L2 Acquisition of discourse constraints on the use of Japanese pronouns [*]

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SUMMARY

This study tested the applicability of the Interface Hypothesis (Tsimpli and Sorace, 2006) through investigating the acquisition of discourse constraints with respect to the use of Japanese pronouns. By looking at Japanese, this study extended the previous study on L2 Italian by Sorace and Filiaci (2006) in three ways. First, two factors affecting the choice of antecedents for pronouns, topichood and subjecthood, were separated to determine which is more crucial. Second, not only the distribution of subject pronouns but also object pronouns was investigated. Third, the effects of the surface word order of antecedents were considered. The results from written interpretation and production tasks show that (i) subjecthood, not topichood or word order, is crucial in determining antecedents for null pronominal subjects in Japanese, and that (ii) the L2 grammar did not differ from the monolingual grammar except when interpreting specific null pronominal subjects, which was attributable to a task effect. The latter result fails to provide support for the Interface Hypothesis but supports the view that all aspects of the discourse-syntax interface are not necessarily problematic in L2 acquisition (White, 2011a).

RÉSUMÉ

Cette étude a testé l'applicabilité de la thèse de l'interface (Tsimpli et Sorace, 2006) en examinant l'acquisition des contraintes au niveau du discours concernant l'utilisation des pronoms japonais. En examinant le japonais, cette étude prolonge l'étude précédente sur l'italien langue seconde par Sorace et Filiaci (2006) de trois façons. Premièrement, deux facteurs affectant le choix des antécédents des pronoms, soit la topicalité et la subjectivité, ont été séparés pour déterminer lequel était le plus crucial. Deuxièmement, non seulement la distribution des pronoms sujets mais également des pronoms objets a été examinée. Troisièmement, l'effet de l'ordonnancement en surface des antécédents a été considéré. Les résultats de tâches d'interprétation et de production écrites montrent que (i) la subjectivité, et non la topicalité ou l'ordre des mots, est cruciale pour déterminer les antécédents des sujets pronominaux nuls en japonais, et que (ii) la grammaire L2 ne différait pas de la grammaire unilingue sauf quand il s'agissait d'interpréter les sujets pronominaux nuls spécifiques, ce qui était attribuable à un effet de tâche. Le dernier résultat ne procure pas de support à l'hypothèse de l'interface mais soutient le point de vue selon lequel tous

les aspects de l'interface syntaxe/discours ne sont pas nécessairement problématiques dans l'acquisition de L2 (White, 2011a).

1   INTRODUCTION

A puzzling finding in L2 acquisition is that end state L2 learners (L2ers) often fail to attain native-like competence even if they attain near-native proficiency. The Interface Hypothesis (IH) (Sorace, 2005; Sorace, 2006; Sorace and Filiaci, 2006; Tsimpli and Sorace, 2006) is an attempt to account for this puzzle. The IH suggests that external interfaces, such as the syntax-discourse interface, can cause residual problems for near-native end state L2ers, while other domains of knowledge are fully acquirable. The IH is supported by Sorace and Filiaci (2006) and Belletti, Bennati and Sorace (2007) who investigated the acquisition of discourse constraints with respect to the use of Italian pronouns by L1 English speakers. In Italian, null subject pronouns typically co-refer with topic antecedents ([-topic shift]), whereas overt subject pronouns signal a change in topic ([+topic shift]). Sorace and Filiaci suggested that (i) topichood is crucial in determining the antecedents of pronouns in Italian and that (ii) near-native L2ers overused overt pronouns, suggesting that they had not acquired the [+topic shift] requirement for overt pronouns.

To test the applicability of the IH, this study looks at another null subject language, Japanese, and extends Sorace and Filiaci (2006) in three ways. First, two factors that affect the choice of antecedents for pronouns, namely topichood and subjecthood, can be separated in Japanese, allowing one to investigate which is more crucial. Japanese has a topic marker, which is distinct from a nominative case marker. Therefore, topichood and subjecthood, which may often be confounded in Italian, can be separated. Second, not only the antecedents for subject pronouns, but also those for object pronouns are tested. Japanese allows object drop as well as subject drop. Accordingly, the antecedents for object pronouns, which were not discussed in Sorace and Filiaci due to the lack of null objects in Italian, are investigated. Finally, this study considers the effects of the surface word order of the antecedents. Since Japanese allows scrambling, it is possible to determine whether the word order of the potential antecedents affects the choice of antecedents for pronouns. The results of written interpretation and production tasks show that (i) subjecthood, not topichood or word order, is crucial in determining antecedents for null pronominal subjects in Japanese; and that (ii) advanced L2ers have the same knowledge of pronouns as monolinguals. Contrary to the IH, the latter result supports the view that not all the properties of the external interface are necessarily problematic in L2 acquisition (White, 2011a).

2   TOPIC SHIFT IN ITALIAN

Languages have different grammatical devices to indicate anaphoric linkage within and across clause boundaries. In English, for example, prosody can express whether or not the second clause keeps the same subject as the first clause. The unstressed pronoun in the second clause in (1a) maintains the topic of the first clause (i.e., topic continuity), whereas, the stressed pronoun in (1b)

codes topic discontinuity (Givón, 1983a: 58).

(1) a. John$_i$ hates Bill$_j$, and he$_i$ hates Mary.   (topic continuity)
     b. John$_i$ hates Bill$_j$, and hé$_j$ hates Máry.   (topic discontinuity)

In null subject languages, such as Italian, anaphoric linkage across clause boundaries is expressed by null and overt pronouns, as in (2) (Sorace and Filiaci, 2006; Belletti et al., 2007).

(2) La mamma$_i$ dà un bacio   alla figlia$_k$,   mentre   pro$_i$/lei$_{k/l}$ si mette il cappotto.
     The mother$_i$ gives a kiss   to the daughter$_k$, while   pro/she$_{k/l}$ wears the coat
     'The mother$_i$ kisses her daughter$_k$, while pro$_i$/she$_{k/l}$ is putting on her coat.'

In (2), the embedded null pronoun co-refers with the matrix subject (*La mamma* 'the mother'). By contrast, the embedded overt pronoun (*lei* 'she') co-refers with the matrix complement (*figlia* 'the daughter') or another entity in the discourse. Sorace and Filiaci (2006) and Belletti et al. (2007) suggest that these distinct antecedent preferences are attributable to the discourse functions of the pronouns; null pronouns co-refer with the topic (i.e., old information in discourse) ([-topic shift]), whereas overt pronouns do not ([+topic shift]) (Sorace and Filiaci, 2006: 343). In Italian, preverbal subjects, like *La mamma* 'the mother' in (2), are normally interpreted as 'given, topic like information' (Belletti et al., 2007: 660).

Sorace and Filiaci and Belletti et al. found that this discourse constraint on overt pronouns is persistently problematic for near-native L2ers. They compared L1 English near-native speakers of L2 Italian with monolingual Italian speakers with respect to choosing the antecedents of pronouns in bi-clausal sentences like (2).[1] They found that co-reference between overt pronouns and topical subjects (e.g., 'the mother' in (2)) was rarely chosen by the monolinguals (5%). In contrast, it was chosen more frequently by the L2ers (30%), suggesting that they overused overt pronouns to co-refer with topical subjects. From such data, it was concluded that properties at the syntax-discourse interface are persistently problematic. L2ers have insufficient processing capacity for integrating multiple types of information at the interfaces.

Sorace and Filiaci (2006) uncovered some interesting phenomena relating to interpreting pronouns in L1 and near-native L2 grammar. Moreover, their explanation that L1 English speakers overuse overt pronouns in place of null pronouns because their L1 does not have this discourse constraint is plausible. Furthermore, the IH has clear predictive power regarding which properties should result in residual optionality in L2 acquisition. Nevertheless, Sorace and Filiaci's analysis and findings are debatable on theoretical and empirical grounds.

Turning to the former, the antecedent preferences of pronouns also has been discussed in the Position of Antecedent Hypothesis (Carminati, 2002), as in (3).

(3) Position of Antecedent Hypothesis (PAH) for Italian intra-sentential anaphora:
The null pronoun prefers the antecedent in the highest SpecIP, which is structurally prominent, whereas, the overt pronoun prefers an antecedent in a lower projection, which is structurally less prominent.

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[1] Sorace and Filiaci (2006) and Belletti et al. (2007) also investigated the acquisition of other structures, such as backward anaphora and focus, which are not relevant to the present study.

Carminati confirmed that Italian null pronouns have a bias toward preverbal subjects, rather than postverbal subjects, which Sorace and Filiaci (2006) suggested but did not test in their study. Following Burzio (1986), Carminati postulated that preverbal subjects are in SpecIP, while postverbal subjects are in VP complements, co-indexed with the dummy expletive in SpecIP. In a self-paced reading study, she found that native Italian speakers read clauses with null pronouns significantly faster when the antecedent clauses contained preverbal subjects, compared to when they contained postverbal subjects. Thus, both Carminati and Sorace and Filiaci suggested that null pronouns have a preference for preverbal, not postverbal, subject antecedents more so than overt pronouns do. However, they differ on what is crucial for choosing antecedents for pronouns. For Sorace and Filiaci, the topichood of antecedents is crucial, whereas for Carminati, subjecthood (i.e., being in SpecIP), rather than topichood (i.e., being in TopP), is crucial. Carminati denies the possibility that null pronouns necessarily prefer antecedents in higher specifier positions, such as TopP. She suggested that topicalized referents can be as good antecedents as subjects, but they do not override them (Carminati, 2002: 310). The disagreement between Carminati and Sorace and Filiaci relates to whether or not preverbal subjects are topics. The present study aims to contribute toward a clarification of the distinction between subjects and topics in Japanese, partly inspired by the experimental results in Italian in Sorace and Filiaci (2006).

As regards empirical coverage, the IH is far from conclusive. On the one hand, some studies support the IH. For example, Tsimpli and Sorace (2006) found that the syntax-semantics interface (verb-raising in Focus) was not problematic, whereas the syntax-discourse interface (overt subject pronouns in topic shift) was vulnerable in the grammar of advanced L1 Russian speakers of L2 Greek. Similarly, Valenzuela (2006) suggested that near-native L1 English speakers of L2 Spanish did not acquire [+specific] requirement on preposed topics in clitic left dislocation, although they were sensitive to syntactic constraints on clitics.

Recently, however, a number of studies have shown that the syntax-discourse interface is ultimately acquirable, despite possible developmental delays, contrary to the IH. Ivanov (2012) found that advanced L1 English speakers of L2 Bulgarian had the same knowledge of clitic left dislocation with topic objects as native Bulgarian speakers. Donaldson (2011a, 2011b, 2012) suggested that L1 English speakers of near-native L2 French did not differ from native French speakers with respect to interpreting and producing several discourse-sensitive structures (i.e., right-dislocations to represent [-hearer new] information, left-dislocations to mark topic, and clefts to mark focus and introduce new discourse referents). Slabakova, Kempchinsky and Rothman (2012) found that L1 English speakers of near-native L2 Spanish had native-like knowledge of clitic left dislocation and focus fronting. Iverson, Kempchinsky and Rothman (2008) found that L1 English speakers of advanced L2 Spanish had a target-like interpretation of subjunctive complements with negated epistemic predicates, which require the discourse-dependent subjunctive mood.

Similarly, studies on the discourse-governed distribution of pronouns also failed to support the IH. Rothman (2009) found that advanced L1 English speakers of L2 Spanish were target-like in interpreting and producing null and overt subject pronouns in contrastive focus and answers to topic-wh questions. Zhao (2012) investigated the acquisition of two types of null arguments in Chinese, one of which is deleted by a discourse function (topic chain), and the other by a purely syntactic operation. She found that advanced L1 English speakers of L2 Chinese had successfully acquired both types of null arguments.

Thus, while the IH gives an interesting possible account of end state divergent grammar, its

wider applicability still needs to be tested. Studies investigating discourse pro-drop languages are especially needed, given that most previous studies on pronouns, except Zhao (2012), tested the IH in Romance null subject languages. The present study fills the gap by investigating Japanese topic shift.

It should be noted that Sorace (2011) argues that the IH is applicable only to near-native end state L2 grammar, not to developmental state L2 grammar. However, the present study extends the applicability of the IH to highly advanced L2 grammar, following White (2011b), who suggests that it may be reasonable to assume that L2ers in developmental stages also suffer from the same interface problem as near-native L2ers, given that L2ers' problem with interfaces does not happen out of blue.

3   TOPIC SHIFT IN JAPANESE

3.1   STATUS OF PRONOUNS

This study investigates the referential characteristics of Japanese third person singular pronouns — *kare* 'he' and *kanozyo* 'she.' *Kare* and *kanozyo* do not necessarily have the same distributions as their English counterparts.[2] Nevertheless, following Noguchi (1997) and Déchaine and Wiltschko (2002), I regard them as pronouns because they share the property of co-referential use, which I investigate in this study.

In Romance null subject languages, null subjects are assumed to be licensed by their rich agreement morphology. By contrast, in a discourse pro-drop language like Japanese, arguments can be dropped due to discourse familiarity. At least two different ways of treating null arguments are possible — as silent pronouns or NP/VP ellipsis (Takahashi, 2008). I treat both null subjects and objects that are pragmatically controlled and used in the bi-clausal structures in this study as null pronouns.

3.2   INTERPRETATION OF SUBJECT PRONOUNS AND THE ROLE OF THE TOPIC MARKER

If we look at the Japanese sentence in (4), equivalent to (2) in Italian, similar antecedent preferences of pronouns are observed.

(4)   Okaasan$_i$-ga musume$_k$-ni   [kanozyo$_{k/l}$-ga/pro$_i$ kooto-o   kiru   oki] kisu-osita
      mother$_i$-Nom daughter$_k$-Dat [she$_{k/l}$-Nom   pro$_i$ coat-Acc put on when] kiss-Acc did
      'The mother$_i$ kissed the daughter$_k$ when she$_{k/l}$/pro$_i$ was putting on the coat.'

As (4) shows, in Japanese, the embedded clause appears between the matrix clause arguments (mother-Nom daughter-Dat) and the matrix clause verb (kissed-Acc). In (4), the embedded overt pronominal subject *kanozyo* 'she' usually does not co-refer with the matrix subject *okaasan* 'the mother,' but co-refers with *musume* 'the daughter' or another woman in the context (+topic shift). By contrast, when the embedded subject co-refers with the matrix subject, it should be either null

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[2]   For example, *kare* and *kanozyo* are assumed to be in noun heads, whereas English pronouns are in determiner heads. As a result, *kare* and *kanozyo* can be modified by an adjective, a possessive pronoun, and demonstrative pronouns (Noguchi, 1997). They also cannot be bound by wh-words and quantified noun phrases, unlike English pronouns (Montalbetti, 1984). Furthermore, they are mostly used in written formal occasions.

as in (4) or a reflexive *zibun* 'self' (-topic shift).

In (4), the matrix subject is marked with the nominative case marker *–ga*. Note that the nominative case marker can be replaced with a topic marker *–wa*,[3] as in (5).

(5)   Okaasan$_i$-wa musume$_k$-ni   [kanozyo$_{k/l}$-ga/pro$_i$ kooto-o   kirutoki]   kisu-osita
       mother$_i$-Top daughter$_k$-Dat [she$_{k/l}$-Nom   pro$_i$ coat-Acc put on when] kiss-Acc did
       'The mother$_i$ (Topic) kissed the daughter$_k$ when she$_{k/l}$/pro$_i$ was putting on the coat.'

Although both the topic marker and the nominative case marker attach to the subject, they are syntactically and semantically distinct. In the cartographic approach (Rizzi, 1997), discourse-related elements, such as Topic and Focus, are projected in the left-periphery, splitting the traditional CP. In Japanese, a topic marked subject is assumed to be base generated in SpecTopP and co-indexed with the null subject in SpecIP (Saito, 1985). The topic marker expresses that the sentence is a predication, consisting of a premise and a judgment about the premise. In (5), for example, *mother-Top* is the premise (i.e., if X is the mother), and the remaining part of (5) expresses the judgment about the premise (i.e., then, 'X kissed the daughter when she put on the coat' is true.) (Kuroda, 2005). I assume that this logical characteristic of the sentence makes the topic-marked NP represent what the sentence is about ('aboutness topic' in Kuno, 1972; Reinhart, 1981; Frascarelli, 2007). The sentential topic often expresses the discourse topic; as a result, it is previously mentioned (i.e., old information) in the discourse (see Reinhart (1981) for the difference between the 'aboutness topic' and 'old information'). This definition of topic seems to be compatible with the definition of 'topic' as 'old information' in Sorace (2005), although it is not explained what kind of topic is postulated for Italian in Sorace and Filiaci (2006).

By contrast, the sentence with the nominative case marker is not a predication but just a description of a fact or a situation. However, the nominative case marked NP also can represent what the sentence is about because it is a syntactic subject, which is described by the remaining part of the sentence. The nominative case marker is typically used when the NP is first mentioned in the discourse. In such cases, the nominative case marker expresses new information (Noda, 1996).

3.3   INTERPRETATION OF OBJECT PRONOUNS

Japanese allows null objects when they are recoverable from the context. I assume that null object pronouns have a bias toward topic antecedents and that overt object pronouns do not, just like their subject counterparts. However, the matrix subject preference of null object pronouns may not be as strong as that of null subject pronouns for two reasons. First, structural parallelism may override the original preference of null object pronouns; as a result, the matrix object (*daughter-Dat*) may become more preferable. The parallel function hypothesis (Smyth, 1994) suggests that a pronoun that has multiple possible antecedents in a preceding clause will be interpreted as co-referential with the candidate that has the same grammatical role: subject refers to subject, object to object. This structural parallelism could affect the antecedent choice in a double clause structure like (6), although the parallelism is often observed in conjoint structures (e.g., First *John*

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[3] *-Wa* is used not only as the topic marker, but also as the contrastive marker, typically when a contrastive element is given in the sentence or *–wa* is pronounced with prosodic prominence (Kuno, 1973). However, contrastive usage is not relevant to this paper.

hit Bill, and then *he* hit Mary).

(6)   Okaasan$_i$-ga/wa musume$_k$-ni [otoosan-ga kanozyo$_{k/l}$-o/pro$_i$ sagasiteiru tokini]   kisu-o   sita
       mother$_i$-Nom/Top daughter$_k$-Dat [father-Nom she$_{k/l}$-Acc/pro$_i$ looking for when] kiss-Acc did
       'The mother$_i$ kissed the daughter$_k$ when the father was looking for her$_{k/l}$/pro$_i$.'

Second, co-reference between antecedents and referential expressions, including pronouns, is affected by the distance between them. When the distance is greater, full NPs are preferred to pronouns as referential expressions (Givón, 1983b; Ariel, 1990). The distance between antecedents and null object pronouns is usually larger than the distance between antecedents and null subject pronouns in cases involving forward anaphora. Consequently, the antecedent preference of null object pronouns may be weaker than that of null subject pronouns.

4   A PREVIOUS STUDY ON INTERPRETATION OF JAPANESE PRONOUNS

Ueno and Kehler (2010) investigated the effects of subjecthood and topichood on native Japanese speakers' use of subject pronouns.[4] They conducted a written production task in which native Japanese speakers wrote continuations of given sentences, containing a transfer-of possession verb and two animate nouns with the same gender, one of which was 'Source' and the other 'Goal of the verb' (e.g. 'John handed a book to Bob.' in Japanese). Ueno and Kehler varied topic/nominative case markings on the Source noun. The participants wrote a completion sentence starting with one of three referents: a null pronoun (for which they were instructed to omit a subject), an overt pronoun, or a free form. The intended antecedent of each referent was judged by the remaining part of the sentence.

The results show that null pronouns were uniformly Source-biased, irrespective of topic marking (80% of the time). In other words, the topic-marked Source did not attract more null pronouns than the nominative case-marked Source. Similarly, topic marking did not affect the antecedents for overt pronouns. These results suggest that the topichood is not a crucial determinant of antecedent choice for subject pronouns in inter-sentential anaphora resolution. This is surprising if we consider that topichood is crucial for determining the antecedents for pronouns in Italian, according to Sorace and Filiaci (2006). The present study investigates this issue of intra-sentential anaphora resolution to make a direct comparison with findings in Italian. The present study also differs from Ueno and Kehler (2010) in investigating the antecedent preference of object pronouns as well, since Japanese allows both subject and object drop.

5   RESEARCH QUESTION AND HYPOTHESES

The present study aims to clarify whether topichood or subjecthood is more crucial in determining the antecedents for pronouns in Japanese. Second, this study tests the applicability of the IH by using a new L1-L2 combination. The following research questions and hypotheses will be tested.

Research Questions

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[4]   Ueno and Kehler also investigated the effect of the grammatical aspect of the verb (perfective/imperfective) in the previous sentence on antecedent choice and found that imperfectives yielded more Source referents than perfectives.

RQ1: Do Japanese subject and object pronouns show antecedent preferences? If so, which is more crucial in determining the antecedents of pronouns, subjecthood or topichood?
RQ2: Do advanced L1 English speakers of L2 Japanese acquire the [±topic shift] requirement for pronouns?

Hypotheses
H1: If topichood determines the antecedent choice of null pronouns in Japanese, topic marked antecedents should be preferred, regardless of their syntactic positions (subject vs. object).
H2: Extending the findings of Sorace and Filiaci (2006), advanced L1 English speakers of L2 Japanese will have a problem in determining the antecedents for pronouns that depend on interface constraints for successful resolution (e.g., overt pronouns in Italian).

6   THE EXPERIMENT

6.1   PARTICIPANTS

The participants were 14 L1 English speakers of L2 Japanese with a highly advanced level of proficiency and 14 monolingual Japanese speakers. The L2ers were originally from the US, Canada, and the UK. They started their study of Japanese after puberty (range 15–28, mean 22 years old) and had lived in Japan for at least 0.8 years (range 0.8–23, mean 9.6 years). Nine of them had obtained the first grade of Japanese-Language Proficiency Test (JLPT[5]) and three of them had obtained the second grade. Each L2er also took an independent proficiency measurement, a cloze test with 43 blanks adopted from Umeda (2008). The mean score of the proficiency test was 36.5 out of the total 43 (85%), ranging from 31–41 (72%–95%).

The monolingual Japanese speakers were residents in Japan (aged 33–60, mean 45). They had neither lived in an English speaking country nor used English for at least 11 years after finishing education at a high school or a university. Therefore, they were considered to be monolingual, although English education is compulsory in high school in Japan.

6.2   THE INTERPRETATION TASK

6.2.1   METHODOLOGY

The first task was a 3-choice picture verification, adapted from Sorace and Filiaci (2006), to examine anaphora interpretation of pronouns in embedded adverbial clauses, as in (7).

(7) *Topic-S (null/overt)* for subject pronouns
Context (given in Japanese): 'The mother and daughter finished their dinner and began to leave the restaurant. Another woman also fished the dinner and began to leave near them.'

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[5]   JLPT is the most popular Japanese-language test for non-native speakers (the number of examinees in 2009 was 770,000 throughout the world). The 1st grade is the highest level, which requires the ability to understand a variety of topics with logical complexity, such as newspaper editorials. 2nd grade is the second highest level, requiring the ability to understand Japanese in everyday situations and in a variety situations to a certain extent (The Japan Foundation and Japan Educational Exchanges Services, 2011).

Okaasan-wa   musume-ni   pro/kanozyo-ga kooto-o   kiru   tokini   kisu-o sita.
mother-Top daughter-Dat   pro/she-Nom   coat-Acc   put on   when   kiss-Acc did
'The mother (Topic) kissed the daughter when pro/she was putting on the coat.'

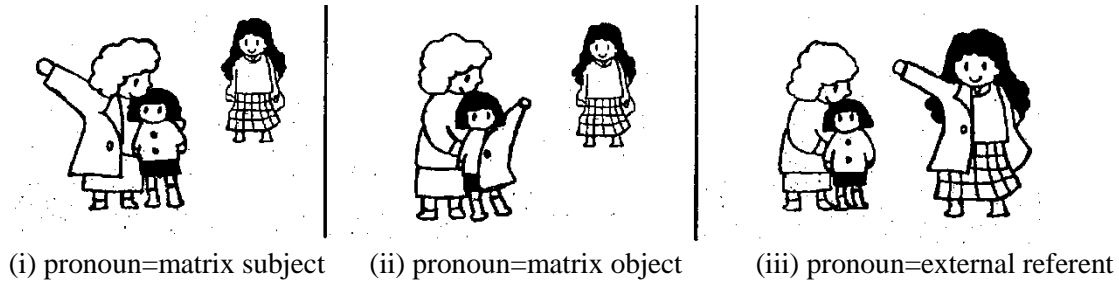(i) pronoun=matrix subject   (ii) pronoun=matrix object   (iii) pronoun=external referent

Figure 1

The participants were instructed to read the context and the sentence, and then choose the appropriate picture(s) depicting different referents: (i) the matrix subject, (ii) the matrix object, and (iii) the external referent, as in Figure 1. The sentence contained an animate subject, a transitive verb, and an animate indirect object in the matrix clause, as in (7). The embedded pronoun ambiguously referred to the matrix subject, the matrix object, or the external referent, since they had the same gender and number. The informants were encouraged to choose multiple pictures when they were applicable, as in Sorace and Filiaci (2006). However, the task was different from the picture verification in Sorace and Filiaci in two ways. First, the written context was added to help the informants understand the situation depicted in the picture, as well as to set up the topic. Second, the external referent, which only appeared in one out of three pictures in Sorace and Filiaci, was depicted in all three pictures. This was to prevent the informants, especially the L2ers, from overlooking the external referent and to accurately test their knowledge.

Table 1: Conditions for subject pronouns.

1. *Topic-S (null)*	The matrix subject is topic marked, followed by the matrix object. The embedded subject is a null pronoun.	(7)
2. *Topic-S (overt)*	The matrix subject is topic marked, followed by the matrix object. The embedded subject is an overt pronoun.	
3. *Topic-O (null)*	The matrix object is topic marked, followed by the matrix subject. The embedded subject is a null pronoun.	(8)
4. *Topic-O (overt)*	The matrix object is topic marked, followed by the matrix subject. The embedded subject is an overt pronoun.	
5.*Non-topic-SO (null)*	Neither the matrix subject nor the matrix object is topic marked. The matrix subject is followed by the matrix object. The embedded subject is a null pronoun.	(9)
6.*Non-topic-SO (overt)*	Neither the matrix subject nor the matrix object is topic marked. The matrix subject is followed by the matrix object. The embedded subject is an overt pronoun.	

7.*Non-topic-OS* *(null)*	Neither the matrix subject nor the matrix object is topic marked. The matrix object is followed by the matrix object. The embedded subject is a null pronoun.	(10)
8.*Non-topic-OS* *(overt)*	Neither the matrix subject nor the matrix object is topic marked. The matrix object is followed by the matrix object. The embedded subject is an overt pronoun.	

As Table 1 shows, eight conditions were formed for subject pronouns through the interaction of the following variables: topic marking on the antecedents (subject vs. object vs. neither), the word order of the antecedents (subject-object vs. object-subject), and pronominal type (null vs. overt). (7)–(10) represent examples of each condition. For (8)–(10), the same context as (7) was provided.

(8) *Topic-O (null/overt)* for subject pronouns
Musume-ni-wa   okaasan-ga   (aizyoo-o komete)   [pro/kanozyo-ga kooto-o kiru tokini]
daughter-Dat-Top mother-Nom (affection-Acc with) [pro/she-Nom coat-Acc put on when]
kisu-o sita.
kiss-Acc did
'The mother kissed the daughter (Topic) (affectionately) when pro/she was putting on the coat.'

In (8), an adverb *aizyoo-o komete* 'affectionately' modifying the matrix verb 'kissed' was added between the matrix subject 'the mother' and the embedded null subject. This was designed to prevent informants from misinterpreting the sentence structure with the matrix subject in the embedded clause.

(9) *Non-topic-SO (null/overt)* for subject pronouns
Soko-de-wa okaasan-ga   musume-ni [pro/kanozyo-ga kooto-o kiru   oki]   kisu-o   sita.
That place-at-Top mother-Nom daughter-Dat [pro/she   coat-Acc put on when] kiss-Acc did
'At that place (Topic), the mother kissed the daughter when pro/she was putting on the coat.'

(10) *Non-topic-OS (null/overt)* for subject pronouns
Soko-de-wa   musume-ni   okaasan-ga (aizyoo-o komete)   [pro/kanozyo-ga kooto-o kiru
That place-at-Top daughter-Dat mother-Nom (affection-Acc with) [pro/she   coat-Acc put on
toki]   kisu-o   sita.
when] kiss-Acc did
'At that place (Topic), the mother kissed the daughter (affectionately) when pro/she was putting on the coat.'

In (9) and (10), neither the matrix subject nor the matrix object was topic marked.[6] The matrix subject was nominative case marked and the matrix object was dative case marked. Instead, the PP expressing the place where the matrix event happened was added and topic marked (*soko-de-*

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[6] To see the effect of the topic marking on subject pronouns, (7) should be compared with (4), rather than (9), because (7) and (4) differ only in terms of topic marking. However, (4) was not included in the stimuli because the pilot study showed that native speakers' interpretation of (4) did not statistically differ from (7). Instead of (4), (9) was included, expecting that the participants would clearly understand that the matrix subject is not a topic by the existence of the topic PP in (9).

wa 'at that place'). In (10), the adverb was added before the null subject for the same reason as (8). For object pronouns, the same eight conditions were formed as those for subject pronouns. (11) presents an example of *Topic-S (null/overt)* for object pronouns (see Appendix 1 for the remaining examples). Each condition contained four stimuli (i.e., two each for masculine/feminine referents, and two each for accusative/dative case marked pronouns). The stimuli (n=64) and distracters (n=32) were randomized.

(11) *Topic-S (null/overt)* for object pronouns
Okaasan-wa musume-ni   [otoosan-ga   pro/kanozyo-o sagasiteiru   tokini]   kisu-o sita.
mother-Top   daughter-Dat [father-Nom pro/she-Acc   looking for   when]   kiss-Acc did
'The mother (Topic) kissed the daughter when the father was looking for pro/her.'

In analyzing the data, the number of responses given by each participant was counted, and the proportion of antecedent choices was calculated for each participant. An ANOVA was run on the percentages obtained for the two groups in each condition, following Sorace and Filiaci (2006).

6.2.2   GROUP RESULTS (SUBJECT PRONOUNS)

Table 2: Distribution of antecedents for null pronominal subjects (%) *p<.05

antece-dents	*Topic-S**		*Topic-O*		*Non-topic-SO**		*Non-topic-OS*	
	Control	L2er	Control	L2er	Control	L2er	Control	L2er
S	77	55	75	71	81	47	71	62
O	21	38	23	26	17	50	27	34
E	2	7	2	3	2	4	2	4
total	100	100	100	100	100	100	100	100

Table 2 shows the distribution of antecedent choices for null subject pronouns.[7]   In the table, *S*, *O*, and *E* represent subject antecedents, object antecedents, and external referents, respectively. The controls chose subject antecedents over 70% of the time, regardless of topic marking and word order. The ANOVA showed that neither topic marking nor word order had a significant main effect (topic marking $F(2, 52)=0.16$, $p=.852$, word order $F(1, 52)=1.20$, $p=.279$). These results suggest that null subject pronouns have a bias toward subject antecedents, irrespective of topic marking or word order. In other words, subjecthood is more crucial than topichood or word order for determining the antecedents for null subject pronouns.[8]

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[7]   One out of the four stimuli for subject pronouns ((4) in Appendix 1) was eliminated from analysis because the participants categorically chose object antecedents. As a result, each condition for subject pronouns consisted of three stimuli.

[8]   It is not likely that the absence of an effect of topic marking is attributable to the participants' misinterpretation of the topic marker as the contrastive marker. It is logically possible but not natural to interpret the sentence initial topic

The L2ers differed from the controls in the two conditions, *Topic-S* and *Non-topic-SO*. With respect to these conditions, the L2ers chose subject antecedents significantly less frequently than the controls (i.e., the controls 77% vs. the L2ers 55%, $F(1, 26)=5.15$, $p=.032$ in *Topic-S*, the controls 81% vs. the L2ers 47%, $F(1, 26)=4.17$, $p<.001$ in *Non-topic-SO*) and object antecedents significantly more. Given that in both conditions, the matrix object was adjacent to the null pronoun, the L2ers seem to have preferred adjacent antecedents, although the main effect of word order on their choice of antecedents was not statistically significant ($F(1, 52)=3.88$, $p=.054$). To the contrary, in the remaining two conditions, the L2ers did not differ from the controls, choosing the subject antecedents as often as the controls ($F(1, 26)=0.22$, $p=.647$ in *Topic-O*, $F(1, 26)=1.20$, $p=.283$ in *Non-topic-OS*). The external antecedents were hardly ever selected by either group.

Table 3: Distribution of the antecedents of overt pronominal subjects (%)

antece -dents	Topic-S		Topic-O		Non-topic-SO		Non-topic-OS	
	Control	L2er	Control	L2er	Control	L2er	Control	L2er
S	37	26	50	34	43	25	49	37
O	51	60	41	56	47	63	40	50
E	12	14	9	10	10	12	11	13
total	100	100	100	100	100	100	100	100

Table 3 shows the distribution of antecedent choices for overt subject pronouns. Two findings were obtained. First, neither topic marking nor word order had a significant main effect on the controls' choosing antecedents (topic marking $F(2, 52)=0.16$, $p=.851$, word order $F(1, 52)=0.28$, $p=.602$). In all conditions, the controls chose subject and object antecedents to approximately the same extent and their difference was not significant (e.g., subject 37% vs. object 51%, $F(1, 26)=1.48$, $p=.235$ in *Topic-S*; $F=1.98$, $p=.171$ in *Topic-O*; $F=0.12$, $p=.731$ in *Non-topic-SO*; $F=0.59$, $p=.449$ in *Non-topic-OS*). This result suggests that overt subject pronouns do not show an antecedent bias. Second, the L2ers did not differ from the controls in choosing subject and object antecedents in any condition ($F(1, 52)=0.02$, $p=.887$ in *Topic-S*, $F=0.025$, $p=.874$ in *Topic-O*, $F=0.027$, $p=.870$ in *Non-topic-SO*, $F=0.025$, $p=.875$ in *Non-topic-OS*).

6.2.3   GROUP RESULTS (OBJECT PRONOUNS)

As for the object pronouns (see Appendix 2 for the data), in both null and overt conditions, neither topic marking nor word order had a significant main effect on the controls' choice of antecedents (for null pronouns, topic marking $F(2, 52)=1.75$, $p=.184$, word order $F(1, 52)=1.04$, $p=.312$; for overt pronouns, topic marking $F=0.87$, $p=.425$, word order $F=1.04$, $p=.312$). In all conditions, the controls chose subject and object antecedents to almost the same extent (i.e.,

marker as a contrastive marker when the contrastive element is not clearly given in the sentence or the context. In fact, no participant reported that (s)he interpreted *–wa* as a contrastive marker or found it ambiguous in the debrief after the experiment.

subject antecedents 42.1–55.3%, object antecedents 36.4–46.4%), suggesting that null and overt object pronouns do not have a clear antecedent bias.

The L2ers differed from the controls in *Topic-S* and *Non-topic-SO* for null object pronouns, similar to the case of null subject pronouns. In these conditions, they chose matrix subjects significantly less frequently than the controls (the controls 51% vs. the L2ers 43%, $F(1, 26)=4.82$, $p=.037$ in *Topic-S*; the controls 49% vs. the L2ers 40%, $F(1, 26)=5.42$, $p=.028$ in *Non-topic-SO*). In the remaining conditions, the L2ers did not differ from the controls.

To summarize, the following findings were obtained in the interpretation task:

1. For Japanese, subjecthood is more crucial than topichood or word order for determining antecedents for null subject pronouns.
2. For Japanese, neither overt subject pronouns nor null or overt object pronouns show an antecedent bias.
3. The L2ers chose subject antecedents for null pronouns significantly less frequently than the controls when the subject preceded the object (i.e., *Topic-S* and *Non-topic-SO* for null subject and object pronouns).

6.3   THE INTERPRETATION TASK

6.3.1   METHODOLOGY

The second task was a written elicited production task adapted from Serratrice (2009) with a number of modifications. This task was designed to test the production of embedded pronouns referring to matrix topic subjects/objects in the [±topic shift] contexts created by the pictures, as in Figures 2 and 3.

Figure 2 [-topic shift]

(12) *[-topic shift]+Topic-S*

Onnanokoi-wa	senseij-ni	[(			) tokini]	aisatu-o	sita
			mizu	yaru			
girli-Top	teacherj-Dat	[	water	give	when]	greeting-Acc	did

Target answer: (proi   mizu-o   yatteiru   )
pro_i   water-Acc giving
'pro is watering'

'The girl_i (Topic) greeted the teacher_j when she_i was watering (flowers)'

(13) *[-topic shift]+Topic-O*

Sensei$_j$-ni-wa   onnanoko$_i$-ga   [(   ) tokini] aisatu-o   sita
                                        mizu   yaru
teacher$_j$-Dat-Top girl$_i$-Nom   [water   give   when]   greeting-Acc did

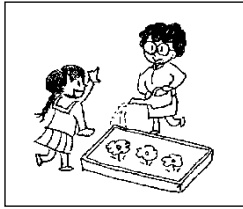'The girl$_i$ greeted the teacher$_j$(Topic) when she$_i$ was watering (flowers)'

   Figure 3 [+topic shift]

(14) *[+topic shift]+Topic-S*
Onnanoko$_i$-wa   sensei$_j$- ni   [(   ) tokini] aisatu-o   sita
                                     mizu   yaru
girl$_i$-Top   teacher$_j$-Dat   [water   give   when]   greeting-Acc did

                Target answer: (kanozyo$_j$/sensei$_j$-ga/*pro$_j$ mizu-o   yatteiru   )
                               she$_j$/teacher$_j$-Nom/*pro$_j$ water-Acc giving
                               'she is watering'

'The girl$_i$ greeted the teacher$_j$(Topic) when she$_j$ was watering (flowers)'

(15) *[+topic shift]+Topic-O*
Sensei$_j$- ni-wa   Onnanokoi-ga   [(   ) tokini] aisatu-o   sita
                                      mizu   yaru
teacher$_j$-Dat-Top girl$_i$-Nom   [water   give   when] greeting-Acc did
'The girl$_i$ greeted the teacher$_j$(Topic) when she$_j$ was watering (flowers)'

In the [-topic shift] picture (Figure 2), the topic subject (i.e., the girl) was simultaneously doing two actions: (i) a transitive action that affected a human object (i.e., greeting the teacher) and (ii) an action which did not (i.e., watering flowers). This depiction was to elicit an embedded null pronominal subject referring to the matrix subject. By contrast, in the [+topic shift] picture (Figure 3), the topic subject (i.e., the girl) was only doing the first action, and the other person (i.e., the teacher) was doing the other action. This depiction was to elicit an embedded, overt pronominal subject referring to the matrix object.

   In the stimulus sentences (12)–(15), the matrix clauses were given, whereas embedded clauses in the brackets were not. The participants were instructed to complete the sentence to match the meanings depicted in the pictures by using given verbs. The base verb form (e.g., 'give') and, when necessary, the inanimate verb complement (e.g., 'water') were provided to control the structure produced by the participants.

Table 4: Conditions for embedded subjects

Condition	Explanation	Example
1.*[-topic shift]* *+Topic-S*	The [-topic shift] picture forces the matrix subject to serve as the embedded subject. The matrix subject is topic marked.	(12)
2. *[-topic shift]* *+Topic-O*	The [-topic shift] picture forces the matrix subject to serve as the embedded subject. The matrix object is topic marked.	(13)
3. *[+topic shift]* *+Topic-S*	The [+topic shift] picture forces the matrix object serve as the embedded subject. The matrix subject is topic marked.	(14)
4. *[+topic shift]* *+Topic-O*	The [+topic shift] picture forces the matrix object serve as the embedded subject. The matrix object is topic marked.	(15)

As Table 4 shows, four conditions were formed for embedded subjects through the interaction of the following variables: contexts ([-topic shift] vs. [+topic shift]); topic marking on the antecedents (subject vs. object). The same four conditions were formed for embedded objects. Note that either the matrix subject or object was topic marked in all stimuli. Each condition consisted of four different sentences with even numbers of male and female subjects. The stimuli (n=32) and distracters (n=16) were randomized. In the experiment; about half of the participants first took the interpretation task, and the remaining half first took the production task to avoid task effects.

6.3.2   GROUP RESULTS

Table 5: Production of embedded subjects (%)

productions	*[-topic shift]* *+Topic-S*		*[-topic shift]* *+Topic-O*		*[+topic shift]* *+Topic-S*		*[+topic shift]* *+Topic-O*	
	Control	L2er	Control	L2er	Control	L2er	Control	L2er
Null pronouns	84	87	82	91	39	32	34	39
Overt forms	16 (2)	13 (2)	18 (5)	9 (2)	61 (16)	68 (20)	66 (12)	61 (20)
total	100	100	100	100	100	100	100	100

Table 5 shows the production of embedded subjects. The 'Overt forms' row represents the total percentages of overt pronouns and other overt forms, including the reflexive zibun 'self' and repetitions of the nouns. The numbers in the brackets represent the percentages of overt pronouns only. The ANOVA shows that topic shift, but not topic marking, had a significant main effect on the controls' production of null pronouns (topic shift $F(1, 52)=22.27$, $p<.001$, topic marking $F(1, 52)=0.13$, $p=.718$). In the [-topic shift] contexts, the controls produced null pronouns more than 80% of the time to co-refer with the matrix subjects, irrespective of topic marking. Their production of the null pronouns was significantly higher than overt forms (less than 20%) in each

condition ($F(1, 26)=38.9$, $p<.001$ in *[-topic shift]+Topic-S*, $F(1, 26)=28.8$, $p<.001$ in *[-topic shift]+Topic-O*). These results show that null pronouns have a bias toward subject antecedents in [-topic shift] contexts, and topichood is not important in deciding their antecedents.

In contrast, in the [+topic shift] contexts, the controls' production of the overt forms was not significantly higher than null pronouns in each condition ($F(1, 26)=1.79$, $p=.193$ in *[+topic shift]+Topic-S*, $F(1, 26)=4.04$, $p=.055$ in *[+topic shift]+Topic-O*). This result suggests that overt subject pronouns do not have an antecedent bias. These results are consistent with the findings in the interpretation task.

The L2ers did not differ from the controls in their choice of antecedents in any condition. The ANOVA shows the main effect of the group was not significant in producing null and overt pronouns in every condition ($F(1, 52)=0.000$, $p=1.00$ in *[-topic shift]+Topic-S*, $F(1, 52)=0.024$, $p=.877$ in *[-topic shift]+Topic-O*, $F(1, 52)=0.066$, $p=.799$ in *[+topic shift]+Topic-S*, $F(1, 52)=0.102$, $p=.751$ in *[+topic shift]+Topic-O*). This result suggests that the L2ers had the same knowledge of pronouns as the controls.

As for null and overt object pronouns (see Appendix 2 for the data), an antecedent bias was not observed. Neither the main effect of topic shift nor topic marking was significant in the controls' production (topic shift $F(1, 52)=0.72$, $p=.40$; topic marking $F(1, 52)=0.22$, $p=.64$). The controls produced null pronouns and overt forms nearly to the same extent in all conditions. Similarly, the L2ers produced null pronouns and overt forms nearly to the same extent. Note that in Condition *[-topic shift]+Topic-O*, the L2ers produced significantly more overt pronouns (29%) than the controls (7%) ($F(1, 26)=5.92$, $p=.022$). This difference is attributable to the difficulty of completely controlling produced forms in a production task, especially when multiple overt forms— such as a pronoun, a reflexive, and a repetition of the noun—are appropriate. This difference between the controls and the L2ers disappears if the overt pronouns and other overt forms are counted together (i.e., the controls produced overt forms 61% and the L2ers did 54% in *[-topic shift]+Topic-O*, $F(1, 26)=0.30$, $p=.587$).

To summarize, the following findings were obtained in the production task:
1. For Japanese, subjecthood is more crucial than topichood in determining antecedents of null subject pronouns.
2. For Japanese, neither overt subject pronouns nor null and overt object pronouns show an antecedent bias.
3. The L2ers did not differ from the controls in producing null pronouns and overt forms in all conditions.

6.3.3   INDIVIDUAL RESULTS

Table 6: The number of informants in each production pattern

condition	partici- pants	production patterns				
		null =100% overt=100%	null ≥75% overt≥75%	null ≥50% overt≥50%	null/ overt<50%	null <50% overt<50%
[±topic shift] +Topic-S (embedded subjects)	Control	3	6	0	5	0
	L2er	3	4	1	6	0

[±topic shift] +Topic-S (embedded objects)	Con-trol	0	2	2	9	1
	L2er	0	1	3	9	1

Table 6 presents the number of informants in five production patterns in Conditions *[±topic shift]+Topic-S* for embedded subjects and objects. The 'null=100% overt=100%' column represents the participants who most clearly distinguished null pronouns from overt forms in production. They produced null pronouns in the [-topic shift] context (e.g., *[-topic shift]+Topic-S* for embedded subjects) and produced overt forms in the corresponding [+topic shift] context (e.g., *[+topic shift]+Topic-S* for embedded subjects) 100% each. The next three columns represent the participants who distinguished between null and overt forms less clearly. The rightmost 'null<50% overt<50%' column represents those who produced both forms less than half of the time in each condition.

The table shows that more than half of the participants correctly produced null subject pronouns in the [-topic shift] contexts and overt subject forms in the [+topic shift] contexts over 75% of the time. By contrast, they made a less clear distinction in producing object pronouns. Nine of them produced either null or overt forms less than 50% of the time. In both conditions, the controls and the L2ers showed similar patterns. These individual results support the group results.

7   DISCUSSION

7.1   H1 WAS NOT SUPPORTED

In Section 5, two hypotheses were advanced. H1 was about what drives the antecedent bias of Japanese null pronouns. I hypothesized that if topichood is crucial, topic marked antecedents should be chosen, regardless of their syntactic positions (subjects vs. objects). This hypothesis was not supported by the results from either task. The controls interpreted matrix subjects as antecedents for null subject pronouns, irrespective of topic marking. Similarly, the controls produced null subject pronouns to co-refer with matrix subjects, regardless of topic marking. These results show that subjecthood is more crucial than topichood in determining antecedents for null subject pronouns in Japanese. If we take these results and the analysis of Italian in Sorace and Filiaci (2006) into consideration, it may be reasonable to assume that the importance of subjecthood in determining antecedents for pronouns is universal, as Givón (1983a) suggests, whereas the role of topichood varies according to the languages at stake or the means of topic marking in that language. If the former is the case, Italian belongs to language groups in which topichood is crucial in deciding antecedents for pronouns, while Japanese does not. If the latter is the case, Japanese may have a more effective way to express topic. In fact, in Japanese, topichood can be expressed by a combination of the topic marker and a left dislocation structure (e.g., okaasan ni tuite-wa, mother-about-Top 'speaking of mother'). The left dislocation is limited to occasions involving a change in the discourse topic (Reinhart, 1981); accordingly, it is less commonly used than the topic maker alone. Nevertheless, the left dislocation with a topic marker could have more impact on topic shift than the topic marker alone. In either case, the present study suggests that the prominence of topic antecedents, that Sorace and Filiaci (2006) and

Belletti et al. (2007) suggest occurs in Italian, is lost in Japanese, as long as we focus on the role of the topic marker. Instead, the results of the present study and Ueno and Kehler (2010) are compatible with the PAH in Carminati (2002), which suggests that null pronouns prefer the antecedent in the highest SpecIP.

The present study also shows that the strength of the antecedent preference of pronouns varies across languages. Table 7 compares the interpretation of pronouns by the controls in Sorace and Filiaci (2006) and the present study when the matrix subject was topic marked (*Topic-S*) and when the matrix subject was nominative case marked (*Non-topic-SO*).

Table 7: Distribution of antecedents of pronominal subjects by the controls (%)

antecedents	Italian			Japanese			
				(*Topic-S*)		(*Non-topic-SO*)	
	Null	Overt		Null	Overt	Null	Overt
S	51	8		77	37	81	43
O	44	82		21	51	17	47
E	5	11		2	12	2	10
total	100	100		100	100	100	100

Table 7 shows that topic shift is mainly due to the strong antecedent preference of overt pronouns in Italian. Italian overt pronouns co-refer with matrix objects 82% of the time, whereas null pronouns do not show a clear preference (51% for matrix subjects and 44% for matrix objects). By contrast, Japanese null pronouns have a strong bias toward matrix subjects 77–81% of the time, whereas overt pronouns do not (37–43% for matrix subjects and 47–51% for matrix objects). This result suggests that null/overt pronouns cross-linguistically have a bias toward antecedents; nevertheless, their strength may be language specific.

The weak bias of Japanese overt pronouns might be attributable to the fact that Japanese personal pronouns, *kare/kanozyo* 'he/she,' are derived from demonstratives (Hoji, 1991; Kanzaki, 1994). According to Givón (1983b) and Arial (1990), demonstratives do not have a strong connection with salient entities in the sentence, unlike pronouns.

7.2   H2 WAS NOT SUPPORTED

With respect to H2, I hypothesized that advanced L1 English speakers of L2 Japanese will have a problem in determining the antecedents for pronouns that depend on interface constraints for successful resolution (like overt pronouns in Italian). This hypothesis was not supported.

One of the interesting findings in Sorace and Filiaci (2006) is that the L2 Italian near natives overused overt pronouns in place of null pronouns in the oral production task, although they were accurate with respect to null pronouns. From this, it was suggested that L2 grammar differs from monolingual grammar, as in (16) (Sorace, 2011).

(16) a. Monolingual grammar   b. L2 near native grammar

Overt pronouns ↔ [+topic shift]   Overt pronouns ↔ [+topic shift]
Null pronouns   ↔ [-topic shift]   Overt pronouns ↔ [-topic shift]
                                          Null pronouns   ↔ [-topic shift]

Unlike the Italian L2ers, the L2ers in the present study did not overuse overt pronouns in [-topic shift] contexts. As we have seen, Japanese overt pronouns do not have a clear antecedent bias, as discussed in 7.1, and L2ers were like native speakers in not showing a bias. It also should be noted that English overt pronouns do not have an antecedent bias either. In a follow-up study, 10 native English speakers who were not subjects in the present study participated in an English version of the picture verification task. The participants indicated the reference of embedded English pronouns in English bi-clausal sentences (e.g., 'The mother kissed the daughter when she was putting on the coat.') by choosing from the same pictures as those in the Japanese interpretation task. The results are given in Table 8.

Table 8: Distribution of antecedents in the English picture verification task (%)

antece-dents	Antecedents for overt subject pronouns	Antecedents for overt object pronouns
S	42	47
O	44	39
E	14	14
total	100	100

In contrast to overt pronouns, Japanese null subject pronouns show a bias toward subject antecedents. As for the L2 acquisition of null subject pronouns, somewhat contradictory results were obtained in the two tasks in the present study. On the one hand, in the interpretation task, the L2ers chose co-reference between the matrix subjects and null subject pronouns less frequently than the controls in two conditions (*Topic-S* and *Non-topic-SO*). On the other hand, the L2ers correctly produced null subject pronouns to co-refer with the matrix subjects, like the controls. How can we give a unified account of these opposing results? I take the latter, the accuracy in production, as evidence that the L2ers had acquired the discourse constraint on null subject pronouns. I argue that this discourse constraint is not in fact problematic for L2ers. This is incompatible with the view of the IH though the IH focuses on discourse constraints on overt pronouns, not null pronouns. Why, then, did the L2ers in the present study fail to interpret the null subject pronouns co-referentially? I suggest that this failure is attributable to the complexity of the interpretation task. In the task, the participants were required to read the context and the ambiguous sentence in Japanese, and then to observe three pictures, considering the possibility of three options (i.e., a subject antecedent, an object antecedent, and an external referent). By contrast, in the production task, the participants did not have to read a context; moreover, they needed to consider only two options (i.e., subject and object antecedents). As a result, the L2ers, as well as the controls, showed clearer preferences in producing antecedents for null subject

pronouns (the L2ers 87–91%, the controls 82–84% in *[-topic shift]+Topic-S* and *[-topic shift]+Topic-O*) than they did in interpreting null subject pronouns in the corresponding conditions (the L2ers 55–71%, the controls 75–77% in *Topic-S* and *Topic-O*). I speculate that the L2ers mistakenly interpreted the preceding nouns (i.e., the matrix objects) as the antecedents for null pronouns to reduce the processing burden in the task. In the production task, under less processing pressure, they did not need to employ this strategy. This explanation is in accordance with the IH, which suggests that the L2ers have a persistent processing problem at the external interfaces. However, the present study fails to fully support the IH because the production task suggests that the discourse constraints on pronouns are not problematic for advanced L2ers.

8   CONCLUSION

This paper reports on an empirical study on the use of Japanese pronouns, partly inspired by the experimental results on L2 Italian. First, I presented data showing that subjecthood rather than topichood is crucial for determining the antecedents of null subject pronouns in Japanese. Both the interpretation and the production tasks suggest that the prominence of topic antecedents, which is postulated for Italian, is absent in L1 and L2 Japanese. The data also suggest that surface word order of the antecedents does not affect the antecedent preferences of pronouns. Overt subject pronouns and null and overt object pronouns do not show a clear antecedent preference. Second, I presented data confirming that advanced L1 English speakers of L2 Japanese do not have a problem with producing pronouns in [±topic shift] contexts. Instead, they experienced problems in interpreting null pronouns in four out of the total of 16 conditions tested in this study. This difference is attributable to a task effect, not deviant L2 grammar. These results suggest that the discourse constraints on the use of pronouns can be acquired in L2 Japanese, supporting the view that all properties at the discourse-syntax interface are not necessarily problematic in L2 acquisition (White, 2011a).

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Appendix 1. Stimuli sentences

The following shows all stimuli in Conditions *Topic-S* and one example in each remaining object condition. (The examples in the remaining subject conditions are not repeated here since they are presented in the main text.)

1. The interpretation task
Condition *Topic-S*-null/overt subject pronouns
(1) Context: 'The mother and daughter finished their dinner and began to leave the restaurant. Another woman also fished dinner and began to leave near them.'

Okaasan-wa musume-ni [pro/kanozyo-ga kooto-o kiru   tokini] kisu-o sita.
'The mother(Topic) kissed the daughter when pro/she was putting on the coat.'

(2) Context: 'The woman with long hair and the girl met in the town. Another woman was also walking near them.'

Kami-no nagai onnanohito-wa onnanoko-ni [pro/kanozyo-ga michi-o watatteiru tokini] hanasikaketa.
'The woman with long hair(Topic) talked to the girl when pro/she was crossing the road.'

(3) Context: 'The boy and the teacher met in a school classroom today. Another male student, who was wearing a cap, was also near them.'

Otokonoko-wa   sensei-ni [pro/kare-ga kyoositu-ni haittekuru tokini]   aisatu-o sita.
'The boy(Topic) greeted the teacher when pro/he was coming into the classroom.'

(4) This stimulus was excluded (see the footnote 7).
Context: 'The conductor and the man were talking on the platform of the station. A boy was also near them.'

Shashoo-wa   otokonohito-ni [pro/kare-ga densha-ni noru tokini] kippu-o watashita.
'The conductor(Topic) gave the ticket to the man when pro/he was getting onto the train.'

Condition *Topic-S*-null/overt object pronouns
(5) Context: 'The mother and the daughter were waiting for the father at the café. A waitress was near them.'

Okaasan-wa   musume-ni [otoosan-ga pro/kanozyo-o sagasiteiru   tokini] kisu-o sita.
'The mother (Topic) kissed the daughter when the father was looking for pro/her.'

(6) Context: 'The woman with long hair and the girl met in town. A boy was running and another woman was also walking near them.'

Kami-no   nagai onnanohito-wa onnanoko-ni [otokonoko-ga pro/kanojyo-o mita tokini] hanasikaketa.
'The woman with long hair(Topic) talked to the girl when the boy saw pro/her.'

(7) Context: 'The boy and the teacher met in a school classroom today. A girl and another boy who was wearing a cap were also near them.'

Otokonoko-wa   sensei-ni   [onnanoko-ga pro/kare-o yondeiru tokini] aisatu-o sita.
'The boy(Topic) greeted the teacher when the girl was calling pro/him.'

(8) Context: 'The conductor and the man were talking on the platform of the station. An old woman and a boy were also near them.'

Shashoo-wa   otokonohito-ni [obaasan-ga pro/kare-o mituketa tokini] kippu-o watashita.
'The conductor(Topic) gave the ticket to the man when the old woman found pro/him.'

Condition *Topic-O*-null/overt object pronouns
(9) The same context as (5)
Musume-ni-wa okaasan-ga [otoosan-ga pro/kanozyo-o sagasiteiru   tokini] kisu-o sita.
'The mother kissed the daughter(Topic) when the father was looking for pro/her.'

Condition *Non-topic-SO*-null/overt object pronouns
(10) The same context as (5)
Soko-de-wa okaasan-ga musume-ni [otoosan-ga pro/kanozyo-o sagasiteiru tokini] kisu-o sita.
'The mother kissed the daughter at that place(Topic) when the father was looking for pro/her.'

Condition *Non-topic-OS*-null/overt object pronouns
(11) The same context as (5)
Soko-de-wa musume-ni okaasan-ga [otoosan-ga pro/kanozyo-o sagasiteiru tokini] kisu-o sita.
'The mother kissed the daughter at that place(Topic) when the father was looking for pro/her.'

2. The production task
Condition *Topic-S* for embedded subjects
(12) Onnanoko-wa   sensei-ni [pro/kanozyo–ga mizu-o yatteiru   tokini] aisatu-o   sita
 'The girl(Topic) greeted the teacher when pro /she was watering (flowers)'

(13) Wakai onnnanohito-wa onnanoko-ni [pro/kanozyo–ga sanpositeiru tokini] te-o futta
'The woman(Topic) waved to the girl when pro/she was walking'

(14) Otokonohito-wa   tenin-ni [pro/kare–ga toire-kara   detekita   tokini] okane-o watasita
'The man(Topic) gave money to the waiter when pro/he came out of the toilet.'

(15) Otoosan-wa   otokonoko-ni [pro/kare–ga   terebi-o miteiru tokini] hanasikaketa
'The father(Topic) talked to the boy when pro/he was watching TV.'

Condition *Topic-S* for embedded objects
(16) Onnanoko-wa   sensei-ni [otokonohito-ga pro/kanozyo–ni   nimotu-o todoketa tokini]
aisatu-o sita
greeting-Acc did
'The girl(Topic) greeted the teacher when the man brought a parcel to pro /her.'

(17) Wakai onnanohito-wa onnanoko-ni   [omawarisan-ga pro/kanozyo–*o*   mita tokini] te-o futta
'A young woman(Topic) waved to the girl when the policeman looked at pro/her.'

(18) Otokonohito-wa   tenin_j-ni [onnanohito-ga pro/kare–ni   hanasikaketa tokini] okane-o
watasita
'The man(Topic) gave money to the waiter when the woman talked to pro/him.'

(19) Otoosan-wa   otokonoko-ni [okaasan-ga pro/kare–o   yonda tokini] hanasikaketa
'The father(Topic) talked to the boy when the mother called pro /him.'

Condition *Topic-O* for embedded objects
(20) Sensei-ni-wa onnanoko-ga [otokonohito-ga pro/kanozyo–ni   nimotu-o todoketa tokini]
aisatu-o sita
 'The girl greeted the teacher(Topic) when the man brought a parcel to pro /her.'

Appendix 2. Tables for object pronouns

Table 9: Distribution of antecedents for null pronominal objects in the interpretation task (%)

antece	*Topic-S**	*Topic-O*	*Non-topic-SO**	*Non-topic-OS*

-dents	Control	L2er	Control	L2er	Control	L2er	Control	L2er
S	51	43	44	45	49	40	55	47
O	41	42	46	42	41	45	36	37
E	8	15	10	13	10	15	9	16
total	100	100	100	100	100	100	100	100

Table 10: Distribution of antecedents for overt pronominal objects in the interpretation task (%)

antece-dents	*Topic-S*		*Topic-O*		*Non-topic-SO*		*Non-topic-OS*	
	Control	L2er	Control	L2er	Control	L2er	Control	L2er
S	49	45	42	51	46	48	53	51
O	41	44	46	43	46	44	40	44
E	10	11	12	6	8	8	7	5
total	100	100	100	100	100	100	100	100

Table 11: Production of embedded objects in the production task (%)

productions	*[-topic shift]* *+Topic-S*		*[-topic shift]* *+Topic-O*		*[+topic shift]* *+Topic-S*		*[+topic shift]* *+Topic-O*	
	Control	L2er	Control	L2er	Control	L2er	Control	L2er
Null pronouns	52	53	39	46	43	45	39	46
Overt forms	48 (7)	47 (18)	61 (7)	54 (29)	57 (9)	55 (14)	61 (13)	54 (18)
total	100	100	100	100	100	100	100	100