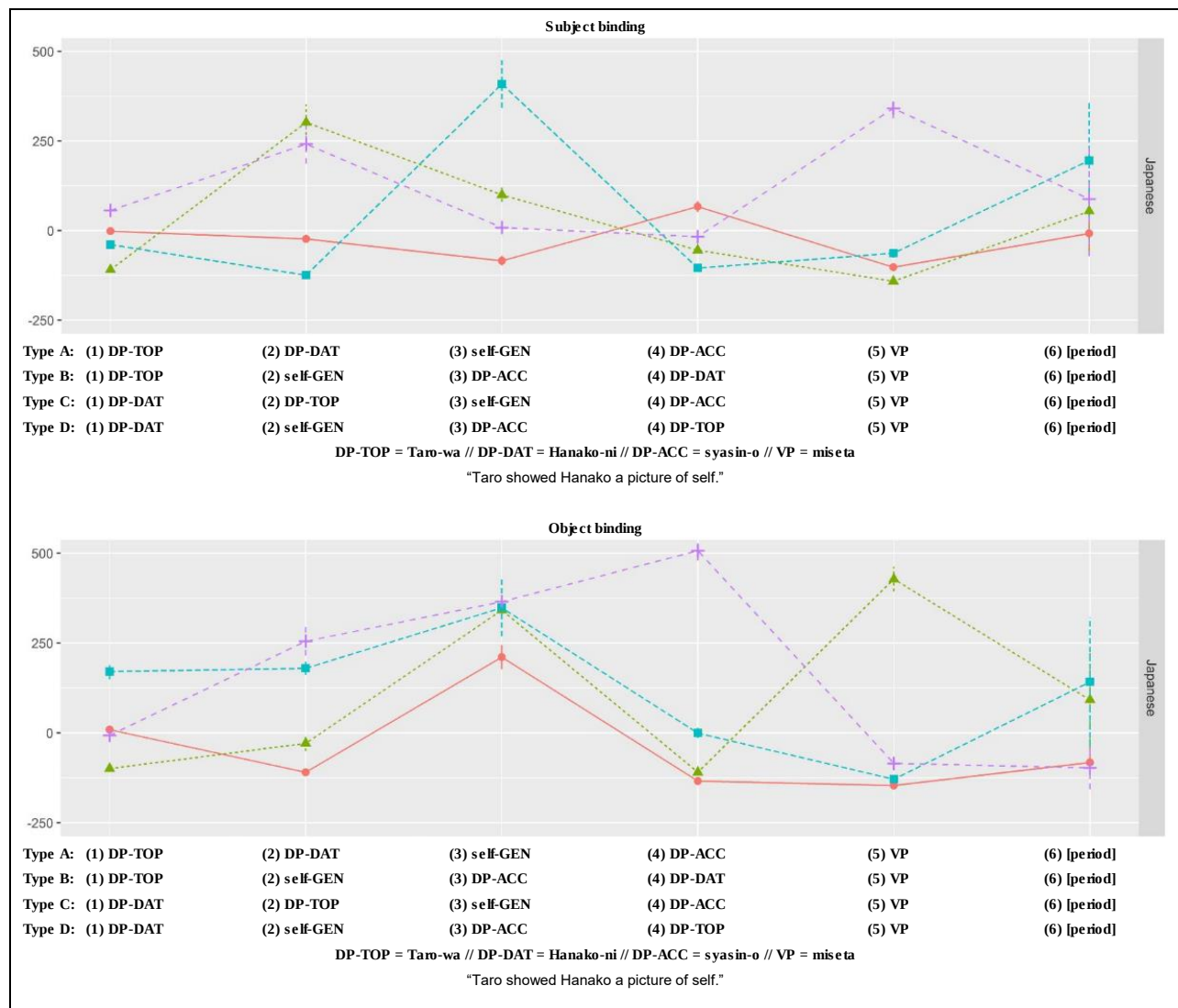


Figure 29. L1 Japanese residual reading times from mono-clausal sentences with *kare/kanozoyo-zisin*

Key: ○ = Type A // △ = Type B // □ = Type C // + = Type D //

G.2 L1 CHINESE

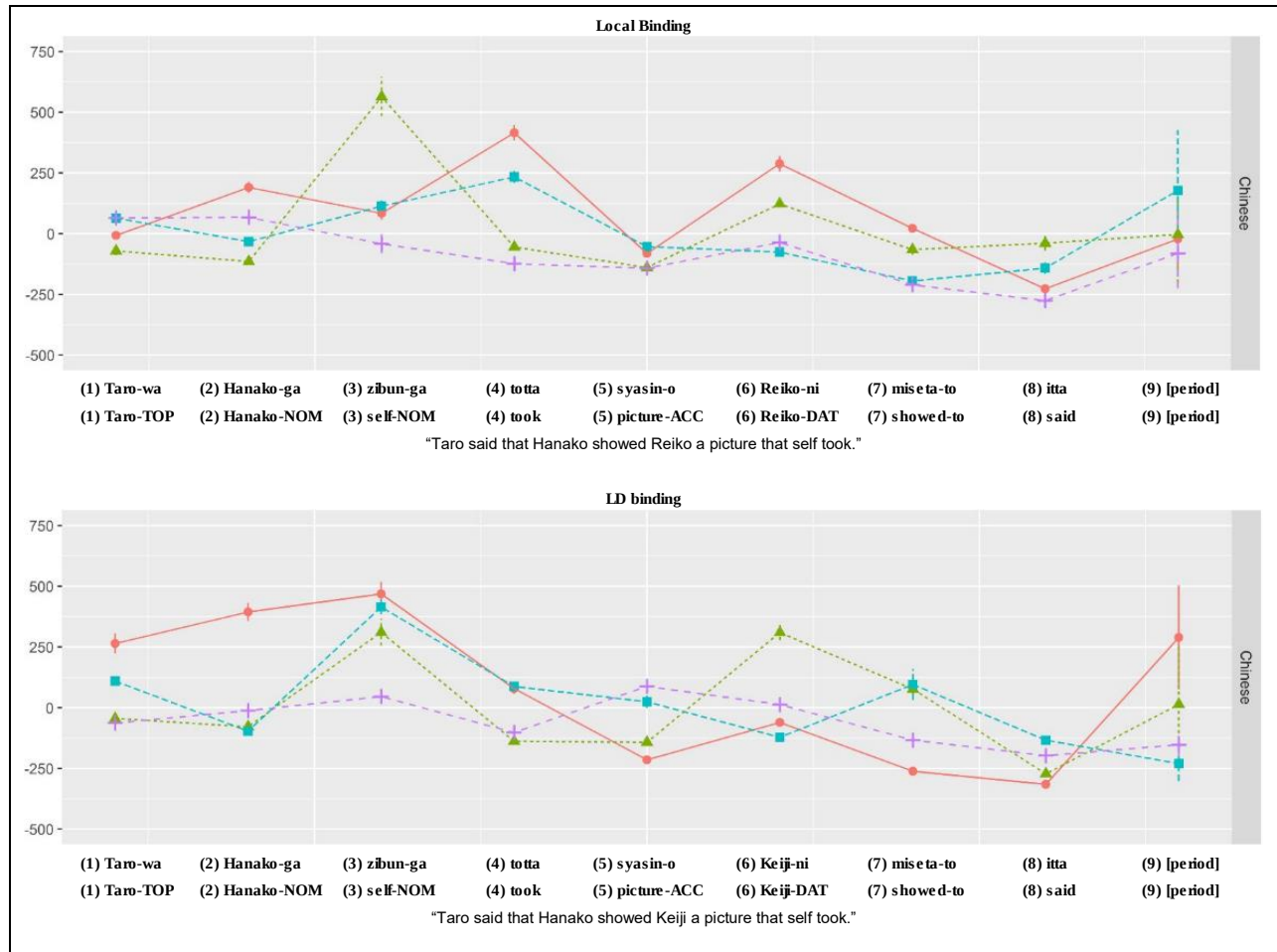


Figure 30. L1 Chinese residual reading times from multi-clausal sentences with nominative case-marked reflexives

Key: $\square$ = *zibun* // $+$ = *zibun-zisin* // Δ = *kare-zisin* // $\circ$ = *kanozyo-zisin*

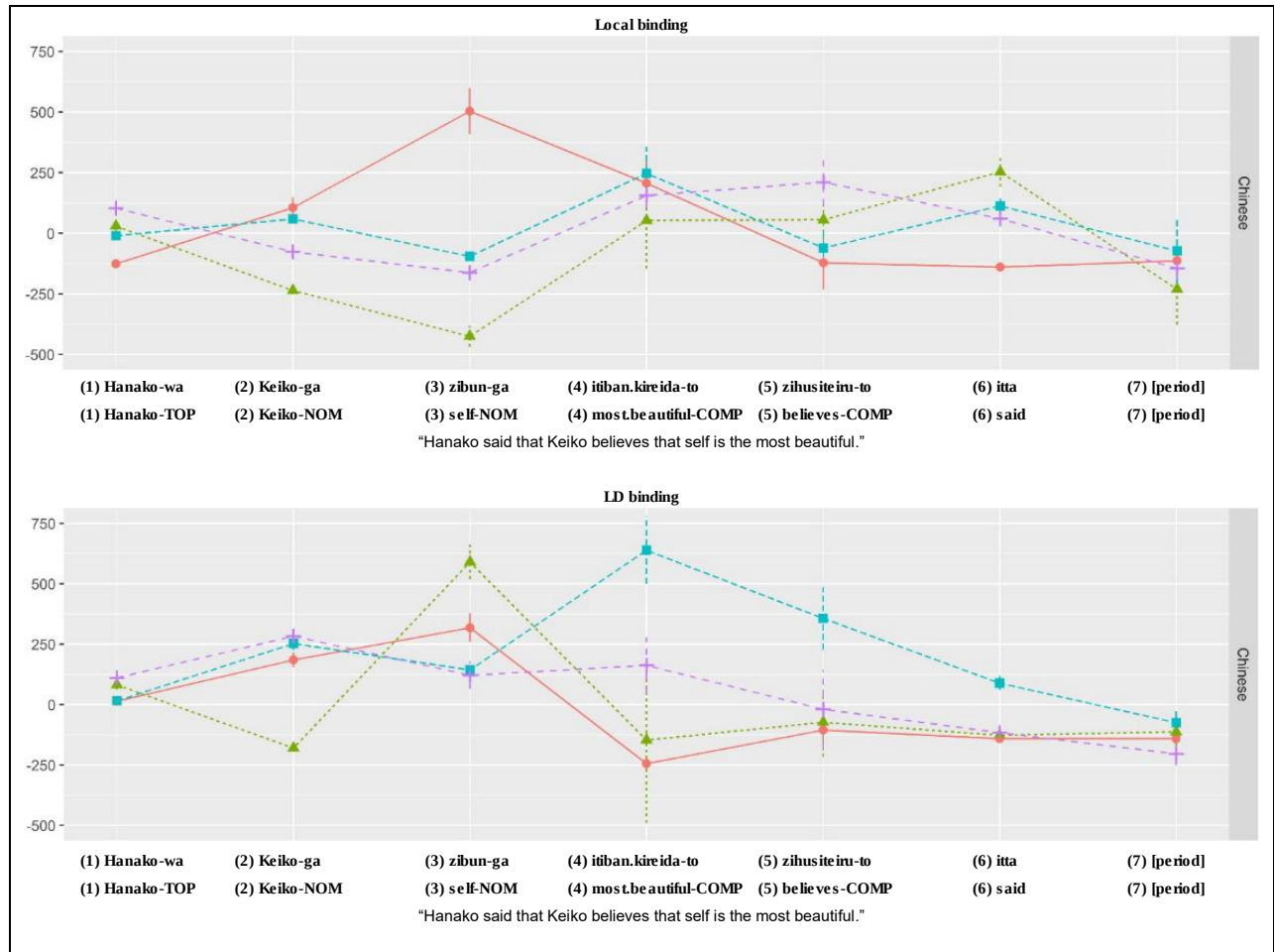


Figure 31. L1 Chinese residual reading times from multi-clausal sentences with nominative case-marked reflexives
(continued)

Key: □ = *zibun* // + = *zibun-zisin* // Δ = *kare-zisin* // ○ = *kanozzyo-zisin*

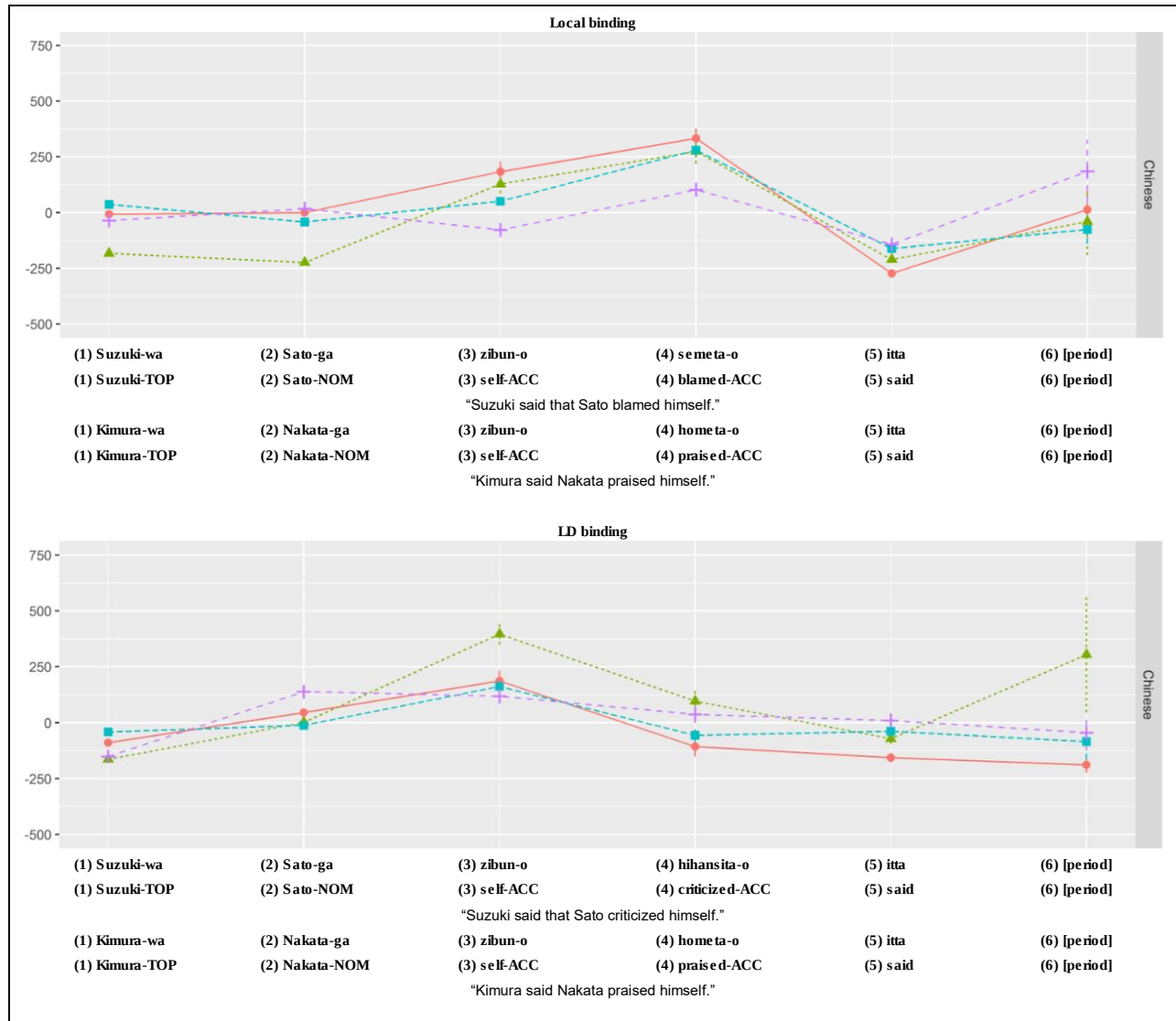


Figure 32. L1 Chinese residual reading times from multi-clausal sentences with accusative case-marked reflexives

Key: □ = *zibun* // + = *zibun-zisin* // Δ = *kare-zisin* // ○ = *kanozyo-zisin*

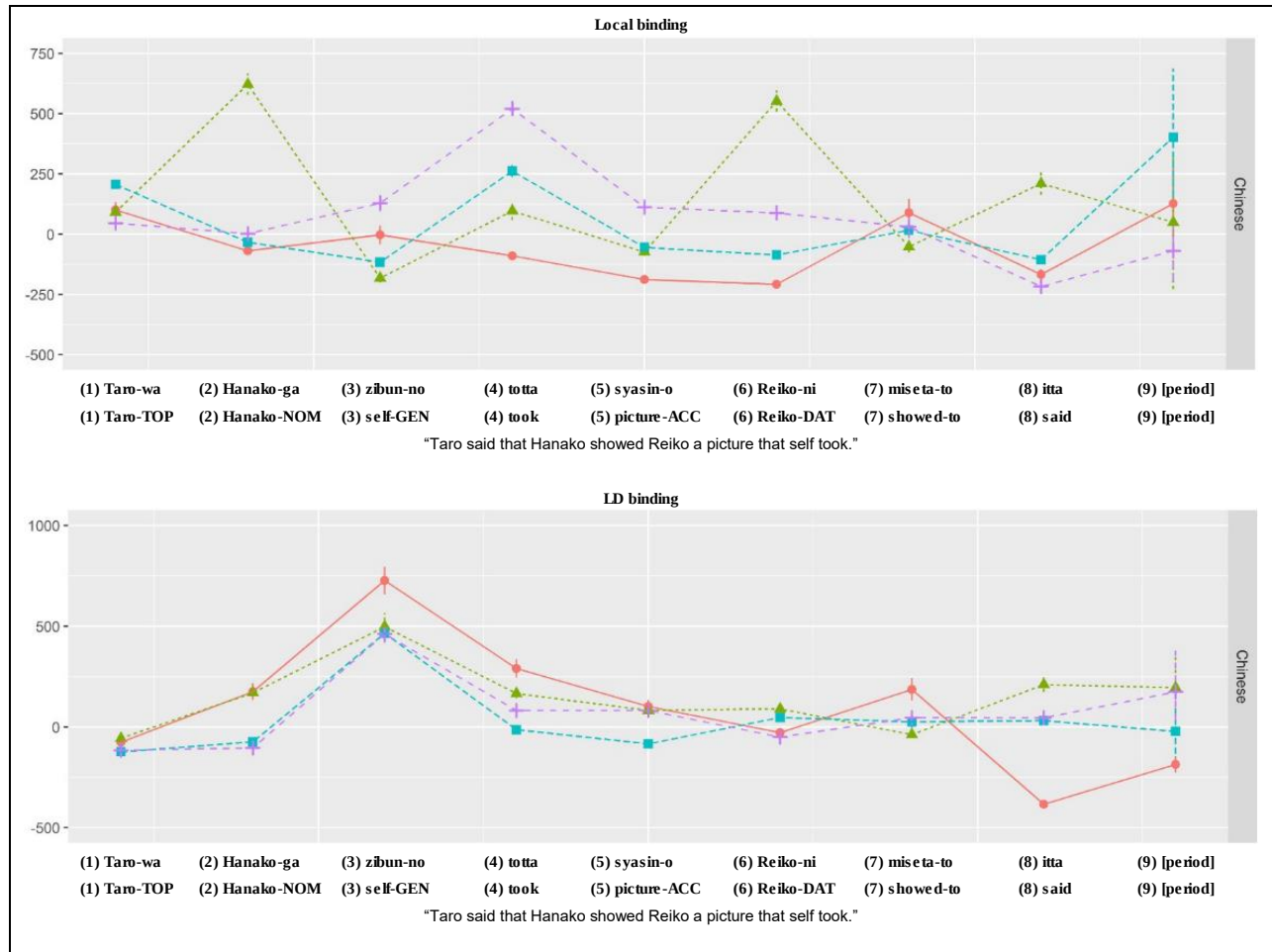


Figure 33. L1 Chinese residual reading times from multi-clausal sentences with genitive case-marked reflexives

Key: $\square$ = *zibun* // $+$ = *zibun-zisin* // Δ = *kare-zisin* // $\circ$ = *kanozyo-zisin*

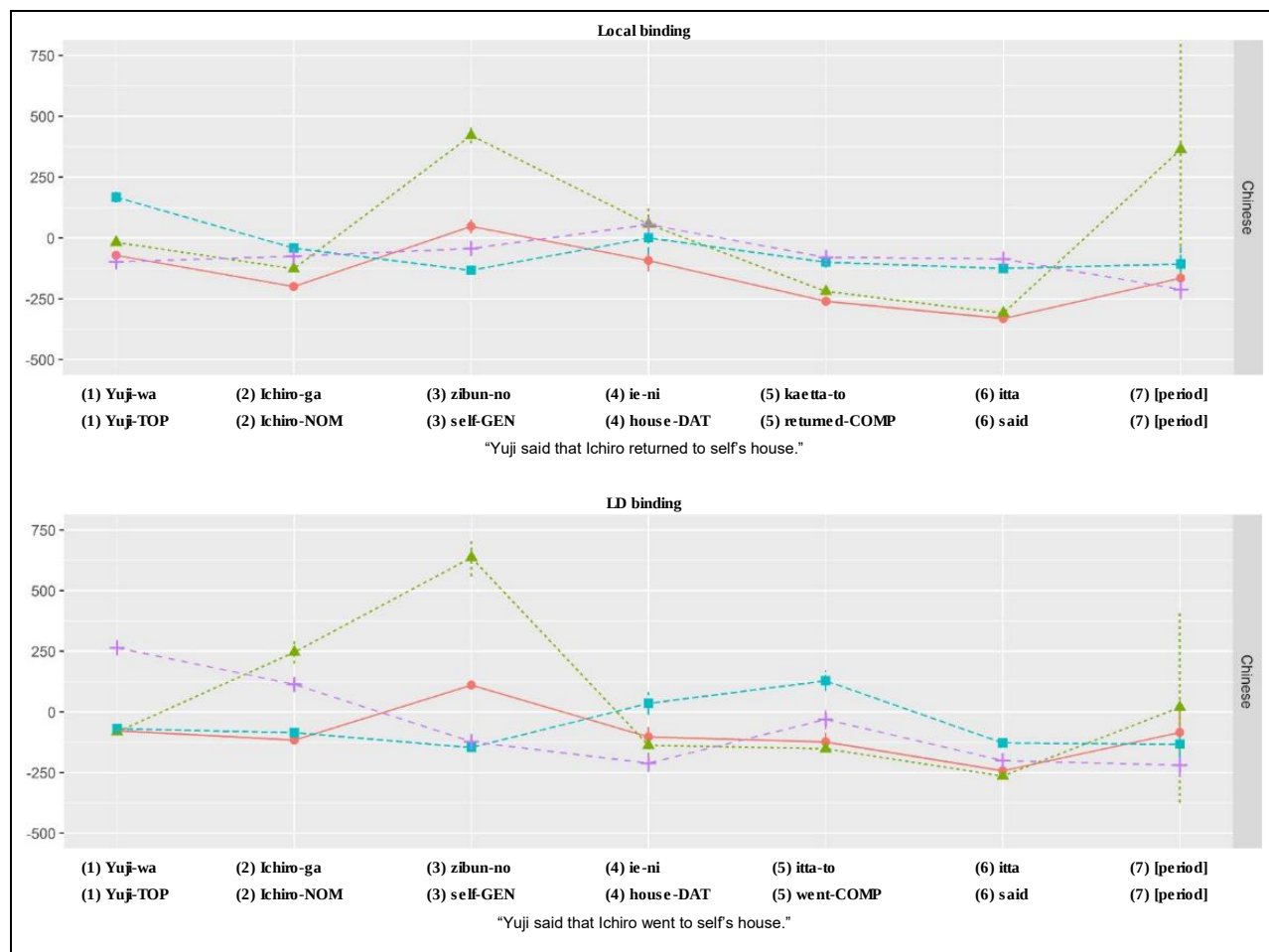


Figure 34. L1 Chinese residual reading times from multi-clausal sentences with genitive case-marked reflexives
(continued)

Key: $\square$ = *zibun* // $+$ = *zibun-zisin* // Δ = *kare-zisin* // $\circ$ = *kanozyo-zisin*

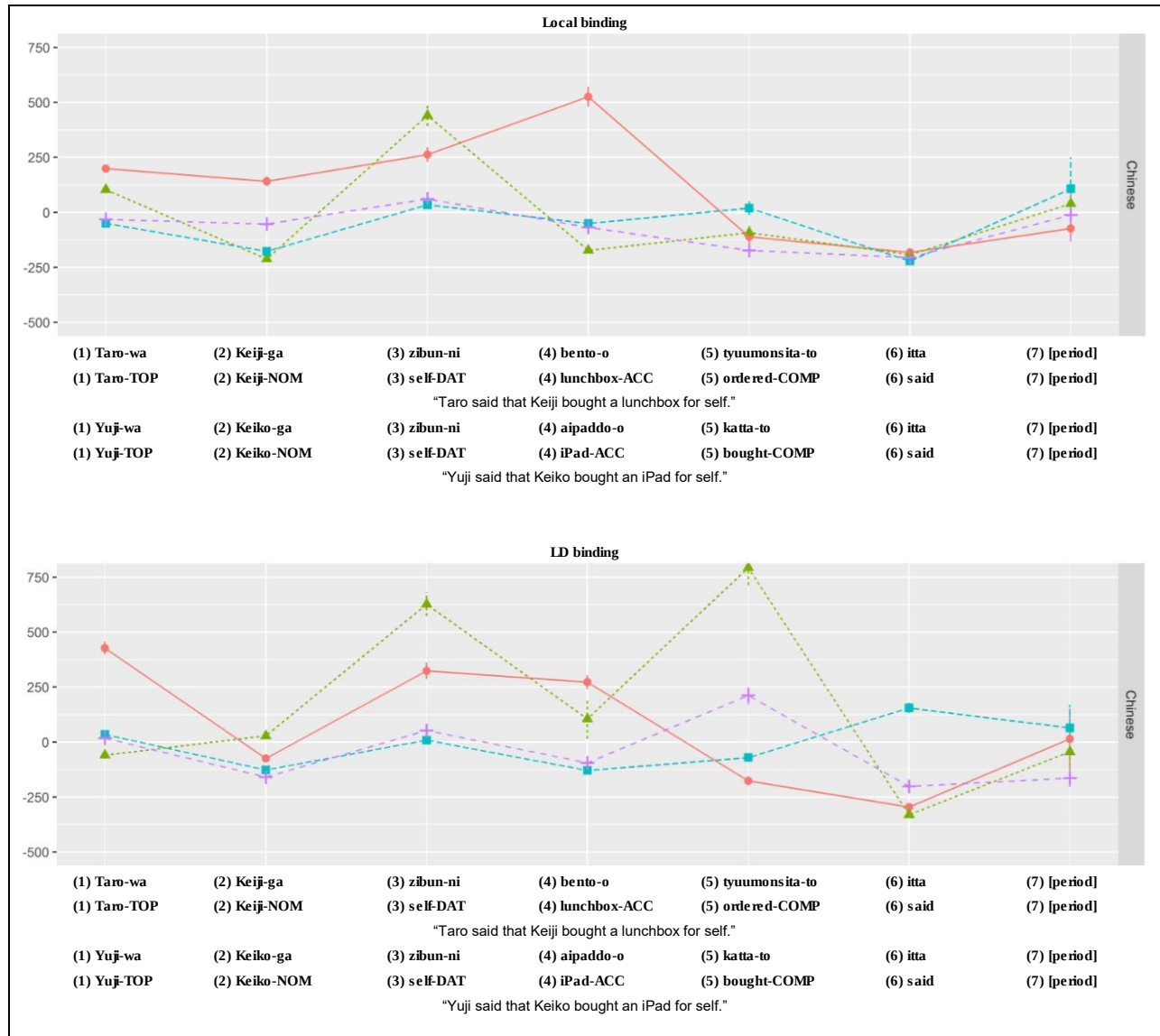


Figure 35. L1 Chinese residual reading times from multi-clausal sentences with dative case-marked reflexives

Key: □ = *zibun* // + = *zibun-zisin* // Δ = *kare-zisin* // ○ = *kanozyo-zisin*

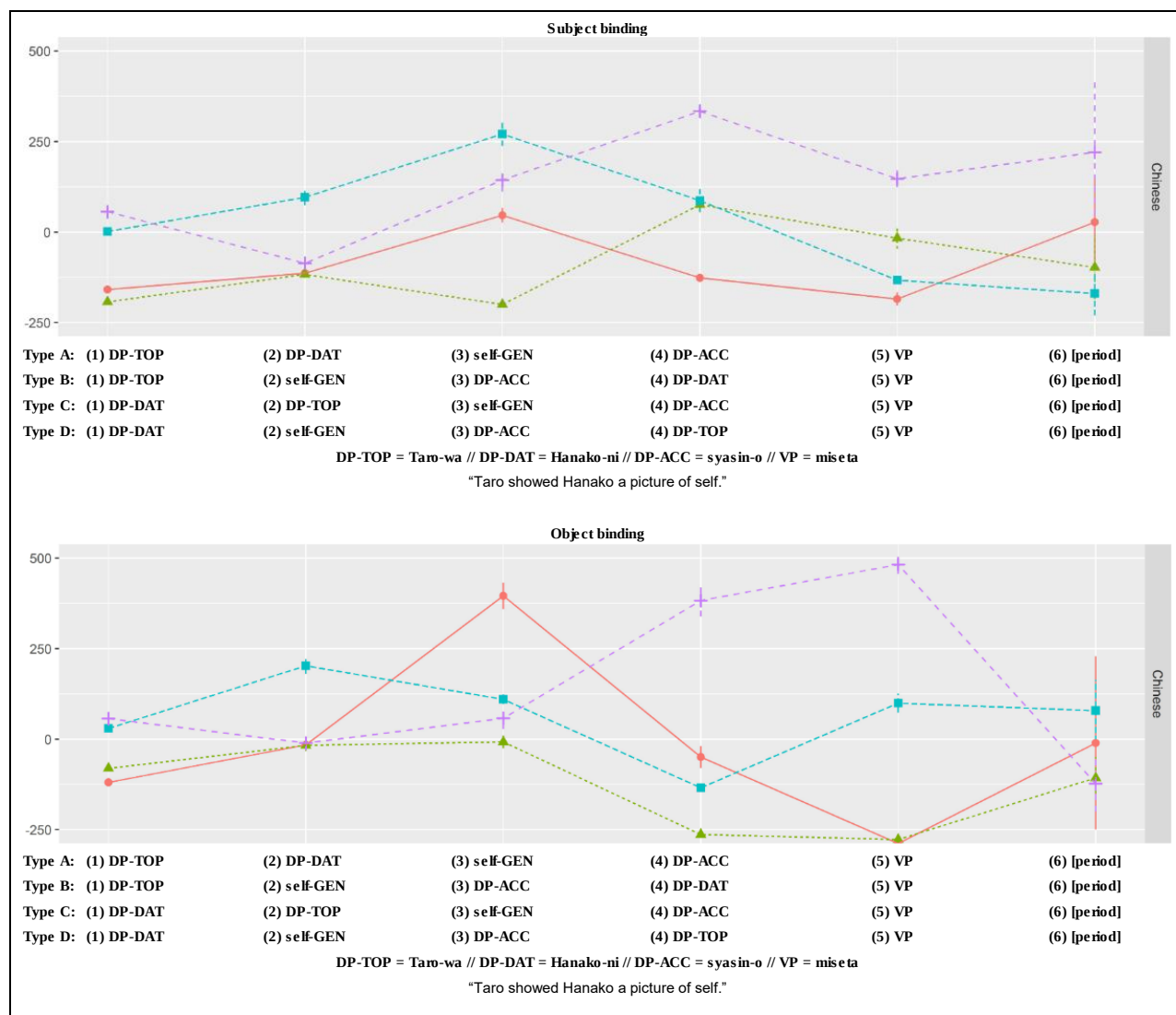


Figure 36. L1 Chinese residual reading times from mono-clausal sentences with *zibun*

Key: ○ = Type A // △ = Type B // □ = Type C // + = Type D

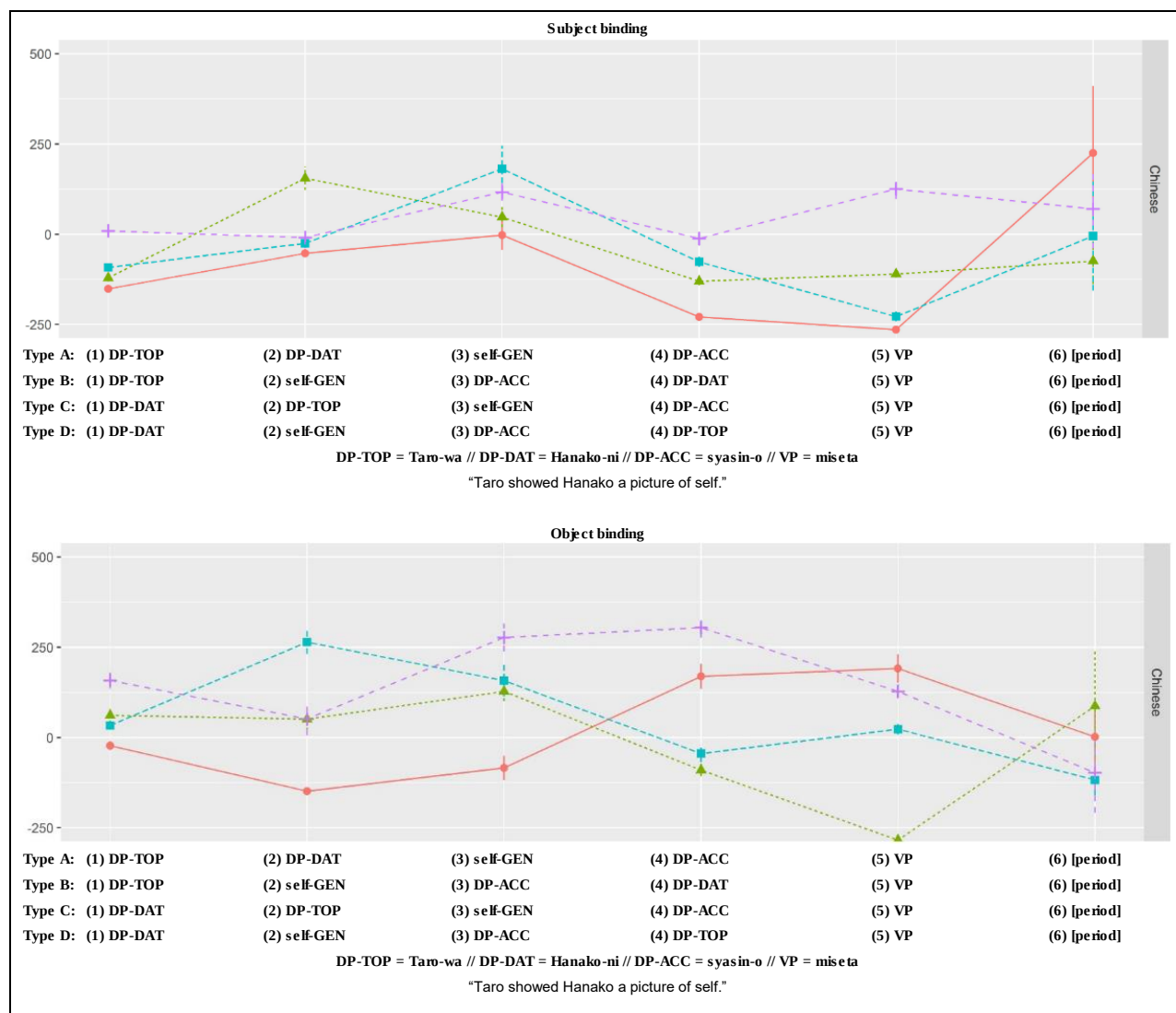


Figure 37. L1 Chinese residual reading times from mono-clausal sentences with *zibun-zisin*

Key: ○ = Type A // △ = Type B // □ = Type C // + = Type D

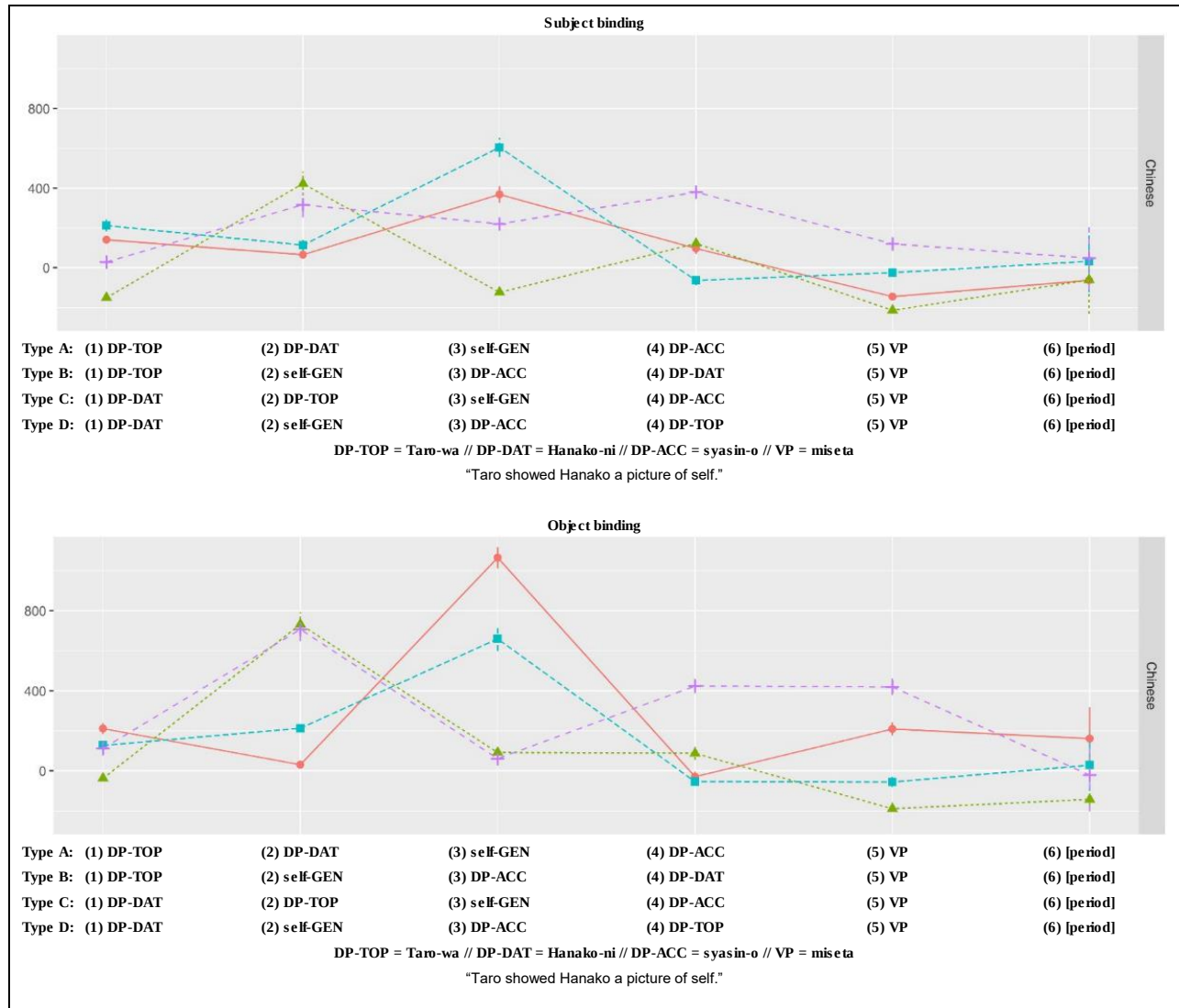


Figure 38. L1 Chinese residual reading times from mono-clausal sentences with *kare/kanozoyo-zisin*

Key: ○ = Type A // △ = Type B // □ = Type C // + = Type D

APPENDIX H

FREE PRODUCTION TASK RESULTS

The following are the responses from the picture description task. The L1 Japanese responses are provided first, followed by the L1 Koreans, and the L1 Chinese. Responses are ordered by picture type (Picture A is first, followed by Picture B, and lastly Picture F in alphabetical order).

H.1 L1 JAPANESE

Picture A

1. 祐司は自分が撮った夏子の写真をスタバで彼女に見せた。
2. 祐司は夏子の写真を撮った。祐司は彼女自身の写真を編集して喫茶店で夏子に会い、その写真を夏子に見せた。
3. 祐司は夏子に彼が撮り、編集した彼女自身の写真を見せた。
4. 祐司は自分が撮った写真を夏子にあげた。
5. 祐司は夏子に彼自身が撮った写真を見せた。
6. 祐司は夏子に自分が編集した彼女自身の写真を見せた。

7. 祐司は夏子を撮った写真をスタバで彼女自身に渡した。
8. 夏子は祐司が自分自身を撮り、翌日見せてくれた。
9. 祐司が夏子に彼女自身が映った写真を渡した。
10. 祐司は、自分が撮った写真を夏子に見せた。
11. 祐司は、夏子に彼女自身が映った写真をあげた。
12. 祐司は夏子に自分が撮った写真を見せた。
13. 祐司は夏子に彼自身が撮った写真を見せた。
14. 祐司は夏子に彼女自身の写真をあげた。
15. 祐司は彼女自身の写真を夏子に渡した。
16. 祐司はスタバで夏子に自分が撮った写真を見せた。
17. 祐司はスタバで夏子に彼自身が撮った夏子の写真を見せた。
18. 祐司は夏子に、彼女自身が写った写真を見せた。
19. 祐司は自分自身が撮った夏子の写真を彼女に見せた。
20. 祐司は夏子を撮った写真をカフェで彼女自身に見せた。
21. 祐司は夏子が撮っている写真を彼女自身に見せた。
22. 慎司は夏子の写真を撮り、次の日スタバ前で彼自身が撮った写真を彼女に見せた。
23. 夏子は祐司に自分自身の写真をとってもらいそれを夏子に見せた。
24. 祐司は夏子に彼女自身の写真を渡した。
25. 祐司が夏子に彼女自身の写真をプレゼントした。
26. 祐司は夏子に自分が撮った彼女自身の写真をあげた。
27. 祐司は夏子に自分が撮った写真をポスターにした。夏子は喜んだ。

28. 祐司は自分が撮った夏子の写真を彼女自身に見せた。
29. 祐司は夏子から彼女自身の自撮り写真をもらった。
30. 祐司は、夏子に自分が撮った彼女の写真を喫茶店で渡した。
31. 祐司は前に自分自身で夏子を撮った写真を夏子に渡した。
32. 祐司は夏子に彼女自身の写真をあげた。
33. 写真家の祐司は夏子に、自分で編集した彼女自身の写真を喫茶店で見せた。
34. 夏子はスターバックスで祐司から彼自身が撮影、編集した自分が被写体の写真をもらった。
35. 祐司は、夏子の写真を撮影した後編集し、後日スターバックスで彼女に彼女自身の写真を渡した。
36. 祐司は夏子に山で撮った彼女自身の写真をスタバで見せた。
37. 祐司は自分が撮った夏子の写真を編集してスターバックスにて彼女に手渡した。
38. 祐司は彼自身が撮った夏子の写真をスタバで渡した。
39. 祐司は熱子に彼女自身の撮った写真をカフェで見せた。
40. 祐司は夏子に彼女自身の写真を編集したものをあげた。
41. 祐司は自分が撮った彼に編集した夏子の写真をプレゼントした。
42. 祐司は自分が撮った写真をスタバで夏子へ手渡した。夏子は自分自身がとても美しく映っていることに顔をほころばせて喜んだ。
43. 祐司は夏子に彼女自身の写真を渡した。
44. 祐司は夏子とスターバックスで会い、彼女自身が写った写真を渡した。
45. 祐司は夏子に彼女自身を撮った写真を見せた。

46. 祐司が夏子を自分自身で撮影し編集し、それがスタバに飾られていることを夏子に言った。
47. 祐司は彼自身が撮った夏子の写真を彼女自身に見せた。
48. 夏子はスターバックスで祐司に撮ってもらった自分の写真を、彼から受け取った。

Picture B

1. 夏子は友達に祐司が自分自身の写真を撮ってくれたと話した。
2. 祐司は夏子の写真を撮った。その写真を祐司はスタジオで編集し、後日、喫茶店で夏子に彼女自身の写真を見せた。松子はその写真を友達に見せた。
3. 夏子は祐司に取ってもらった彼女自身の写真を友達に見せた。
4. 夏子は祐司に撮ってもらった彼女自身の写真を友達に見せた。
5. 夏子は友達に祐司が自分が写った写真を見せた。
6. 夏子は友達に祐司が撮ってくれた自分の写真を見せた。
7. 夏子は友達に祐司に彼女自身を撮った写真をもらったことを話した。
8. 夏子は祐司が自分自身の写真を撮ってくれた。翌日その写真を友達に見せた。
9. 夏子は自分がもらったものを友達に見せた。
10. 夏子は、祐司に撮ってもらった自分の写真を友達に見せた。
11. 夏子は、自分が撮った写真を友達にあげた。
12. 夏子は友達に祐司が撮ってくれた自分の写真を見せた。
13. 夏子は祐司が彼女自身を撮った写真を友達に見せた。
14. 夏子は自分が写った写真を友達に見せた。

15. 夏子は友達に祐司が自分の写真を撮ってくれたと言った。
16. 夏子は友達に祐司が撮った彼女自身の写真を見せた。
17. 夏子は自分自身が写った写真を友達に見せた。
18. 夏子は友達に祐司が自分自身を撮ってくれた写真を見せた。
19. 夏子は友達に自分自身が撮った写真を見せた。
20. 夏子は友達に彼女自身が撮った写真を祐司が編集して渡してくれたと言った。
21. 夏子は友達に自分自身を撮った写真を見せた。
22. 夏子は祐司に撮ってもらった彼女自身の写真を友達に見せた。
23. 夏子は友達に自分がオススメする本を紹介した。
24. 夏子は友達に祐司が自分の写真をとってくれたと話した。
25. 夏子は友達に自分の写真を見せた。
26. 夏子は友達に自分が撮ってもらった写真を嬉しそうに見せた。夏子は自分自身が写っている写真に満足してるようである。
27. 夏子は、祐司が撮ってくれた彼女自身の写真を、友達に見せた。
28. 自分は夏子から本をもらった。
29. 夏子は、祐司にとってもらった彼女自身の写真を友達に自慢した。
30. 夏子は友達に祐司が夏子の写真を撮って自分にくれたことを話した。
31. 夏子は祐司からもらった自分の写真を友達に見せた。
32. 夏子は図書館で友達に、祐司が彼女自身を撮った写真を見せた。
33. 夏子は祐司が撮影し、編集してくれた自分自身が被写体の写真を自分の友達に図書館で見せた。

34. 夏子は、祐司が撮影した図書館で友達に見せた。
35. 夏子は友達に祐司が彼女自身の写真を撮ってくれたと言った。
36. 夏子は、祐司が撮ってくれた自分の写真を、友達に見せた。
37. 夏子は友達と図書館で自分の借りたい本を探した。
38. 夏子は祐司が撮ってくれた彼女自身の写真を友達に見せた。
39. 夏子は祐司が彼女自身を撮って編集してくれた写真を友達に見せた。
40. 夏子は友達に彼氏の祐司が自分を撮ってくれてくれて、さらに編集してくれた写真をくれたと話した。
41. 夏子は図書館で働く友達に祐司が撮ってくれた彼女自身が被写体を写真を嬉しそうに差し出した。「みてよくとれてるでしょ〜。」
42. 夏子は祐司が撮ってくれた彼女自身の写真を友達に見せた。
43. 夏子は自分自身が祐司とスターバックスで会ったことを図書館で友達に話した。
44. 夏子は友達に祐司が自分自身を撮った写真をくれたと言った。
45. 夏子は祐司が撮って編集してくれた自分自身の写真を友達に見せた。
46. 夏子は祐司に撮ってもらった彼女自身の写真を友達に見せた。
47. 夏子は、祐司が撮った彼女自身の写真を、友達に見せた。
48. 夏子は祐司に撮ってもらった写真を友達に見せた。

Picture C

1. アリスはゲームを買った。彼女自身、面白いて思ったので、恵子に電話ですすめた。
2. 慎司はテレビを見てゲーム欲しくなった。なので彼自身のお金でビックカメラに行ってゲームを買った。慎司の彼女であるアリスはそのことについて恵子に話した。
3. アリスは慎司が自分自身にゲームを買ったということを恵子に話した。
4. アリスは彼氏の慎司が彼女自身にゲームの話をしたと恵子に話した。
5. アリスは恵子に電話で、慎司が買ったゲームを彼女自身に見せたことを話した。
6. アリスは恵子に慎司が自分自身のためにゲーム機を買ったことを言った。
7. アリスは慎司がゲームばかりしていることを自分が良く思っていないことを恵子に話した。
8. 慎司はゲームがほしかったので自分自身に買った。アリスはこのことを恵子に言った。
9. アリスが恵子に自分自身が欲しい物を伝えた。
10. アリスは、慎司がゲームに夢中で自分にかっまってくれないと恵子に話した。
11. アリスは恵子に慎司が彼自身にD Sを買ったと言った。
12. アリスは慎司が彼自身がゲームばかりだと恵子に話した。
13. アリスは恵子に彼自身がゲームばかりすると言った。
14. アリスは恵子に慎司が彼自身で買ったゲームのことについて話した。
15. アリスは恵子に慎司が彼自身のためにゲームを買ったと言った。
16. アリスは彼氏の慎司が彼自身にd sを買ったと恵子に話した。

17. アリスは恵子に、彼氏の慎司が自分にゲームの話ばかりしてくることを話した。
18. アリスは恵子に慎司が自分自身で買ったゲームの事について話した。
19. アリスは彼氏の慎司が新しく自分で買ったゲームを自慢してきたので、友達の子にそのことを話した。
20. アリスは慎司が自分のことではなくゲームのことばかり話すというぐちを恵子に話した。
21. 慎司は TV で DS の CM を見てほしくなりビックカメラに買いに行った。そのことを彼女のアリスに話した。次の日アリスは恵子に彼自身のことを話した。
22. 祐司は買ったゲームをアリスに見せて彼女はそれを恵子に行った。
23. アリスは自分自身の得意なゲームを恵子に挑んだ。
24. アリスは彼氏の慎司がゲームばかりで自分自身のことは相手にしてくれないと恵子に話した。
25. アリスは恵子に自分の彼氏がゲームの自慢をしてくる話をした。
26. アリスは恵子に慎司がゲームをおねだりしたとはなした。その際にアリスは慎司に自分自身で買いなさいと説得したと言った。すると慎司は自分でゲームを買ったという話を話した。
27. アリスは、慎司が彼自身にゲームを買ったと、恵子に電話で話した。
28. アリスは恵子に自分自身のゲームを返して言った。
29. アリスは、彼氏の慎司が自分自身のためだけにゲームをかったことを恵子に話した。
30. アリスは彼自身がゲームを買ったことを恵子に話した。

31. アリスは慎司が彼自身にゲームを買ったことを恵子に言った。
32. アリスは友達恵子に、彼氏の慎司が彼自身にゲームを買ったと伝えた。
33. アリスは友達祐司が新しいゲーム機を買い、彼自身がゲーム中毒であることを恵子に電話で話した。
34. 恵子は、アリスから彼女自身の彼氏の慎司がゲームに熱中していると聞いた。
35. アリスは友達恵子に彼氏の慎司がゲームを彼自身に買ったと言った。
36. 彼女自身は、ゲームを買って喜んでいる慎司に対して、よい印象を持っていないのだなと、電話口の恵子は感じた。
37. 恵子は、自分自身がゲームばかりしていることについてアリスに注意された。
38. アリスは恵子に自分が新しいゲームを買ったと話した。
39. アリスは慎司に自分の誕生日プレゼントを買ってくれたと恵子に話した。
40. アリスは慎司が自分自身にゲームを買ったことを恵子に言った。
41. アリスは自分の彼氏がゲーム好きすぎるんだと恵子に話した。
42. 帰宅後、アリスは恵子へ慎司の今日の悪態について電話をした。「彼って自分自身のためにゲームなんて買ってきてるのよ！もうすぐ 20 歳にもなる人が。」恵子はアリスの怒りに「それはないよね」と返すしかなかった。
43. アリスは自分の彼氏の慎司が新しいゲームを買ってきてゲームばかりなのを恵子に言った。
44. 慎司はアリスにゲームがほしいとねだり、彼女自身はそのことを恵子に話した。
45. アリスは恵子に慎司が自分にゲームの話ばかりしてくると言った。
46. アリスは慎司が自分で買ったゲームを嬉しがっていたことを友達に言った。

47. アリスは慎司が彼自身にゲームを買って喜んでいることを恵子に話した。
48. アリスは、彼氏の慎司がゲームゲームと言って彼女自身が呆れたことを、恵子に電話で話した。

Picture D

1. 愛美は圭介が自分の誕生日に新品のアイパッドを買ってくれたと友達に電話で話した。
2. 圭介は彼女の誕生日に何をあげるか悩んでいた。そこで圭介はアップル社へ行って、アイパッドを買った。彼女は自分自身のアイパッドがてに入ったのが嬉しかったので、友達にその話をした。
3. 愛美は圭介から自分のためにプレゼントをくれたということを友達に話した。
4. 愛美は圭介から誕生日プレゼントをもらったことを彼女自身の友達に話した。
5. 愛美は自分の誕生日に圭介からスマホをもらったことを友達に話した。
6. 愛美は友達に圭介が自分のために新しいアイパッドを誕生日にプレゼントしてくれたと言った。
7. 愛美の誕生日に彼女自身が使うために圭介が iPad をプレゼントした事を友達に愛美が話した。
8. 愛美は圭介が彼女自身に新しいスマートフォンを買ってくれたことを友達に言った。
9. 愛美が友達に自分自身に新しい携帯電話を買ったと話した。

10. 圭介は、彼女の誕生日に自分で買ったケータイをプレゼントし、彼女はそのことを友達に話した。
11. 愛美は友達に圭介が自分のために買ってくれた電話について話した。
12. 愛美は圭介が自分にアイパッドを買ってくれたと友達に話した。
13. 愛美は彼が自分にアイパッドを買ってくれたことを友達に話した。
14. 愛美は友達に圭介が自分に誕生日プレゼントに iPhone をくれたと言った。
15. 愛美は自分自身の誕生日に彼氏の圭介がアイパッドをプレゼントしてくれたと話した。
16. 愛美は彼氏の圭介が自分に誕生日プレゼントを買ってくれて嬉しかったことを友達に話した。
17. 愛美は友達に圭介が自分自身のためにプレゼントを買ってくれたと話した。
18. 愛美は圭介が彼女自身に誕生日プレゼントとして iPad をもらったことを友達に話した。
19. 愛美は友達に圭介が自分に対して iPad をプレゼントしてくれたと話した。
20. 圭介は愛美の誕プレにアイパッドを買った。愛美は喜んで友達に彼自身のことを話した。
21. 圭介は彼女の誕生日に iPad を買ってあげ、彼女はそれを友達に言った。
22. 愛美は自分が新しいアイパッドを買ったことを友達に話した。
23. 愛美は友達に彼氏の圭介が自分に誕生日プレゼントをくれたと話した。
24. 愛美は友達に圭介が自分に新しい iPad をプレゼントしてくれたことを話した。

25. 圭介は彼女の愛美にアイパッドをプレゼントした。愛美は嬉しくて、友達に圭介が自分に iPad をプレゼントしてくれたことを話した。
26. 愛美は、圭介が、自分の誕生日にアイパッドをくれたと友達に電話で話した。
27. 愛美は友達に自分のスマホを買ったと言った。
28. 愛美は、彼氏が自分のためにアイパッドを誕生日プレゼントとして買ってくれたことを友達に話した。
29. 愛美は自分自身が圭介からアイパッドをもらったことを友達に話した。
30. 愛美は圭介が自分に iPad を買ってくれたことを友達に話した。
31. 愛美は友達に、彼氏の圭介が自分に誕生日プレゼントとして、携帯を買ってくれたことを伝えた。
32. 愛美は自分の友達に彼氏の圭介が自分の23歳の誕生日にプレゼントとして新しいアイパッドを彼自身が買ってくれたことを電話で言った。
33. 愛美は彼氏の圭介が自分の誕生日プレゼントとして新しい 아이폰 を買ってくれたと友達に話した。
34. 愛美は友達に彼氏の圭介彼女自身にアイパッドを買ったと言った。
35. 圭介が、自分に誕生日プレゼントとして IPAD を渡してくれたと、圭介の彼女である愛美は、電話口の友達に喋った。
36. 愛美は、自分自身のスマホを新しくしたことを友達に話した。
37. 愛美は友達に彼女自身のスマホを新しくしたと話した。
38. 愛美が圭介に自分の誕生日プレゼントを買ってくれたことを友達に言った。
39. 愛美は友達に圭介が自分のためにアイパッドを買ってくれたことを言った。

40. 愛美は友達に自分の誕生日に彼氏の圭介が自分に iPad をプレゼントしてくれて嬉しかったと伝えた。
41. 圭介は誕生日の後愛美の友達から自分がプレゼントした iPad がそうとう嬉しかったという電話が来たことを教えてもらった。それを聞いた圭介は自分自身も嬉しくなった。
42. 愛美は圭介が自分の誕生日にアイパッドをくれたことを友達に言った。
43. 愛美は圭介が自分自身にタブレットをプレゼントしてくれたと友達に電話した。
44. 愛美は圭介が自分に 아이폰を買ってくれたと友達に言った。
45. 愛美は自分が彼氏からアイパッドを貰ったことを友達に言った。
46. 愛美は自分自身の誕生日に彼氏の圭介からプレゼントをもらったことを友達に話した。
47. 愛美は、自分に圭介が新型のアイパッドくれたと、友達に電話で話した。
48. 圭司は彼女の誕生日にアイパッドをあげて、愛美は友達に電話した。

Picture E

1. 祐司はミスター大学コンテストで圭介が自分自身で票を入れたと彼女の夏子に電話で話した。
2. ミスター大学でコンテストがあり、三人は出場した。祐司は慎司に投票し、圭介は自分自身に投票した。結果は圭介が優勝した。祐司はそのことを彼女である夏子に話した。
3. 祐司は夏子に圭介が自分自身に投票したということを話した。

4. 祐司は彼女の夏子に圭介が彼自身に投票したといった。
5. 祐司は夏子に圭介がミスターコンで自分自身に投票したと話した。
6. 祐司は彼女の夏子に圭介が自分自身のために票を入れたと言った。
7. 祐司は彼女に圭介彼自身がナルシストだと話した。
8. ミスター大学のコンテストで圭介は自分自身に票を入れた。祐司は彼女の夏子にこのことを言った。
9. 祐司が夏子に自分の予定を伝えた。
10. 祐司は、圭介が自分に投票したことを夏子に話した。
11. 祐司は、自分の彼女の夏子にテストの点が悪かったとやつ当たりした。
12. 祐司は夏子に圭介が彼自身に投票したと言った。
13. 祐司は夏子に圭介が彼自身に投票したと話した。
14. ミスター大学コンテストで祐司は彼女の夏子に自分に投票したか聞いた。
15. 祐司は夏子に圭介が自分自身に投票したと言った。
16. 祐司は夏子に圭介が彼自身に票を入れたと言った。
17. 祐司は彼女の夏子に圭介が彼自身を投票したと話した。
18. 祐司は、圭介が彼自身に投票したことを彼女の夏子に話した。
19. 祐司は彼女の夏子に圭介が自分自身を選んだと言った。
20. 彼自身はミスター大学コンテストで最終までいったいたが、落ちてしまい、彼女に落ちたと伝えると彼女自身は受かると思っていたので落ち込んだ。
21. 祐司は圭介が自分自身に投票しているのを彼自身からきいた。その話を彼女の夏子に話した。

22. ミスター大学コンテストのファイナリストに圭介が選ばれたことを祐司に話した。
祐司は夏子に彼自身のことを話した。
23. ミスター大学コンテストで圭介は自分自身を選んで祐司はそれお彼女に言った。
24. 祐司は夏子に自分自身のスケジュールについて話した。
25. 祐司は彼女に夏子にミスター大学コンテストで圭介は彼自身に票を入れていたと話した。
26. 祐司は夏子に、圭介が自分自身に投票したことを話した。
27. 圭介はミスター大学のファイナリストの投票で自分自身に投票した。そのことについて、祐司は夏子に電話で話した。
28. 祐司は、圭介が彼自身をファイナリストに自分で選んだと電話で彼女の夏子に話した。
29. 祐司は夏子に自分が一番かっこいいと言った。
30. 祐司は、圭介が自分自身が大学で一番かっこいいと思っているということを彼女の夏子に話した。
31. 祐司は夏子に圭介自分自身に投票していたことを話した。
32. 祐司はミスター大学子テストで圭介が自分自身に投票したことを夏子に言った。
33. 祐司は彼女の夏子に、圭介がコンテストの票を自分自身に入れたと伝えた。
34. 祐司はミスター大学コンテストの投票で自分は慎司に投票したが、圭介は彼自身に票を入れていたことを彼女の夏子に電話で言った。
35. 祐司は彼女の夏子に、ミスター大学のファイナリストになっている圭介が彼自身に投票したことを話した。

36. 祐司は彼女の夏子に圭介が自分自身に投票したと言った。
37. ミスター大学コンテストにて、圭介が自分自身に投票したことを、祐司は電話で夏子に伝えた。
38. 祐司は彼女の夏子に彼自身のテストの点数うを話したが、夏子はあまり低さに飽きた。
39. 祐司は圭介が彼自身に票を入れたことを夏子に言った。
40. 祐司は圭介が自分自身に投票したことを彼女の夏子に言った。
41. 祐司は圭介が自分自身に票を入れていたと夏子に話した。
42. 投票後、祐司は夏子へ今日の出来事を電話した。「祐司へ入れるっていつてるのにあいつナルシストなところあるから自分自身にいれやがった。まじでないわ。」祐司に頑張ってもらいたいと思った夏子は何を言っているのかわからずあいまいな返事を返すのみだった。
43. 祐司は圭介が彼自身にチェックを入れたと夏子に言った。
44. 圭介は自分自身に投票してほしいと祐司に言い、その話を夏子にした。
45. 祐司は夏子に圭介が自分自身に票を入れたと言った
46. 祐司は圭介が彼自身に投票していたことを彼女に言った。
47. 祐司は彼女の夏子に圭介が彼自身に投票したことを話した。
48. 祐司は、圭介が自分自身に投票したと彼女の夏子に電話で話した。

Picture F

1. 慎司は友達に電話で祐司が自分に票を入れてくれたと話した。
2. ミスター大学でコンテストが行われた。祐司は慎司に投票し、圭介は自分自身に投票した。祐司は慎司に投票したことをはなし、そのことが嬉しかったので、友達の大郎にそのことを話した。
3. 慎司は祐司が自分に投票してくれたことを大郎に話した。
4. 慎司は祐司が自分に投票してくれたと大郎に話した。
5. 慎司は祐司がミスターコンで自分に投票してくれたことを大郎に話した。
6. 慎司は大郎に祐司が自分のために票を入れてくれたと言った。
7. 慎司は祐司が彼自身をミスコンで選んだことを友達に話した。
8. ミスター大学のコンテストで、慎司は祐司が彼自身に票を入れてくれたことを友達の大郎に言った。
9. 慎司が大郎に自分自身の予定を伝えた。
10. 慎司は、祐司が自分に票を入れてくれたことを、友達に話した。
11. 慎司は友達の大郎に自分に投票して欲しいと頼んだ。
12. 慎司は大郎に祐司が自分に投票したと話した。
13. 慎司は自分に投票したか大郎に聞いた。
14. 祐司は慎司に投票した。圭介は彼自身に投票した。
15. 慎司は大郎に祐司が自分に票を入れたと言った。
16. 慎司は友達の大郎に祐司が自分自身に投票したと話した。
17. 慎司は、祐司が自分に投票してくれて嬉しかったことを友達の大郎に話した。

18. 慎司は友達 of 太郎に祐司が自分自身を選んでくれたと言った。
19. 大学のミスコンで祐司が優勝し、そのことを友達に自分自身のことを話した。
20. 慎司は太郎に祐司が自分に投票してくれたと話した。
21. 慎司は友達 of 太郎にミスター大学コンテストのファイナリストに彼自身が選ばれたことを話した。
22. 慎司は祐司にミスター大学コンテストで選んでもらい彼は嬉しくなり友達にそういった。
23. 慎司は太郎に彼自身の予定を電話で聞いた。
24. 慎司は友達 of 太郎にミスター大学の子テストで祐司が自分に票を入れてくれたと話した。
25. 慎司は太郎に祐司が自分に投票したことを話した。
26. 慎司はミスター大学のコンテストに出場したことについて太郎に話した。真珠は祐司が自分に投票してくれたと言った。
27. 慎司は、祐司が自分をミスター大学コンテストのファイナリストに選んでくれたと、友達 of 太郎に電話で話した。
28. 慎司は太郎に自分が一番かっこいいと言った。
29. 慎司は、自分が大学のファイナリストになったことを友達 of 太郎に話した。
30. 慎司はファイナリストに慎司を自分自身を選んだことを太郎に話した。
31. 慎司はミスター大学コンテストで祐司が自分に投票してくれたことを友達 of 太郎に話した。
32. 慎司は友達 of 太郎に、祐司が自分にコンテストの票を入れたと伝えた。

33. 慎司は友達 of 太郎に祐司がミスター大学コンテストの投票で彼自身ではなく、自分自身に投票してくれたことを電話で話した。
34. 慎司は、祐司がミスター大学の投票で自分自身がファイナリストなのにも関わらず自分自身に投票しなかったと、友達 of 太郎に話した。
35. 慎司は友達 of 太郎に祐司が自分自身に投票してくれたといった。
36. 祐司は、彼自身がミスター大学コンテストに出場しているにもかかわらず、自分に投票してくれたと、電話口 of 太郎に話した。
37. 慎司は、太郎に自分自身のことについて話した。
38. 慎司は友達 of 太郎に自分のテストの点数が良かったと話した。
39. 慎司は祐司が自分に票を入れてくれたということを太郎に言った。
40. 慎司は太郎に自分自身に祐司が投票してくれたことを伝えた。
41. 慎司は祐司が自分に投票してくれたと友達 of 太郎に話した。
42. 投票後、慎司は太郎へ電話をした。「もしもし、太郎。あのさ、慎司が自分に票を入れてくれたから今回のミスターいただいたわ。」「そっか、よかったな！じゃ焼肉よろしく」太郎がおどけた調子で返してきた。「それは逆だろ」と突っ込みを入れておいた。
43. 慎司は太郎にミスター大学コンテストで祐司が自分にチェックしてくれたことを言った。
44. 慎司は自分自身に投票してほしいと太郎に電話した。
45. 慎司は友達に自分自身に票を入れるように頼んだ。
46. 慎司は自分が 1 位になるように友達におねがいをした。

47. 慎司は自分自身に投票したことを友達の太郎に話した。
48. 慎司は自分自身を大学コンテストの投票に祐司が投票してくれたと太郎に電話で話した。

H.2 L1 KOREAN

Picture A

1. 祐司は夏子に写真を撮ってあげた。その後、祐司は自分自身にスタジオで彼自身が撮った写真を編集した。後日、祐司と夏子はカフェで会い、祐司は自分自身が編集した写真を夏子に見せた。
2. 祐司は夏子の写真を撮って、自分が撮った写真を夏子に渡した。
3. 祐司は夏子に彼女自身を撮った写真を渡した。
4. 祐司はスタバで夏子に自分が撮った夏子の写真を見せました。
5. 祐司は夏子に、自分自身が撮った夏子の写真をあげた。
6. 祐司は慎司に自分が慎司投票したと言う事実を太郎に言った。
7. 夏子は自分が撮られた写真を祐司にもらった。
8. 祐司は自分が撮った夏子の写真を彼女に見せた。
9. 祐司はスタバで夏子と会って、祐司自分が撮った写真を夏子彼女自身に見せた。
10. 祐司は彼自身が撮った彼女の夏子ん写真を自分で編集し、次の日カフェで彼女にその写真を渡した。
11. 祐司は夏子に自分が撮った写真を見せた。

12. 祐司は夏子に自分がトタ彼女の写真を見せた。
13. 祐司は夏子に彼女自身の写真を見せた。
14. 祐司は自分が撮った写真を夏子に見せた。
15. 祐司は夏子に彼女自身を撮った写真をスタバで渡した。
16. 自分自身が撮った夏子の写真を夏子に見せた。
17. 祐司は夏子の写真を撮って編集した。数日後、スターバックスで祐司は夏子に彼自身が撮って編集した写真を夏子に見せた。
18. 祐司は夏子に自分が撮った写真を見せた。

Picture B

1. 祐司は夏子に写真を撮ってあげた。祐司は自分自身が撮った写真を編集した。その後、祐司と夏子はカフェで会い、夏子に彼自身が撮った写真を渡した。夏子は、祐司が撮った彼女自身の写真を友達に見せた。
2. 夏子は祐司が彼女自身を撮った写真を友達に見せた。
3. 夏子は祐司から撮ってもらった自分自身の写真を友達に見せた。
4. 夏子は、祐司が、自分の写真を撮ってくれたと、友達に言った。
5. 夏子は、祐司が撮った彼女自身の写真を友達に見せた。
6. 夏子は友達に祐司が撮ってくれた自分の写真を見せた。
7. 夏子は自分の写真を祐司にもらって友達に話している。
8. 夏子は祐司が彼女自身の写真を撮ってくれたことを友達に言った。
9. 夏子は祐司が撮ってくれた自分自身の写真を友達に見せた。

10. 夏子は先日彼氏の祐司が撮って自分で編集までしてくれた。彼女自身の写真を図書館で友達に見せた。
11. 夏子は友達に自分を撮った写真を祐司が見せてくれたと言った。
12. 夏子は友達に自分が撮られた写真を見せた。
13. 夏子は祐司が自分を撮った写真を友達に見せた。
14. 夏子は友達に祐司が自分を撮った写真をくれたと言った。
15. 夏子は自分の友達に彼氏が撮ってくれた自分の写真を見せた。
16. 夏子は祐司は撮った彼女自身を写真を友達に見せた。
17. 祐司は夏子の写真を撮って編集した。数日後、スターバックスで夏子は祐司から写真をもらい、友達に彼女自身が撮られている写真を見せた。
18. 夏子は友達に祐司が撮ってくれた彼女自身の写真を見せた。

Picture C

1. 慎司はテレビのコマーシャルを見てゲーム機を買いたいと思った。その後、彼はゲーム機を買いに電気屋さんに行き、ゲーム機を買った。それをうれしいと思った慎司は、彼の彼女であるアリスに彼自身のゲームの話ばかりを言った。アリスは、慎司が話したことについて恵子に話した。
2. アリスは、彼氏が、自分自身のために買ったゲームをを恵子に話した。
3. アリスは慎司が自分自身のためにゲームを買ったと恵子に言った。
4. アリスは恵子に慎司が自分自身に言ってくれたことについて話しました。
5. アリスは、慎司が彼自身のためゲームを買ったことを恵子に説明した。

6. アリスは恵子に慎司が彼自身にゲームを買ってくれて言ったのを話した。
7. アリスは慎司が彼自身のためのゲームを買ったと恵子に話している。
8. アリスは彼である慎司が自分自身のため DS を買ったことを恵子に話した。
9. アリスは慎司が買った新しいゲームを自分に見せたと恵子に話した。
10. アリスは自分の彼氏の慎司がゲームに夢中で自分に新しいゲームを買ったことまで報告したと友達恵子に飽きた顔で話した。
11. アリスは自分自身のために彼氏がゲームを買ったと恵子に話した。
12. アリスはけいこに慎司が彼自身のためにゲームを買ったと言った。
13. アリスは彼氏の慎司がゲーム機を自分に見せたと恵子に言った。
14. アリスは恵子に慎司が自分自身の任天堂を買ったと言った。
15. アリスは自分の彼氏がいつもゲームの話ばかりすると友達恵子に話した。
16. アリスは慎司が自分自身のゲームを買ったと恵子に話した。
17. 慎司はビックカメラでセール中のゲーム機を買った。彼女であるアリスは友達に彼自身が買ったゲームの話ばかりをしたことを話した。
18. アリスは恵子に慎司が彼自身にゲームを買ったことを言った。

Picture D

1. 祐司は夏子に自分が撮った写真を見せた。
2. 愛美は彼氏が彼女自身のために、新しい携帯をプレゼントもらったことを友達に話した。
3. 愛美は彼氏の圭介が彼女自身のため 아이폰 を買ってくれたと友達に言った。

4. 愛美は友達に彼氏の圭介が自分の誕生日の時くれたプレゼントについて話しました。
5. 愛美は、圭介が自分のためアイホンを買ってくれたことを友達に自慢した。
6. 愛美は友達に圭介が自分のためにアイパッドを買ってくれたと言った。
7. 愛美は自分自身のためのプレゼントを消すけからもらって友達と連絡しています。
8. 愛美は圭司が彼女自身のためにアイホンを方と友達に言った。
9. 愛美は彼氏が自分にくれたアイパッドのことを友達に話した。
10. 圭介は金曜日が自分の彼女の誕生日だと気づいて iPhone を買いに行った。そして金曜日に彼女の愛美にそれを渡した。彼女は嬉しくなって友達にそのことを電話で話した。
11. 愛美は友達に彼氏が自分のために合ばどを買ったと言った。
12. 愛美は友達に圭介が彼女自身のために新しいアイパッドを買ってくれたと言った。
13. 愛美は友達に彼氏の圭介が自分にアイパッドをプレゼントでくれたと言った。
14. 愛美は圭介が自分にプレゼントをくれたと友達に言った。
15. 愛美は自分の彼氏が自分のためにアイパッドを買ってくれたと友達に言った。
16. 自分は誕生日プレゼントを貰ったことを友達に話した。
17. 圭介は彼女である愛美の誕生日プレゼントでアイパッドを買ってあげた。愛美は嬉しくなって、友達に圭介が自分のために買ってくれたプレゼントについて話した。
18. 愛美は圭介が彼女自身にアイパッドを買ってくれたと友達に言った。

Picture E

1. 祐司、圭介、慎司は大学のコンテストにてファイナリストのメンバーとして選抜された。祐司は慎司に投票をしたが、圭介は彼自身に投票した。後に、圭介は自分自身に票を入れたと祐司に言った。祐司は彼の彼女にこのことについて話した。
2. ミスター大学のコンテストで祐司は、圭介が自分自身を選んだと、彼女に話した。
3. 祐司は夏子に圭介が自分自身の名前を選択したと言った。
4. 祐司は夏子と電話して、圭介がコンテストで自分自身に投票したことについて話しました。
5. 祐司は、圭介が自分自身をこの学校で一番かっこいいと思っていることを夏子に説明した。
6. 祐司は圭介が自分自身に投票した事実を自分の彼女である夏子に言った。
7. 祐司は圭介が彼自身を投票したと夏子に話しています。
8. 祐司は圭介がミスター大学コンテストの投票の時に自分自身にチェックしたと彼女の夏子に話した。
9. 祐司は圭介が彼自身を選んだと夏子に話した。
10. ミスター大学コンテストのファイナル戦でファイナリストの祐司は3人の内圭介だけが自分自身に投票したってことを彼自身から聞いて、ずるいと思い、そのことを彼女の夏子に愚痴った。
11. 祐司は彼女に圭介がコンテストで勝つために彼自身を選んだと話した。
12. 祐司は彼女の夏子に圭介がミスター大学コンテストで彼自身のために投票したと言った。

13. 祐司は彼女の夏子に圭介が自分自身をチェックしたと言った。
14. 祐司は彼女の夏子に圭介が自分自身を褒めたと言った。
15. 祐司は自分彼女にミスター大学コンテストで圭介が彼自身に投票したって言った。
16. ミスター大学コンテストで圭介が自分自身を選んだと夏子に話した。
17. 祐司は圭介がミスター大学コンテストのファイナルリストで自分自身に投票したことを聞いた。祐司は彼女の夏子に圭介が彼自身に投票したことを話した。
18. 祐司は夏子に圭介が自分自身に投票したことについて言った。

Picture F

1. 祐司、圭介、慎司は大学のコンテストにてファイナリストのメンバーとして選抜された。祐司は慎司に、圭介は自分自身に票を入れた。祐司は自分が慎司に投票したことを慎司にいった。慎司は嬉しくて友達太郎にそのことを話した。
2. 慎司は祐司が自分を選んでくれたと、友達に話した。
3. 慎司は友達太郎に祐司が自分自身を選択してくれたと言った。
4. 慎司は太郎に祐司がコンテストで彼自身に投票してくれたと言いました。
5. 慎司は、祐司が自分をこの学校で一番かっこいいと思っていることを太郎に自慢した。
6. 祐司は慎司に自分が慎司投票したと言う事実を太郎に言った。
7. 慎司は祐司が自分に投票したと太郎に伝えている。
8. 慎司はコンテストで祐司が自分に投票したことを友達太郎に話した。
9. 慎司は祐司が自分自身のことを選んでくれたと太郎に話した。

10. ミスター大学コンテストのファイナリストの1人慎司は、競争者の祐司が自分に票をひれたってことを彼自身から聞いて嬉しくなって、そのことを友達太郎に話した。
11. 慎司は祐司がコンテストで自分を選んだと友達に話した。
12. 慎司は友達太郎に祐司が自分のために投票してくれたと言った。
13. 慎司は友達太郎に祐司が自分をチェックしたと言った。
14. 慎司は友達太郎に祐司が自分を褒めたと言った。
15. 慎司は彼自身を自分の友達祐司がミスター大学コンテストで投票してくれたと太郎に言った。
16. 慎司はミスター大学コンテストで祐司が自分を選んでくれたと太郎に話した。
17. 慎司は祐司がミスター大学コンテストのファイナルリストで自分に投票したことを聞いた。慎司は嬉しくなって、友達太郎に祐司が自分に投票してくれたことを話した。
18. 慎司は祐司が自分に投票したことを太郎に言った。

H.3 L1 CHINESE

Picture A

1. 祐司は夏子の写真を撮って夜に編集して、次の日に夏子とスタバで会って、自分取った写真を夏子にあげた。
2. 夏子は公園で写真を撮った。祐司に彼女自身の写真を見せた。
3. コーヒー店で祐司は自分を撮った夏子の写真を夏子に見せた。

4. 祐司は夏子の彼女自身の写真に見せた。
5. 先日、友達の夏子の写真を撮った。編集してから、スタバで夏子さんに見せた。
6. 祐司は夏子に彼女自身の写真を見せた。
7. 祐司は夏子の写真を撮った、その後、祐司は夏子の写真を編集して、翌日喫茶店で夏子と会ったとき、祐司は夏子に彼女自身の写真を見せた。
8. 祐司は編集した夏子自分の写真を夏子にあげた。
9. 祐司は夏子の写真を撮りました。編集してから自分自身が撮った写真を夏子に見せました。
10. 祐司はスタバで彼自分が撮った夏子の写真を夏子に渡った。
11. 夏子に祐司は彼女自身の写真を見せた。
12. 祐司は夏子の写真を撮り、編集後に、スタッパで彼女自身の写真を見せた。
13. 祐司は自分が撮って編集した夏子の写真を夏子にあげた。
14. コーヒー屋で祐司は夏子に彼自分が撮って編集した写真を送った。
15. 祐司は夏子自身を撮った写真を喫茶店で彼女へあげた。
16. 祐司は喫茶店で自分が撮った夏子の写真を夏子に渡した。
17. 写真家の慎司は夏子の写真を撮りました。その写真を編集した後でスタバで夏子に自分自身が編集した写真をあげました。
18. 祐司は夏子自身の写真を編集して夏子にあげた。
19. 喫茶店で祐司が夏子に公園で撮った彼女自身の写真を見せてあげた。
20. 祐司は夏子が彼女自身の写真を見せてあげた。
21. 祐司は夏子に彼女自身の写真を見せた。

22. 祐司はコーヒーショップで夏子に彼女自身の写真を渡した。
23. 祐司は夏子に撮った写真を自分に編集して見せた。
24. 祐司はスタバで夏子に自分が撮った彼女の写真を見せた。
25. 祐司は夏子の写真を撮って、彼女自身に上げた。
26. 祐司は夏子に自分が撮った彼女の写真を見せた。
27. 祐司は彼女自身に撮った写真を見せた。
28. スタバで慎司は自分が夏子にとった写真を彼女自身に見せた。
29. 祐司はスタバで先日夏子のために撮った写真を彼自身に見せた。
30. 祐司は自分が撮影した夏子の写真を編集して、夏子に見せた。
31. 祐司が夏子に写真を撮って、編集して、祐司に夏子の彼女自身の写真を見せた
32. 祐司はスターバックスで夏子に彼が撮った彼女自身の写真を見せてあげました。
33. 祐司は喫茶店で夏子に彼女自身の写真を見せました。
34. 祐司は夏子の写真を撮った。そして自分が編集した。スタバであった夏子に自分が撮った夏子の写真を見せた。
35. 祐司は山で夏子の写真を撮った。編集した後、祐司は喫茶店で夏子にあって、彼女自身の写真をあげた。
36. 祐司は自分が撮った夏子の写真を恵子に見せた。
37. 祐司は夏子に彼女自身の写真を見せた。
38. 祐司は夏子に自分が彼女自身を撮った写真を見せた。
39. 祐司はその前夏子に自分が撮った写真を編集して夏子に見せた。
40. 祐司は夏子に彼女自身の写真をあげた。

Picture B

1. 祐司は夏子の写真を撮って、スタバで夏子に会って、自分の撮った写真をあげた。
夏子はその写真を友達に見せた。
2. 夏子は友達に自分自身の写真を見せた。
3. 夏子は祐司を公園で撮った自分の写真を友達に見せた。
4. としょかんで夏子が自分の友達に自分自身の写真を見せた。
5. ようやく夏子ちゃんと付き合ってたよかった。先日前が得意なうでが彼女に友達に見せて、羨ましくてもらっらしいです。
6. 夏子は友達に祐司が自分自身に撮った写真を見せた。
7. 祐司は夏子の写真を撮った、その後家で夏子の写真を編集した。翌日喫茶店で夏子と会った時、夏子に写真をあげた。夏子は祐司が撮った自分の写真を友達に見せた。
8. 夏子は祐司からもらった編集した自分の写真を友達に見せた。
9. 祐司は夏子の写真を撮りました。編集してから、夏子にあげました。夏子は自分自身の写真を図書館で友達に見せました。
10. 夏子は祐司が撮った彼女自身の写真を友達に見せた。
11. 夏子は祐司が自分自身を撮ったの写真を友達を見せた。
12. 夏子は友達に祐司が自分自身のために撮った写真を見せた。
13. 夏子は友達に祐司から自分自身で撮った写真を編集してもらったことを言った。
14. 夏子は祐司が撮られて編集した彼女自分の写真を友達に送った。
15. 夏子は裕子が彼女自身を撮った写真を友達に見せた。
16. 夏子は祐司が彼女自身を撮った写真を友達に見せた。

17. 写真家の祐司は夏子に写真をとってあげました。そのあと夏子の写真を編集しました。翌日スタバで夏子に彼自身が編集した写真をあげました。夏子が写真をもらってから、とても喜びました。そのあとゆうじから編集してくれた写真を友達に見せました。
18. 夏子は慎司が自分の写真を編集して友達に見せた。
19. 夏子が祐司が撮ってくれた自分自身の写真を友達に見せてあげた。
20. 夏子は自分自身の写真が友達に見せた。
21. 夏子は友達に祐司が彼自身撮った写真を見せた。
22. 夏子は友達に自分の写真を見せました。
23. 夏子は友達に祐司が彼女自身のために撮った写真を見せた。
24. 夏子は友達に祐司が撮った彼女自身の写真を見せたと言った。
25. 夏子は自分が祐司に撮られた写真を友達に見せました。
26. 夏子は祐司が撮った自分の写真を友達に見せた。
27. 夏子は友達に祐司から撮った自分の写真を見せた。
28. 夏子は祐司が彼女自身のために撮った写真を友達に見せた。
29. 夏子は図書館で友達に祐司が彼女自分自身のためにとり編集した写真を見せた。
30. 夏子は祐司が撮影して編集した自分自身の写真を友達に見せた。
31. 夏子は祐司に自分自身の写真を友達に見せました。
32. 夏子は祐司が自分を撮った写真を友達に見せてあげました。
33. 夏子は友達に祐司が撮った自分の写真を見せました。
34. 祐司は夏子の写真を撮った。写真を編集して、スタバで会った。夏子に彼女自身の写真を祐司は見せた。夏子は祐司が撮った自分の写真を友達に見せた。

35. 祐司は山でなつこの写真を撮れた。編集した後の翌日、祐司は喫茶店で写真を夏子にあげた。その後、夏子は彼女自身の写真を友達に見せた。
36. 夏子は祐司が撮った自分自身の写真を友達に見せた。
37. 夏子は友達に自分の写真を見せた。
38. 夏子は友達に祐司が自分自身に取った写真をみせた。
39. 夏子は友達に祐司が自分に撮った写真を見せた。
40. 夏子さんは友達に「祐司が自分の写真を撮ってくれて、スタバで編集した写真をくれた」と話した。

Picture C

1. 恵子はアリスに電話をして、自分がゲームをしたいと言った。
2. アリスは恵子に慎司はDSを買った後ずっと自分前にゲームをしたと言います。
3. アリスは自分のすまなゲームがもらったということ恵子に言った。
4. 彼氏が先日DSを買ってからずっとゲームばかり言って、悩んでいる。
5. アリスは恵子に自分がゲームをしたと言った。
6. 慎司はテレビでゲーム機の値下げ広告を見て、ゲーム機を買いに行った、その後、彼女のアリスにゲーム機を買ったことを言った。アリスは友達恵子に慎司が自分自身にゲーム機を買ったと言った。
7. リスクと女と電話をかけている。リスクは彼氏自分をゲームのことばかり考えると喋って、女はリスクも自分自身のことばかり喋ってると感じた。

8. 慎司は割引があったゲーム機を買いました。そして彼女に言いました。彼女は彼自身がゲーム機を買ったことを友達の子に言いました。
9. アリスは彼氏の慎司が彼自身にゲーム機を買ったと友達の子に言った。
10. アリスは慎司が自分自身に DS を買ったと子に話した。
11. アリスは子に彼氏の慎司が彼自身にゲーム機を買ったと言った。
12. アリスは子に彼氏が自分自身で買ったゲームを自分に見せたと言った。
13. アリスは子に慎司がゲームに夢中して、自分のことを無視したといった。
14. アリスは彼氏の慎司が彼自身へ DS を買ったことを友人の子へ伝えた。
15. アリスは慎司が彼自身に DS を買ったと子に言った。
16. ゲームするのが好きな慎司さんはビクカメラにゲーム機を買いました。自分が買ったゲーム機をアリスに見せました。アリスは慎司に彼自身が買ったゲーム機を見せてくれたという子に言いました。
17. アリスは慎司が自分自身のためにゲームを買ったを子に言った。
18. アリスが友達の子に彼氏の慎司が自分自身にゲームカメラを買った。
19. アリスは慎司自分自身ゲームを買ったことは子に話した。
20. アリスは子に慎司自分買ったゲームに夢中になったと言った。
21. アリスは子に自分の彼氏の慎司が新しいゲームを買ったことについて話した。
22. アリスは電話で子に彼氏がテレビ通販ゲームを買って自分自身に展示すると言った。
23. アリスは子に慎司がゲームのために自分でパソコンを買ったと言いました。
24. アリスは電話で自分の彼氏の慎司がゲームにはめられたと子に言いました。

25. アリスは彼氏の慎司が彼自身のために DS を買ったことを恵子に話した。
26. 彼女自身好きのことを話している。
27. アリスは慎司自分自身がゲームを買いたいと恵子に言った。
28. 恵子はアリスに慎司は彼自分自身のためにビックカメラに行き、ゲーム機を買った。
29. アリスが一日ゲームをしていた。翌日友達恵子に自分自身一日ゲームをしていたことを伝えました。
30. アリスは恵子に慎司が彼自身がゲーム買うことと言いました。
31. 慎司の彼女のアリスは慎司が彼自身にゲームを買ったことを恵子に言っていました。
32. アリスは友達恵子に自分の彼氏がゲーム機を買ったことを言いました。
33. 慎司はゲーム機を欲しい。そしてビックカメラに行ってゲーム機を買った。彼は自分にゲーム機を買ったことを彼女にアリスに話した。アリスは慎司が彼自身にゲーム機を買ったことを友達に話した。
34. 慎司はテレビでゲームマシンの広告を見えた。慎司はすぐ店に行って、ゲームマシンを買った。そのことを彼女のアリスが知られた。アリスは電話で慎司は自分にゲームマシンをかったということを恵子に伝えた。
35. アリスは慎司が自分自身好きなゲームの話を聞かさればかりと恵子にグチを言った。
36. 慎司が彼女のアリスに自分が買ったゲーム機を見せた。アリスは理解できなくて恵子にこのことを言った。

37. アリスは恵子に慎司が彼自身にゲームを買ったと言いた。
38. アリスは友達恵子に彼氏としての慎司が自分自身のためにゲームを買ってずっとゲームをやっていると言った。
39. アリスは恵子に彼氏の慎司が彼自身のためにビックカメラでゲームを買ったと話した。
40. 慎司はゲームが大好きで、ビックカメラに行って、自分が 3DS を買ったことを彼女の彼女に話した。彼女は友達恵子にそのことを話した。

Picture D

1. 彼女の誕生日のために圭介はプレゼントを買った。プレゼントをもらった彼女が嬉しくて、友達愛美に話した。
2. 愛美は自分がかれしからもらった新しい携帯を友達に言った。
3. 愛美は友達に彼氏圭介が新しい iPhone を買って、自分にあげたと言いました。
4. 愛美は自分の彼氏圭介からもらった誕生日のプレゼントということで、友達に電話で言った。
5. ねね、誕生日プレゼントとして、かれしから iPhone をもらった。しあわせだったろわ。
6. 愛美は友達に自分が新しい携帯を買ったと言った。
7. 圭介はまもなく彼女の誕生日だと知った、圭介はアップルストアへプレゼントを買いに行った。金曜日に圭介は彼女の愛美に誕生日プレゼントをあげた、愛美はうれしかった。その後、愛美は友達に自分が圭介からプレゼントをもらったと言った。

8. 愛美の誕生日のとき、彼氏は自分にアイパットを買ってくれたと友達に喋った。
9. 圭介は彼女の愛美の誕生日プレゼントのためにアイパッドを買って愛美にあげました。愛美はうれしくて、彼女自身にプレゼントをくれたことを友達に言いました。
10. 愛美は友達に彼氏の圭介が自分にアイパッドを買ったと言った。
11. 愛美は圭介は自分に新しいの電話を買ったと友達に言った。
12. 愛美は友達に圭介が自分のためにアイパットを買ったと言った。
13. 圭介は愛美の誕生日のため、アイパットを買いに行った。金曜日に愛美に買ったアイパットをあげた。愛美は圭介から自分の誕生日のプレゼントとしてのアイパットを買ってくれたことを友達に言った。
14. 愛美は友達に圭介が彼女自分に携帯を誕生日プレゼントとして送ったと言った。
15. 愛美は彼氏の圭介が彼女自身を携帯を買ったことを友達へ伝えた。
16. 愛美は圭介が自分に iPad を買ったと友達に言った。
17. 圭介は最近彼女の愛美ちゃんの 23 歳の誕生日でどんなプレゼントをえらぶのかを悩みました。そのあと愛美ちゃんの誕生日プレゼントのためにアップルショップに行きました。金曜日、自分がアップルショップで買ったアイパッドを彼女愛美ちゃんにあげました。まなみがとても喜びました。愛美は彼氏が新しいアイパッドを誕生日プレゼントとして自分にあげたということを友達に言いました。
18. 愛美は圭介が自分のために iPad を買ったことを友達に言った。
19. 愛美が圭介が自分自身の誕生日にアイパッドを買ってくれたと友達に言いました。
20. 愛美は自分自身の iPhone をもらったことに友達に言った。
21. 愛美は友達に彼の圭介が自分に iPhone をくれたと言った。

22. 愛美は友達に彼氏が自分のために iPad を買ったと言った。
23. 圭介は彼女愛美の誕生日のために彼自身はアップルを買った。愛美は友達に言った。
24. 愛美は友達圭介が自分の誕生日の時 iPad を送りました。
25. 愛美は誕生日のとき彼氏が自分に携帯を贈ってくれたと電話で友達に話しました。
26. 愛美は彼氏の圭介が自分の誕生日のために iPhone をプレゼントしたことを友たちに話した。
27. 愛美さんは自分もらったのプレゼントを友達に言いました。
28. 愛美は圭介が自分誕生日のために iPhone を買ったことを友達に言った。
29. 愛美は友達に彼氏の圭介は彼女自分自身のためにアップルショップに行き、iPhone を買ってくれたと言った。
30. 愛美は彼の圭介が彼女自分自身に携帯電話の誕生日プレゼントをくれたと友達に言った。
31. 圭介は自分の誕生日のプレゼントをもらうこと友達と言いました。
32. 愛美は友達に彼氏の圭介が自分にアイパッドを買ってくれたことを言いました。
33. 愛美は友達に自分の彼氏からアイパッドをもらったことを言いました。
34. 圭介の彼女は来週誕生日である。圭介はiPhoneを店へ行ってiPhoneを買った。誕生日の金曜日に圭介は彼女の愛美に自分がお店で買ったiPhoneを挙げた。愛美はそういうことを友達に話した。

35. 圭介の彼女の誕生日はもう近いた。圭介は iPhone をプレゼントとして彼女の愛美にあけた。その後、愛美は電話で友達に圭介は彼女自身にプレゼントをあけたということをおわられた。
36. 愛美は彼氏が自分のために新しい携帯を買ってくれたことを友達に電話で伝えた。
37. 愛美は圭介が自分にプレゼントをあげたことを友達に言った。
38. 愛美は友達に圭介が自分に携帯を買ってくれたことを言いた。
39. 愛美は圭介に自分をプレゼントもらった。
40. 愛美は友達に彼氏が自分にアイパッドを買ってくれたと話した。

Picture E

1. 祐司と圭介と慎司は 3 人でファイナリストを出て、圭介は自分の名前を書いたことを祐司に伝えた。祐司はそのことを彼女の夏子に話した。
2. 祐司は夏子に自分の選択が正解だと言った。
3. 電話で慎司は彼女なつこに圭介は自分を選んだといいました。
4. 祐司は夏子に自分自身どこがいいを聞いた。
5. 圭介さんがコンテストした後あっちこっちに誰かを書いたかを聞いてしまって悩んでいる。慎司くんを選んだので、しょうがないうそをついた。
6. 祐司は夏子に圭介が自分自身がファイナリストと言った。
7. 祐司、桂介と慎司はミスター大学のコンテストに参加した、祐司は慎司の演説がすばらしいと思って、慎司に投票したが、桂介は自分自身に投票したと祐司に言った。祐司は彼女の夏子に桂介が彼自身に投票したと言った。

8. 祐司と彼女と電話かけている、祐司はクラスメート圭介がファイナリストの推選をする時、彼自身をチェックすると彼女に喋った。
9. 圭介は彼自身はコンテストの第一位だと言った。祐司は不満に思い、彼女の夏子に言いました。
10. 祐司は圭介が彼自身に投票したと彼女の夏子に言った。
11. 祐司は圭介が自分を選んだと夏子を話した。
12. 祐司は彼女の夏子に圭介が自分自身を投票したと言った。
13. 祐司は夏子に圭介が彼自身に投票したことを言った。
14. 祐司は彼女夏子にファイナリストで圭介が自分自身の名前を選んだと言った。
15. 祐司は圭介が自分自身を選ぶことを彼女の夏子に伝えました。
16. 祐司は圭介がファイナリストに彼自身を選んだと夏子に言った。
17. 祐司は夏子に圭介がゼミ長の投票会で自分自身を選んだと言いました。
18. 祐司は夏子に圭介が自分自身のことを選んだと言った。
19. 祐司が彼女の夏子に圭介が彼自分に選挙したって言いました。
20. 祐司は圭介自分自身ファイナリストしたことは夏子に言った。
21. 祐司は彼女の夏子に圭介が彼自身に選挙したと言った。
22. 祐司は夏子に圭介が自分自身に投票したことを告げた。
23. 祐司は彼女にファイナリストで圭介は自分に書いたと言った。
24. 祐司は夏子に圭介が自分自身を選んだと言いました。
25. 祐司は圭介が自分に投票したと自分の彼女の夏子に電話を話しました。
26. 祐司は圭介がファイナリストで彼自身を選んだことを彼女の夏子に話した。

27. 祐司は彼女夏子に圭介自分自身に投票したと言いました。
28. 祐司は夏子に圭介が自分自身を選んだことを言った。
29. 祐司は彼女の夏子に圭介がミスター大学の投票で祐司自身を投票したと言った。
30. 祐司は圭介が大学コンテストで彼自分自身を選んで、自慢の態度を彼女の夏子に言った。
31. 祐司は圭介が彼自身投票にしたことと彼女と言いました。
32. 祐司は圭介が彼自身を選んだことを彼女の夏子に言いました。
33. 祐司は彼女に圭介は自分自身を選んだことと言いました。
34. 祐司はリストに慎司の名前を書き込んだ。圭介は自分の名前を書き込んだ。翌日圭介は自分の名前を書き込んだって祐司はびっくりされた。祐司は圭介が彼自身の名前を書き込んだということを彼女の夏子に話した。
35. 大学の選挙で圭介は自分自身を選ばれた。そして圭介はこのことを祐司に言いました。その後祐司は圭介が選挙で自分を選ばれたということを彼女の夏子に伝えた。
36. 祐司はコンテストの大会で圭介が彼自身を選んだことを夏子に伝えた。
37. 祐司は彼女の夏子に圭介が彼自身に投票したことを言った。
38. 祐司は夏子に圭介が彼自身を選んだと言いた。
39. 祐司は彼女の夏子に圭介が彼自身に選択したと言った。
40. 祐司は彼女の夏子に圭介が彼自身を推薦したと話した。

Picture F

1. 祐司と圭介と慎司は3人でファイナリストを出て、祐司は慎司の名前を書いた。自分のことを友達太郎に話した。
2. 大学のファイナリストの選挙があり、慎司は太郎に自分が自分自身を選んだと言った。
3. 慎司は友達太郎に祐司が自分を選んだと言いました。
4. 慎司は太郎に祐司が自分のこと賛成を言った。
5. 慎司さんは祐司さんが自分をえらんだんと友達太郎さんに言いました。
6. 慎司は太郎に自分自身がファイナリストと言った。
7. 祐司、桂介と慎司はミスター大学のコンテストに参加した、祐司は慎司の演説が素晴らしいと思って、慎司に投票したが、桂介は自分に投票した。祐司は慎司に投票したことを慎司に言った。慎司は友達太郎に祐司が自分に投票したと言った。
8. ファイナリストを推選するとき、祐司が自分をチェックしてくれたと慎司は友達太郎に喋った。
9. ファイナリストコンテストのとき、祐司は慎司としてやりました。慎司は自分自身のことを友達太郎に言いました。
10. 慎司は祐司が自分に投票したと友達太郎に言った。
11. 慎司は祐司が彼自身を選んだと太郎に話した。
12. 慎司は友達に祐司が自分を投票したことを言った。
13. 慎司は友達に祐司が自分自身に投票したことを言った。
14. 慎司は友達に祐司がファイナリストで自分の名前を選んだと言った。

15. 慎司は友人の祐司が自分を選んだことを友達太郎へ伝えた。
16. 慎司は祐司が自分を選んだと太郎に言った。
17. 祐司と圭介はクラスメートでクラスのゼミ長の投票をしました。祐司は慎司に自分自身が慎司に投票したことを言いました。慎司がびっくりして喜びながら友達太郎に彼自身が祐司に選ばれたと言うことを伝えました。
18. 慎司は祐司が自分のことを選んだことを太郎に言った。
19. 慎司は祐司が彼自身に選挙したと友達太郎に言いました。
20. 慎司は彼自身にファイナリストしたことに太郎に言った。
21. 慎司は友達太郎に慎司が自分自身に応援したと言った。
22. 慎司は友達太郎に祐司が自分を選んだことについて話した。
23. 学校ファイナリストの選挙で慎司は友達に自分は慎司を選んだと言った。
24. 慎司は太郎に祐司が自分を選んだと言いました。
25. 慎司は祐司が自分に投票してくれたと電話で太郎に言いました。
26. 慎司は祐司がファイナリストで自分を選んだことを友達太郎に話した。
27. 彼自身のことを友達に伝えている。
28. 慎司は太郎に自分が自分自身を選んだことを言った。
29. 慎司は友達太郎に祐司が彼自身に投票したと言った。
30. 慎司は大学で祐司が自分がかっこいいと言ってくれたことを友達太郎に電話で話しました。
31. 慎司は祐司が自分自身に投票くれたことを太郎と言いました。
32. 慎司は祐司が自分を選ばれたことを太郎に言いました。

33. 慎司は友達太郎に祐司は自分を選びましたと言いました。
34. 祐司は慎司の名前をリストでチェックした。圭介は自分自身の名前をチェックした。そして祐司はそのことを慎司に話した。慎司はびっくりされた。祐司はそういうことを友達太郎に話した。
35. 大学の選挙について祐司は慎司を選ばれた。その後、祐司はこのことを慎司に言いました。慎司はこの語電話で友達に祐司は自分を選ばれたということをと伝わった。
36. 慎司は自分の携帯を使って友達太郎に電話を掛けた。太郎が自分自身の携帯が鳴ったことに気付いて、電話に出た。
37. 祐司と圭介と慎司は大学のファイナリストに出てきた。祐司は自分の投票状態を慎司に言った。慎司は嬉しくて太郎に祐司が自分に投票したことを電話で言った。
38. 慎司は太郎に祐司が自分を選んだと言いた。
39. 慎司は祐司が自分に選択したと言った。
40. 慎司は太郎に彼自身が自分を薦めたと伝えた。

APPENDIX I

SUMMARY OF L2 ACQUISITION OF REFLEXIVES

Summary of selected studies of L2 acquisition of reflexives. Author(s), year of publication, participants' L1 (the number of participants in parentheses), target L2, and the main findings of the study are outlined.

Table 76. Summary of selected studies on L2 acquisition of reflexives

<u>Author(s)</u>	<u>L1</u>	<u>L2</u>	<u>Main Findings</u>
Akiyama (2002)	Japanese (n = 141)	English	Examined embedded <i>that</i> -clauses vs infinitival clauses. Found that L2 learners were able to acquire the locality condition significantly better in sentences of <i>that</i> -clauses than infinitival clauses. Also found a considerable number of advanced learners who also failed in acquiring the locality condition that was tested for.

Felser, Sato, & Bertenshaw (2009)	Japanese (n = 22 for study 1, 32 for study 2)	English	Learners' performance differed from L1 speakers in speeded but not in untimed tasks. They argue learners have difficulty in identifying locality constraints than c-command violations, which was the opposite case for the L1 control group.
Hirakawa (1990)	Japanese (n = 65)	English	Examined data by Wexler & Manzini's (1987) binding parameters. Found that L1 Japanese transferred their L1 parameter setting to the L2, which led to errors. However, results were mixed, and suggests that resetting binding parameters as possible.
Jiang (2009)	Chinese (n = 66)	English	Intermediate level learners were more aware of clause types (finite vs. nonfinite) than beginning and advanced level learners. The intermediate level learners were significantly more accurate in rejecting LD antecedents in finite clauses than non-finite clauses. Noted that L2 learners might have difficulty in identifying tense markings in English.
Kim, Montrul, & Yoon (2015)	English (n = 32)	Korean	L2 learners interpret reflexives similar to L1 speakers, but process pronouns differently, even among learners with advanced English proficiency. Learners may be able to apply syntactic binding

			principles to sentences with anaphoric expressions, but showed difficulty with contextual and discourse information.
Kim, Montrul, & Yoon (2009)	English (n = 41)	Korean	Examined Korean immigrants, bilinguals, and late L2 learners, and found that immigrants perform similarly to L1 speakers, but bilinguals and L2 learners show different binding patterns. They suggest bilinguals and L2 learners (who had similar proficiency scores) showed evidence of L1 transfer from English.
Sperlich (2013)	English (n = 5) Korean (n = 5)	Chinese	L1 Koreans were able to show binding patterns of Chinese, but not for the L1 English group. Reasoning is due to reflexives in Korean and Chinese to be pragmatically oriented, while English is not.
Thomas (1991)	Chinese (n = 8) English (n = 33)	Japanese	As proficiency increased, both L1 English and L1 Chinese participants accepted LD binding of <i>zibun</i> . Lower level learners had substantially lower accuracy rates
Thomas (1995)	English (n = 58)	Japanese	Higher level proficiency learners of Japanese were able to acquire proper binding, but lower proficiency learners were not.

White, Bruhn-Gravato, Kawasaki, Pater, & Prévost (1997)	Japanese (n = 19 for story, 22 for picture) French (n = 22)	English	Learners' performance between the two tasks varied considerably. In the story tasks, both L1 groups were significantly less accurate than the native speakers, but were not in the picture task. They suggest that different tasks may induce different levels of difficulty, which may have affected the results.
Yoshimura, Nakayama, Sawasaki, Fujimori, & Kahraman (2013)	Chinese (n = 48) Turkish (n = 40) English (n = 13)	Japanese	Accuracy of identifying LD antecedent was generally lower than local, and more inconsistency within L2 learner groups. Results suggest that acquisition of LD binding is difficult regardless of L1 background.
Yoshimura, Nakayama, Shirahata, Sawasaki, & Terao (2012)	Chinese (n = 34) English (n = 13)	Japanese	Accuracy of identifying the correct antecedent increased as proficiency advanced, but overall L2 learners had more difficulty in correctly identifying the LD antecedent as opposed to the local.

APPENDIX J

JAPANESE PROFICIENCY TEST

The following are the questions from the Japanese Language proficiency test that was taken by the participants. Questions 1 and 3 from each section are from the N2 level, questions 2 and 4 are from the N3, and question 5 is from N4.

問題 1 _____の言葉の読み方として最もよいものを、1・2・3・4から一つえらびなさい。

- ① この黒い種からどんな花がさくのだろうか。
1 だね 2 たね 3 じゅ 4 しゅ
- ② 鈴木さんはクラスの代表にえらばれた。
1 たいひょう 2 だいひょ 3 だいひょう 4 たいひょ
- ③ 戦後、日本は貧しい時代を経験した。
1 まずしい 2 きびしい 3 けわしい 4 はげしい
- ④ 3日前から雨が続いている。
1 ういて 2 うごいて 3 ついて 4 つづいて
- ⑤ 日本でいろいろな経験をしました。
1 けいけん 2 けいげん 3 けけん 4 けげん

問題2 ____のことばを漢字でかくとき、最もよいものを、1・2・3・4から一つえらびなさい。

⑥ このカメラはデザインも性能もすぐれている。

- 1 超れて 2 恵れて 3 秀れて 4 優れて

⑦ こまっているときに、先生にたすけていただきました。

- 1 助けて 2 守って 3 支えて 4 協けて

⑧ 今日は、ごみしゅうしゅう日ですか。

- 1 拾集 2 修集 3 取集 4 収集

⑨ アルバイトのめんせつは来週の土曜日だ。

- 1 面接 2 面投 3 両接 4 両投

⑩ 地下鉄はとてもべんりです。

- 1 弁利 2 弁理 3 便利 4 便理

問題3 次の文の（ ）に入るのに最もよいものを、1・2・3・4から一つえらびなさい。

⑪ 新しい商品を売るために、彼は毎日忙しく飛び（ ）いる。

- 1 かかって 2 かけて 3 まわって 4 まわして

⑫ ここのパソコンは誰も使えますが、コピーは（ ）です。

- 1 会費 2 費用 3 有料 4 料金

⑬ 今の私の安い給料では、何年働いても自分の家は（ ）そうもない。

- 1 買い 2 買え 3 買う 4 買える

⑭ 彼女の描いた絵は、国内より（ ）海外での評価が高い。

- 1 まさか 2 たとえ 3 むしろ 4 かりに

⑮ 入口の前には車を（ ）ください。

- 1 やめないで 2 しめないで 3 とめないで 4 きめないで

問題4 _____の言葉に意味が最も近いものを、1・2・3・4から一つえらびなさい。

⑯ あの人のお母さんはいつもほがらかです。

- 1 おとなしい 2 まじめ 3 りっぱ 4 あかるい

⑰ 次々に新しいゲームが作られる。

- 1 だんだん 2 これから 3 いつでも 4 どんどん

⑱ 中田さんは単なる友人です。

- 1 大切な 2 一生の 3 ただの 4 唯一の

⑲ 明日飛行機の予約を確認してください。

- 1 変えて 2 調べて 3 行って 4 頼んで

⑳ まもなくバスが出発します。

- 1 泊まります 2 着きます 3 出ます 4 曲がります

BIBLIOGRAPHY

- Aaronson, D. & Scarborough, H. S. (1976). Performance theories for sentence coding: Some quantitative evidence. *Journal of Experimental Psychology: Human Perception and Performance*, 2(1), 56-70.
- Aikawa, T. (2002). Reflexives. In N. Tsujimura (Ed.), *The handbook of Japanese Linguistics* (pp. 154-190). Malden, MA: Blackwell Publishers.
- Akiyama, Y. (2002). Japanese adult learners' development of the locality condition on English reflexives. *Studies in Second Language Acquisition*, 24, 27-54.
- Andersen, R. W. (1984). The One to One Principle to interlanguage construction. *Language Learning*, 34(4), 77-95.
- Aoshima, S., Phillips, C., & Weinberg, A. (2004). Processing filler-gap dependencies in head-final languages. *Journal of Memory and Language*, 51, 23-54.
- Aoshima, S., Yoshida, M., & Phillips, C. (2009). Incremental processing of coreference and binding in Japanese. *Syntax*, 12(2), 93-134.
- Balota, D. & Chumbley, J. (1984). Are lexical decisions a good measure of lexical access? The role of word frequency in the neglected decision stage. *Journal of Experimental Psychology: Human Perception and Performance*, 5, 527-45.
- Bley-Vroman, R. (1990). The logical problem of foreign language learning. *Linguistic Analysis*, 20, 3-49.
- Broselow, E., & Finer, D. (1991). Parameter setting in second language phonology and syntax. *Second Language Research*, 7(1), 35-59.
- Carnie, A. (2013). *Syntax: A generative introduction*. Malden, MA: Blackwell Publishing.
- Chien, Y-C., & Lust, B. (2006). Children's knowledge of the binding principles. In P. Li, L. H. Tan, E. Bates, & O. J. L. Tzeng (Eds.), *The handbook of East Asian Psycholinguistics* (pp. 23-38). Cambridge, UK: Cambridge University Press.
- Chomsky, N. (1981). *Lectures on government and binding*. Dordrecht, Netherlands: Foris.

- Chomsky, N. (1986). *Knowledge of language: Its nature, origins, and use*. New York, NY: Praeger.
- Chomsky, N. (1995). *The Minimalist Program*. Cambridge, MA: MIT Press.
- Clahsen, H., & Felser, C. (2006). Continuity and shallow structures in language processing. *Applied Psycholinguistics*, 27(1), 107-126.
- Cole, P., Hermon, G., & Sung, L-M. (1990). Principles and parameters of long-distance reflexives. *Linguistic Inquiry*, 21(1), 1-22.
- Cole, P., & Sung, L-M. (1994). Head movement and long-distance reflexives. *Linguistic Inquiry*, 25(3), 355-406.
- Culicover, P. W., & Jackendoff, R. S. (1995). Something else for the binding theory. *Linguistic Inquiry*, 26(2), 249-276.
- Cummings, I. (2016). Parsing and working memory in bilingual sentence processing. *Bilingualism: Language and Cognition*, doi: 10.1017/S1366728916000675.
- Dekydtspotter, L., Schwartz, B. D., & Sprouse, R. A. (2006). The comparative fallacy in L2 processing research. In M. Grantham O'Brien, C. Shea, & J. Archibald (Eds.), *Proceedings of the 8th generative approaches to second language acquisition conference* (pp. 33-40). Somerville, MA: Cascadia Proceedings Project.
- Dryer, M. (2003). Word order in Sino- Tibetan languages from a typological and geographical perspective. In G. Thurgood & R. J. LaPolla (Eds.), *The Sino-Tibetan languages* (pp. 44-56). London, UK: Routledge.
- Faltz, L. M. (1977). *Reflexivization: A study in universal syntax*. Doctoral dissertation, University of California, Los Angeles, Los Angeles, CA
- Felser, C., & Cummings, I. (2012). Processing reflexives in English as a second language: The role of structural and discourse-level constraints. *Applied Psycholinguistics*, 33(3), 571–603.
- Felser, C., Sato, M., & Bertenshaw, N. (2009). The on-line application of Binding Principle A in English as a second language. *Bilingualism: Language and Cognition*, 12(4), 485-502.
- Ferreira, G., & Clifton, C. (1986). The independence of syntactic processing. *Journal of Memory and Language*, 25(3), 348-368.
- Ferreira, F., Ferraro, V., & Bailey, K. G. D. (2002). Good-enough representation in language comprehension. *Current Directions in Psychological Science*, 11, 11-15.
- Ferreira, F., & Henderson, J. (1990). Use of verb information during syntactic parsing: Evidence from eye tracking and word by word self-paced reading. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, 16(4), 555-568.

- Ferreira, F., & Patson, N. D. (2007). The 'good enough' approach to language comprehension. *Language and Linguistics Compass*, 1/1-2, 71-83.
- Fodor, J. D., & Hirose, Y. (2003). What Japanese parsing tells us about parsing. In W. McClure (Ed.), *Japanese Korean Linguistics 12* (pp. 193–205). Stanford: Center for the Study of Language and Information.
- Foote, R. (2011). Integrated knowledge of agreement in early and late English-Spanish bilinguals. *Applied Psycholinguistics*, 21(1), 187-220.
- Forster, J. (1976). Accessing the mental lexicon. In R. Wales & E. Walker (Eds.), *New approaches to language mechanisms* (pp. 257-287). Amsterdam: North-Holland.
- Frazier, L. (1987). Syntactic processing: Evidence from Dutch. *Natural Language and Linguistic Theory*, 5(4), 519-559.
- Frazier, L. (2013). Syntax in sentence processing. In R. P. G. van Gompel (Ed.), *Sentence processing* (pp. 21-50). East Sussex, UK/New York: Psychology Press.
- Frazier, L. & Fodor, J. D. (1978). The sausage machine: A new two-stage parsing model. *Cognition*, 6(4), 291-325.
- Frazier, L., & Rayner, K. (1982). Making and correcting errors during sentence comprehension: Eye movements in the analysis of structurally ambiguous sentences. *Cognitive Psychology*, 14(2), 178-210.
- Gass, S. M. (1994). The reliability of second-language grammatically judgments. In E. E. Tarone, S. M. Gass, & A. D. Cohen (Eds.), *Research methodology in second language acquisition* (pp. 303-322). Hillsdale, NJ: Lawrence Erlbaum.
- Haiman, J. (1985). *Natural syntax*. Cambridge, UK: Cambridge University Press.
- Hara, M. (2009). Real-time reading and reactivation evidence of syntactic gap processing in Japanese scrambling. In L. Plonsky & M. Schierloh (Eds.), *Selected proceedings of the 2009 Second Language Research Forum* (pp. 31-50). Somerville, MA: Cascadia Proceedings Project.
- Hara, T. (2001). Anaphoric expressions in Japanese. In T. van der Wouden & H. Broekhuis (Eds.), *Linguistics in the Netherlands* (pp. 113-125). Amsterdam, John Benjamins.
- Hirakawa, M. (1990). A study of the L2 acquisition of English reflexives. *Second Language Research*, 6(1), 60–85.
- Hoover, M., & Dwivedi, V. (1998). Syntactic processing by skilled bilinguals. *Language Learning*, 48(1), 1-29.
- Huang, Y. (1994). *The syntax and pragmatics of anaphora: A study with special reference to Chinese*. Cambridge, UK: Cambridge University Press.

- Inoue, A. (1991). A comparative study of parsing in English and Japanese. Doctoral dissertation, University of Connecticut, Storrs, CT.
- Inoue, A., & Fodor, J. D. (1995). Information-paced parsing of Japanese. In R. Mazuka & N. Nagai (Eds.), *Japanese sentence processing* (pp. 9-64). Hillsdale, NJ: Lawrence Erlbaum.
- Jackendoff, R. S. (1992). Mme Tussaud meets the binding theory. *Natural Language and Linguistic Inquiry*, 10(1), 1-31.
- Jackson, C. N. (2010). The processing of subject-object ambiguities in English and Dutch L2 learners of German. In B. VanPatten & J. Jegerski (Eds.), *Research in second language processing and parsing* (pp. 207-230). Amsterdam: John Benjamins.
- Jegerski, J. (2014). Self-paced reading. In J. Jegerski & B. VanPatten (Eds.), *Research methods in second language psycholinguistics* (pp. 20-49). New York: Routledge.
- Jiang, L. (2009). A referential/quantified asymmetry in second language acquisition of English reflexives by Chinese-speaking learners. *Second Language Research*, 25(4), 469-491.
- Juffs, A. (1998). Some effects of first language argument structure and syntax on second language processing. *Second Language Research*, 14(4), 406-424.
- Juffs, A. (2004). Representation, processing and working memory in a second language. *Transactions of the Philological Society*, 102, 199-226.
- Juffs, A. (2005). The influence of first language on the processing of wh-movement in English as a second language. *Second Language Research*, 21(2), 121-151.
- Juffs, A., & Harrington, M. (1995). Parsing effects in second language sentence processing: Subject and object asymmetries in wh-extraction. *Studies in Second Language Acquisition*, 17(4), 483-516.
- Juffs, A., & Harrington, M. (1996). Garden path sentences and error data in second language processing research. *Language Learning*, 46(2), 286-324.
- Juffs, A., & Rodríguez, G. A. (2014). *Second language sentence processing*. New York: Routledge.
- Just, M. A., Carpenter, P. A., & Woolley, J. D. (1982). Paradigms and processes and in reading comprehension. *Journal of Experimental Psychology: General*, 3, 228-238.
- Kameyama, M. (1984). Subjective/logophoric bound anaphor *zibun*. In J. Drogo, V. Mishra, & D. Testen (Eds.), *Proceedings of the 20th annual meeting on Chicago Linguistic Society* (pp. 228-238). Chicago: University of Chicago.
- Kamide, Y. (2008). Anticipatory processes in sentence processing. *Language and Linguistics Compass*, 2/4, 647-670.

- Kamide, Y., Altmann, G. T. M., & Haywood, S. L. (2003). The time-course of prediction in incremental sentence processing: Evidence from anticipatory eye-movements. *Journal of Memory and Language*, 49(1), 133-159.
- Kang, N-K. (2012). Monomorphemic anaphors and polymorphemic anaphors. *Studies in Linguistics*, 25, 1-20.
- Katada, F. (1988). LF-binding of anaphors. *Proceedings of the West Coast Conference of Formal Linguistics* 7 (pp. 171-186). University of California, Irvine, California.
- Katada, F. (1991). The LF representation of anaphors. *Linguistic Inquiry*, 22(2), 287-313.
- Kim, E., Montrul, S., & Yoon, J. H. (2015). The on-line processing of binding principles in second language acquisition: Evidence from eye tracking. *Applied Psycholinguistics*, 36, 1317-1374.
- Kim, J-H., Montrul, S., & Yoon, J. H. (2009). Dominant language influence in acquisition and attrition of binding: Interpretation of the Korean reflexive caki. *Bilingualism: Language and Cognition*, 13, 73-84.
- Kishida, M. (2011). Reflexives in Japanese. Doctoral dissertation, University of Maryland, College Park, MD.
- Kitagawa, C. (1981). Anaphora in Japanese: *Kare* and *zibun*. In A.K. Farmer and C. Kitagawa, (Eds.), *Coyote papers, Working papers in linguistics from A→Z 2: Proceedings of the Arizona Conference on Japanese Linguistics, the Formal Grammar Sessions* (pp. 61-75). University of Arizona, Tucson.
- Konig, E., & Siemund, P. (2000). Intensifiers and reflexives: A typological perspective. In Z. Frajzyngier, & T. S. Curl (Eds.), *Reflexives: Forms and functions* (pp. 41-74). Amsterdam/Philadelphia: John Benjamins.
- Konig, E., & Vezzosi, L. (2009). The role of predicate meaning in the development of reflexivity. In W. Bisang, N. Himmelmann, & B. Wiemer (Eds.), *What makes grammaticalization? A look from its fringes and its components* (pp. 213-244). Berlin/New York: de Gruyter.
- Kuno, S. (1972). Pronominalization, reflexivization, and direct discourse. *Linguistic Inquiry*, 3, 161-195.
- Kuno, S. (1987). *Functional syntax: Anaphora, discourse, and empathy*. Chicago: The University of Chicago Press.
- Kuno, S., & Kaburaki, E. (1977). Empathy and syntax. *Linguistic Inquiry*, 8(4), 627-672.
- Kuroda, S. (1965). Generative grammatical studies in the Japanese language. Doctoral dissertation, Massachusetts Institute of Technology, Cambridge, MA.

- Lebeaux, D. (1983). A distributional difference between reciprocals and reflexives. *Linguistic Inquiry*, 14(4), 723-730.
- Lee, K-Y. (2008). The role of pragmatics in reflexive interpretation by Korean learners of English. In M. Bowles et al. (Eds.), *Selected proceedings of the 2007 second language research forum* (pp. 97-112). Somerville, MA: Cascadilla Proceedings Project.
- Li, C. N., & Thompson, S. A. (2009). *Mandarin Chinese: A functional reference grammar*. Taipei: Crane Publishing.
- Li, N., & Juffs, A. (2017). Identifying co-reference of zibun and caki: The case of reflexives in Japanese and Korean. To appear in *Proceedings of Buckeye East Asian Linguistics Forum 2*.
- Li, N., & Martin K. (2017). Orthographical errors in beginning and intermediate learners of L2 Japanese from two L1s. To appear in *Pacific Second Language Research Forum 2016 Conference Proceedings*.
- Li, N., & Shirai, Y. (2015). The L2 acquisition of the present in the Japanese tense-aspect system: Evidence for a tripartite system? In D. Ayoun (Ed.), *The acquisition of the present* (pp. 215-252). Amsterdam: John Benjamins. doi: <http://dx.doi.org/10.1075/z.196.08li>
- Lieberman, M., Aoshima, S., & Phillips, C. (2006). Native-like biases in generation of *wh*-questions by non-native speakers of Japanese. *Studies in Second Language Acquisition*, 28(3), 423-448.
- Lombardo, V. & Sturt, P. (2002). Incrementality and lexicalism: a treebank study. In S. Stevenson & P. Merlo (Eds.), *The lexical basis of sentence processing: Formal, computational, and experimental issues* (pp. 137-155). Amsterdam: John Benjamins.
- MacDonald, M. C. (1994). Probabilistic constraints and syntactic ambiguity resolution. *Language and Cognitive Processes*, 9(2), 121-136.
- Manzini, M. R., & Wexler, K. (1987). Parameters, binding theory, and learnability. *Linguistic Inquiry*, 18(3), 413-444.
- Marinis, T. (2010). Using on-line processing methods in language acquisition research. In S. Unsworth & E. Blom (Eds.), *Experimental methods in language acquisition* (pp. 139-162). Amsterdam: John Benjamins.
- Marinis, T., Roberts, L., Felser, C., & Clahsen, H. (2005). Gaps in second language sentence processing. *Studies in Second Language Acquisition*, 27(1), 53-78.
- Mazuka, R., & Itoh, K. (1995). Can Japanese speakers be lead down the garden path? In R. Mazuka & N. Nagai (Eds.), *Japanese sentence processing* (pp. 295-329). Hillsdale, NJ: Lawrence Erlbaum.

- Mazuka, R., Itoh, K., & Kondo, T. (2002). Cost of scrambling in Japanese processing. In M. Nakayama (Ed.), *Sentence processing in East Asian Languages* (pp. 131-166). Stanford: Center for the Study of Language and Information.
- Mitchell, D. M. (2004). On-line methods in language processing: Introduction and historical review. In M. Carreiras & C. Clifton, Jr. (Eds.), *The on-line study of sentence comprehension: Eyetracking, ERPs and beyond* (pp. 15-34). New York: Psychology Press.
- Mitchell, D. C., & Green, D. W. (1978). The effects of context and content on immediate processing in reading. *Quarterly Journal of Experimental Psychology*, 30(4), 609-636.
- Mihara, K., & Hiraiwa, K. (2006). *Sin Nihongo-no tougokouzou* [New Japanese syntactic structures]. Tokyo, Syou Hakusya.
- Mitsugi, S. (2011). The use of morphosyntactic and lexical semantic information during sentence processing in second language Japanese. Doctoral dissertation, Carnegie Mellon University, Pittsburgh, PA.
- Mitsugi, S., & MacWhinney, B. (2010). Second language processing in Japanese scrambled sentences. In B. VanPatten & J. Jegerski (Eds.), *Research in second language processing and parsing* (pp. 159-177). Amsterdam: John Benjamins.
- Miyamoto, E. T. (2002). Case markers as clause boundary inducers in Japanese. *Journal of Psycholinguistic Research*, 31(4), 307-347.
- Miyamoto, E. T. (2008). Processing sentences in Japanese. In S. Miyagawa & M. Saito (Eds.), *The oxford handbook of Japanese linguistics* (pp. 217-249). New York: Oxford University Press.
- Miyamoto, E. T., & Takahashi, S. (2002). Sources of difficulty in the processing of scrambling in Japanese. In M. Nakayama (Ed.), *Sentence processing in East Asian languages* (pp. 167-188). Stanford: Center for the Study of Language and Information.
- Nakamura, M. (1987). Parameterized extension of binding theory. *MIT Working Papers in Linguistics*, 9, 193-223.
- Nemoto, N. (2002). Scrambling. In N. Tsujimura (Ed.), *The Handbook of Japanese Linguistics* (pp. 121-153). Malden, MA: Blackwell Publishers.
- Nishigauchi, T. (2014). Reflexive binding: awareness and empathy from a syntactic point of view. *Journal of East Asian Linguistics*, 23(2), 157-206.
- Noguchi, T. (2005). Semantic composition in reflexivization. In S. Muller (Ed.), *Proceedings of the HPSG05 Conference* (pp. 540-560). Stanford: Center for the Study of Language and Information.

- Noguchi, T. (2015). Some notes on verbal reflexives in Japanese. *Ochanomizu University Studies in Arts and Culture*, 9, 97-111.
- O'Grady, W. (2012). *Reflexive pronouns in second language acquisition*. Invited talk to the 2012 annual meeting of the Japan Second Language Association, Tokyo, Japan.
- Oshima, D. Y. (2002). Logophoricity, empathy, and *de se* interpretation. Master's thesis, Tokyo University, Tokyo, Japan.
- Oshima, D. Y. (2004). Zibun revisited: empathy, logophoricity, and binding. *Proceedings of the 10th NWLC, University of Washington Working Papers*, 23, 175-190.
- Oshima, D. Y. (2006). On exceptional *zibun* binding: An experimental approach. *Japanese/Korean Linguistics*, 14, 283-294.
- Oshima, D. Y. (2007). On emphatic and logophoric binding. *Research on Language & Computation*, 5, 19-35. doi: <http://10.1007/s11168-006-9020-0>
- Pliatsikas, C., & Marinis, T. (2013). Processing empty categories in a second language: when naturalistic exposure fills the (intermediate) gap. *Bilingualism: Language and cognition*, 16, 167-182.
- Pollard, C., & Sag, I. A. (1992). Anaphors in English and the scope of Binding Theory. *Linguistic Inquiry*, 23(2), 261-303.
- Pritchett, B. (1991). Head position and parsing ambiguity. *Journal of Psycholinguistic Research*, 20(3), 251-270.
- Pritchett, B. (1992). *Grammatical competence and parsing performance*. Chicago: University of Chicago Press.
- Reinhart, T., & Reuland, E. (1993) Reflexivity. *Linguistic Inquiry*, 24(4), 657-720.
- Reuland, E. (2011). *Anaphora and language design*. Cambridge, MA: The MIT Press.
- Roberts, L., & Felser, C. (2011). Plausibility and recovery from garden paths in second language sentence processing. *Applied Psycholinguistics*, 32, 299-331.
- Roberts, L., Gullberg, M. & Indefrey, P. (2008). Online pronoun resolution in L2 discourse: L1 influence and general learner effects. *Studies in Second Language Acquisition*, 30, 333-357.
- Runner, J., & Head, K. D. L. (2014). What can visual world eye-tracking tell us about the binding theory? In C. Piñón, (Ed.), *Empirical issues in syntax and semantics, volume 10*.
- Sachs, R. R. (2010). Individual differences and the effectiveness of visual feedback on reflexive binding in L2 Japanese. Doctoral dissertation, Georgetown University, Washington, DC.

- Sawasaki (2007). L2 reading by learners of Japanese: A comparison of different L1s. Doctoral dissertation, The Ohio State University, Columbus, OH.
- Sawasaki, K. & Kashiwagi-Wood, A. (2015). Issues in L2 Japanese sentence processing: Similarities/differences with L1 and individual differences in working memory. In M. Nakayama (Ed.), *Handbook of Japanese psycholinguistics* (pp. 511-543). Berlin/Boston: de Gruyter Mouton.
- Schachter, J. & Yip, V. (1990). Why does anyone object to subject extraction? *Studies in Second Language Acquisition*, 12, 379-392.
- Shibatani, M. (1990). *The languages of Japan*. Cambridge, UK: Cambridge University Press.
- Shirahata, T. (2007). Interpretation of English pronouns and reflexives by Japanese learners: A preliminary study. *Bulletin of the Education Faculty, Shizuoka University, Liberal Arts and Social Sciences Series*, 57, 141-155.
- Scoring sections, pass or fail, score report. (2016). In *jlpt.jp*. Retrieved April 24, 2016, from <http://www.jlpt.jp/e/guideline/results.html>
- Sells, P. (1987). Aspects of logophoricity. *Linguistic Inquiry*, 18(3), 445-479.
- Sorace, A. (2011). Pinning down the concept of ‘interface’ in bilingualism. *Linguistic Approaches to Bilingualism*, 1, 1-33.
- Sperlich, D. W. (2013). The acquisition of long-distance reflexives in Chinese as an interlanguage: an experimental study. Doctoral dissertation, University of Auckland, Auckland, NZ.
- Sugaya, N., & Shirai, Y. (2007). The acquisition of progressive and resultative meanings of the imperfective aspect marker by L2 learners of Japanese: Transfer, universals, or multiple factors? *Studies in Second Language Acquisition*, 29(1), 1-38.
- Sugisaki, K. (2007). The configurationality parameter in the minimalist program: A view from child Japanese. In H. Caunt-Nulton, S. Kulatilake, & I-H Woo (Eds.), *Proceedings of the 31st Annual Boston University Conference on Language Development* (pp. 597-608). Somerville, MA: Cascadilla Proceedings Project.
- Tabor, W., Galantucci, B., & Richardson, D. (2004). Effects of merely local syntactic coherence on sentence processing. *Journal of Memory and Language*, 50(4), 355–370.
- Tamaoka, K. (2015). Processing of the Japanese language by native Chinese speakers. In M. Nakayama (Ed.), *Handbook of Japanese psycholinguistics* (pp.583-632). Berlin/Boston: de Gruyter Mouton.
- Taylor, I., & Park, K. (1995). Differential processing of content words and function words: Chinese characters vs. phonetic scripts. In I. Taylor & D. R. Olson (Eds.), *Scripts and*

- literacy: Reading and learning to read alphabets, syllabaries and characters* (pp. 185-195). Dordrecht, Netherlands: Springer.
- Thomas, M. (1991). Universal grammar and the interpretation of reflexives in a second language. *Language*, 67(2), 211-329.
- Thomas, M. (1995). Acquisition of the Japanese reflexive *zibun* and movement of anaphors in Logical Form. *Second Language Research*, 11(3), 206-234.
- Townsend, D. J., & Bever, T. G. (2001). *Sentence comprehension: The integration of habits and rules*. Cambridge, MA: MIT Press.
- Trueswell, J. C., Tanenhaus, M. K., & Garnsey, S. M. (1994). Semantic influences on parsing: Using a thematic role information in syntactic ambiguity. *Journal of Memory and Language*, 33(3), 285-318.
- VanPatten, B. (2015). Input processing in adult SLA. In B. VanPatten & J. Williams, *Theories in second language acquisition: An introduction (Second Edition)*, (pp. 113-134). New York/London: Routledge.
- Wasow, T. (1985). Postscript. In P. Sells (Ed.), *Lectures on Contemporary Syntactic Theories* (pp. 193-205). Stanford: Center for the Study of Language and Information.
- Weinberg, A. (1999). A minimalist theory of human sentence processing. In S. Epstein & N. Hornstein (Eds.), *Working Minimalism* (pp. 287-315). Cambridge, MA: MIT Press.
- White, L., Bruhn-Garavito, J., Kawasaki, T., Pater, J., & Prévost, P. (1997). The researcher gave the subject a test about himself: problems of ambiguity and preference in the investigation of reflexive binding. *Language Learning*, 47(1), 145-172.
- White, L., & Juffs, A. (1998). Constraints on *wh-* movement in two different contexts of non-native language acquisition: Competence and processing. In S. Flynn, G. Martohardjono, & W. O'Neil (Eds.), *The generative study of second language acquisition* (pp. 111-129). Mahwah, NJ: Lawrence Erlbaum.
- Yamashita, H. (1997). The effects of word-order and case marking information on the processing of Japanese. *Journal of Psycholinguistic Research*, 26(2), 163-188.
- Ying, H.G. (1999). Access to UG and language transfer: A study of L2 learners' interpretation of reconstruction in Chinese. *Second Language Research*, 15(1), 41-72.
- Yoshimura, N., Nakayama, M., Sawasaki, K., Fujimori, A., & Kahraman, B. (2013). The development of long-distance *zibun*: Roles of L1 and L2 in L3 acquisition. In Y. Otsu (Ed.), *The proceedings of the fourteenth Tokyo conference on psycholinguistics* (pp. 221-236). Tokyo: Hituzi Syobo.
- Yoshimura, N., Nakayama, M., Sawasaki, K., & H. Shimizu (2013). Locality in L2 Japanese and English. In S. Stavrakaki, M. Lalioti, & P. Konstantinopoulou (Eds.), *Advances in*

- Language Acquisition* (pp. 375-383). Newcastle upon Tyne, UK: Cambridge Scholars Publishing.
- Yoshimura, N., Nakayama, M., Shirahata, T., Sawasaki, K., & Terao, Y. (2012). Locality and *zibun* in L2 Japanese. *Journal of Japanese Linguistics*, 28, 89-110.
- Yuan, B. (1998). Interpretation of binding and orientation of the Chinese reflexive *ziji* by English and Japanese speakers. *Second Language Research*, 14(4), 324-340.
- Yusa, N. (1998). A minimalist approach to second language acquisition. In S. Flynn, G. Martohardjono, & W. O'Neil (Eds.), *The generative study of second language acquisition* (pp. 215–238). Mahwah, NJ: Lawrence Erlbaum.
- Zhou, H., Rossi, S., Li, J., Liu, H., Chen, R., & Chen, R. (2016). Effects of working memory capacity in processing wh-extractions: eye-movement evidence from Chinese-English bilinguals. *Journal of Research in Reading*, 00, 1-19. doi: 10.1111/1467-9817.12079.