

# ARGUMENT ELLIPSIS IN ACQUISITION \*

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## 1. Introduction

Japanese is a language that allows productive use of null arguments in finite clauses. In (2), which constitutes replies to the question in (1), either the matrix subject or the matrix object is not overtly expressed. Similarly, in (3), both the subject and the object of the embedded clause are phonologically empty.

- (1) Taroo-wa doo shimashita ka?  
Taroo-TOP how did Q

‘What happened to Taroo?’

- (2) a. *e* ano kaisya-ni syuusyoku shimashita.  
that company-DAT employment did

‘He got employed by that company.’

- b. Ano kaisya-ga *e* saiyou shimashita.  
that company-NOM recruitment did

‘That company recruited him.’

- (3) Hanako-ga Taroo-ni [ *e e* saiyou suru to ] yakusokusita.  
Hanako-NOM Taroo-DAT recruitment do that promised

‘Hanako promised Taroo that she will recruit him.’

It has been observed at least since Otani and Whitman (1991) that null objects in Japanese allow sloppy-identity interpretation when their antecedent contains the anaphor *zibun* ‘self’. For example, the sentence with an empty object in (4b) is ambiguous: It means either that Ken respects Taroo’s mother (strict-identity interpretation) or that Ken respects his

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own mother (sloppy-identity interpretation). Oku (1998) observes that the same is true with null subjects: The missing embedded subject in (5b) can be construed either as Taroo's child or as Ken's own child.<sup>1</sup>

- (4) a. Taroo-wa zibun-no hahaoya-o sonkeisiteiru.  
Taroo-TOP self-GEN mother-ACC respect  
'Taroo<sub>1</sub> respects his<sub>1</sub> mother.'
- b. Ken-mo *e* sonkeisiteiru.  
Ken-also respect  
Lit. 'Ken respects *e*, too.'
- (5) a. Taroo-wa [ zibun-no kodomo-ga eigo-o hanasu to ]  
Taroo-TOP self-GEN child-NOM English-ACC speak that  
omotteiru.  
think  
'Taroo<sub>1</sub> thinks that his<sub>1</sub> child speaks English.'
- b. Ken-wa [ *e* furansugo-o hanasu to ] omotteiru.  
Ken-TOP French-ACC speak that think  
Lit. 'Ken thinks that *e* speaks French.'

In order to account for the availability of sloppy interpretation, a number of syntactic studies have proposed that Japanese permits ellipsis of argument DPs (e.g. Oku 1998; Saito 2003, 2007; Takahashi 2008). According to this 'Argument Ellipsis' analysis, the sloppy interpretations for (4b) and (5b) stem from the structures containing full-fledged DPs, and these argument DPs are elided under identity with their antecedent DPs, as shown in (6b) and (7b).

- (6) a. Taroo-wa zibun-no hahaoya-o sonkeisiteiru.  
Taroo-TOP self-GEN mother-ACC respect
- b. Ken-mo ~~zibun-no~~ ~~hahaoya-o~~ sonkeisiteiru.  
Ken-also self-GEN mother-ACC respect
- (7) a. Taroo-wa [ zibun-no kodomo-ga eigo-o hanasu to ]  
Taroo-TOP self-GEN child-NOM English-ACC speak that  
omotteiru.  
think

<sup>1</sup> The same observation holds for null subjects and null objects in Korean. See Kim (1999) and Saito and An (2010) for a detailed discussion.

- b. Ken-wa [ ~~zibun-no~~ kodomo-ga furansugo-o hanasu to ]  
 Ken-TOP self-GEN child-NOM French-ACC speak that  
 omotteiru.  
 think

This study demonstrates experimentally that Japanese-speaking preschool children permit the sloppy-identity interpretation both for null subjects and null objects, thereby suggesting that the knowledge of Argument Ellipsis is already in their grammar. This finding will be further corroborated by the experimental observation that, in contrast to arguments, children do not permit ellipsis of adjuncts. In addition, it will also be demonstrated experimentally that children do not allow *wh*-phrases to undergo Argument Ellipsis. These findings together point to the conclusion that Japanese-speaking preschool children already have completely adult-like knowledge of Argument Ellipsis, which is consistent with the view that the availability of Argument Ellipsis and its constraints directly follows from the properties of biologically-determined Universal Grammar (UG).

This paper is organized as follows. In Section 2, we overview evidence for postulating Argument Ellipsis in Japanese, and in Section 3, we summarize two major approaches to the cross-linguistic variation in Argument Ellipsis. In Section 4, we draw a certain prediction from these parametric proposals for the acquisition of Argument Ellipsis, and in Section 5 and 6, we evaluate this prediction by conducting an experiment. Section 7 reports results of an experiment investigating children's knowledge of the constraint that adjuncts cannot undergo ellipsis, and Section 8 is dedicated to the experiment examining children's knowledge of the ban on eliding *wh*-phrases. Section 9 briefly concludes the discussion.

## 2. Argument Ellipsis in Japanese

The availability of sloppy interpretation for an empty object is unexpected if the object position is occupied by a null pronoun *pro*, since pronouns typically do not permit sloppy-identity interpretation, as exemplified in (8b).

- (8) a. Taroo-ga zibun-no konpyuutaa-o kowasita.  
 Taroo-NOM self-GEN computer-ACC destroyed  
 'Taroo<sub>1</sub> destroyed his<sub>1</sub> computer.'
- b. Hanako-mo sore-o kowasita.  
 Hanako-also it-ACC destroyed  
 'Hanako<sub>2</sub> also destroyed his<sub>1</sub> computer.' /  
 \* 'Hanako<sub>2</sub> also destroyed her<sub>2</sub> computer.'

In order to account for the availability of sloppy interpretation for null objects in Japanese, Otani and Whitman (1991) built on Huang's (1991) study on Chinese null objects, and put forth the analysis in which the relevant interpretation of (8b) stems from VP-ellipsis. One of

the fundamental assumptions of their analysis is that Japanese has overt V-to-T raising, and hence the sentences in (8) are represented as in (9) in overt syntax.<sup>2</sup> In the LF component, the antecedent VP is copied onto the empty VP, yielding (10b), which contains an anaphor in its object position as well. The LF representation in (10b) accounts for the sloppy interpretation of the sentence involving a null object in (8b).

- (9) *In Overt Syntax:*
- a. [TP John-ga [T [VP zibun-no konpyuutaa-o  $t_V$  ] [T kowasi<sub>V</sub>-ta<sub>T</sub> ] ] ]  
 John-NOM self-GEN computer-ACC destroyed
- b. [TP Mary-mo [T [VP  $e$  ] [T kowasi<sub>V</sub>-ta<sub>T</sub> ] ] ]  
 Mary-also destroyed

(10) *In the LF Component:*

- a. [TP John-ga [T [VP zibun-no konpyuutaa-o  $t_V$  ] [T kowasi<sub>V</sub>-ta<sub>T</sub> ] ] ]  
 John-NOM self-GEN computer-ACC destroyed
- b. [TP Mary-mo [T [VP **zibun-no konpyuutaa-o**  $t_V$  ] [T kowasi<sub>V</sub>-ta<sub>T</sub> ] ] ]  
 Mary-also self-GEN computer-ACC destroyed

Even though the VP-ellipsis analysis successfully explains why null objects in Japanese permit sloppy interpretations, it faces a variety of problems (see Hoji 1998, Oku 1998, Saito 2007, and Takahashi 2008). Most notable is the observation by Oku (1998) that even null subjects allow the sloppy-identity reading, as already illustrated in (5) and repeated here as (11). Given that subjects arguably stay outside of VP in overt syntax and in LF, the VP-ellipsis analysis by Otani and Whitman (1991) would predict that the sloppy interpretation should not be possible with null subjects, contrary to facts.

- (11) a. Taroo-wa [ zibun-no kodomo-ga eigo-o hanasu to ]  
 Taroo-TOP self-GEN child-NOM English-ACC speak that  
 omotteiru.  
 think  
 ‘Taroo<sub>1</sub> thinks that his<sub>1</sub> child speaks English.’
- b. Ken-wa [  $e$  furansugo-o hanasu to ] omotteiru.  
 Ken-TOP French-ACC speak that think  
 ‘Ken<sub>2</sub> thinks that his<sub>1</sub> child / his<sub>2</sub> child speaks French.’

In order to accommodate both the null-object examples as in (4) and the null-subject examples as in (5), Oku (1998), Saito (2003, 2007) and Takahashi (2008) (among others) put

<sup>2</sup> For a detailed discussion of why some languages permit ellipsis of such ‘headless’ phrases but others don’t, see Funakoshi (2012).

forth an alternative analysis in which only the relevant argument DP (not the VP) is elided. Under their Argument Ellipsis analysis, the sentences in (11) have the representations in (12) in overt syntax. After the derivation enters into LF, the antecedent DP, namely the anaphoric subject in (12a), is copied onto the empty subject position in (12b), resulting in the LF representation in (13b), which successfully yields the sloppy interpretation of the null subject.

(12) *In Overt Syntax:*

- a. Taroo-wa [CP [DP zibun-no kodomo-ga ] [T' eigo-o hanasu ]  
 Taroo-TOP self-GEN child-NOM English-ACC speak  
 to ] omotteiru.  
 that think
- b. Ken-wa [CP [DP e ] [T' furansugo -o hanasu ]  
 Ken-TOP French-ACC speak  
 to ] omotteiru.  
 that think

(13) *In the LF Component:*

- a. Taroo-wa [CP [DP zibun-no kodomo-ga ] [T' eigo-o hanasu ]  
 Taroo-TOP self-GEN child-NOM English-ACC speak  
 to ] omotteiru.  
 that think
- ↓
- b. Ken-wa [CP [DP zibun-no kodomo-ga ] [T' furansugo -o hanasu ]  
 Ken-TOP self-GEN child-NOM French-ACC speak  
 to ] omotteiru.  
 that think

### 3. Approaches to the Parametric Variation in Argument Ellipsis

Oku (1998) observes that the availability of Argument Ellipsis is subject to cross-linguistic variation: Argument Ellipsis is permitted in Japanese but is not allowed in languages like Spanish or English.<sup>3</sup> As illustrated in (14b), Spanish permits null subjects, but these null subjects do not have sloppy interpretation: (14b) only means that Juan believes that Maria's proposal will be accepted, and it never means that Juan believes that Juan's proposal will be accepted. In the English example (15), which contains a verb that optionally allow an empty object, the second clause simply means that John did some eating activity, and never permits sloppy reading.

<sup>3</sup> See also Takahashi (2007) for a detailed cross-linguistic survey concerning the availability of Argument Ellipsis.

(14) Spanish (Oku 1998:305):

a. Maria cree [ que su propuesta será aceptada ] y  
 Maria believes that her proposal will-be accepted and

‘Maria<sub>1</sub> believes that her<sub>1</sub> proposal will be accepted and ...’

b. Juan también cree [ que \_\_\_\_\_ será aceptada ].  
 Juan too believes that will-be accepted

‘Juan<sub>2</sub> also believes that her<sub>1</sub> proposal will be accepted.’

\* ‘Juan<sub>2</sub> also believes that his<sub>2</sub> proposal will be accepted.’

(15) English (Oku 1998:311):

Bill<sub>1</sub> ate his<sub>1</sub> shoe, and John ate, too.

To account for the cross-linguistic difference between Japanese (and Korean) on one hand and English and Spanish on the other, Oku (1998) and Takahashi (2008) proposed that the availability of Argument Ellipsis in a given language is tightly connected to the availability of (Japanese-type) scrambling.<sup>4</sup> According to this “scrambling approach”, both of these properties stem from the parameter proposed by Bošković and Takahashi (1998), which can be called the Parameter of  $\theta$ -feature Strength.

(16) The Parameter of  $\theta$ -feature Strength:  $\theta$ -features are {strong, weak}.

Bošković and Takahashi (1998) argue that  $\theta$ -features of a verb are weak in Japanese, while they are strong in non-scrambling languages like English and Spanish. Given their weak nature,  $\theta$ -features of Japanese verbs need not be checked in overt syntax. This property of Japanese makes it possible for an argument to be base-generated in a ‘scrambled’ position, as shown in (17a). In the LF component, the ‘scrambled’ object undergoes a lowering operation and merges with the predicate, in order to check the selectional features of the verb.

(17) a. *In Overt Syntax:*

[TP Ken-o [TP Taroo-ga [CP Hanako-ga [VP sikatta ] to ] itta ]]  
 Ken-ACC Taroo-NOM Hanako-NOM scolded that said

Lit. ‘Ken, Taroo said that Hanako scolded.’

b. *In the LF Component:*

[TP \_\_\_\_\_ [TP Taroo-ga [CP Hanako-ga [VP **Ken-o** sikatta] to ] itta ]]  
 Taroo-NOM Hanako-NOM Ken-ACC scolded that said

Such a derivation is not available in English or Spanish, since  $\theta$ -features in these languages are strong and hence they must be checked in overt syntax soon after verbs are introduced into the derivation.

<sup>4</sup> See also Saito (2003) for a related proposal.

Building on Bošković and Takahashi’s LF analysis of scrambling, Oku (1998) and Takahashi (2008) argue that the possibility of Argument Ellipsis in Japanese also follows from the weakness of  $\theta$ -features. Since  $\theta$ -features of Japanese verbs need not undergo checking in overt syntax, an argument position can be literally absent in Japanese, as shown in (18). In the LF component, the sentence in (18b) comes to have a licit transitive configuration through the LF-copying of an antecedent DP, as shown in (19b).

(18) *In Overt Syntax:*

- a. Taroo-ga [VP [DP zibun-no konpyuutaa-o ] kowasita. ]  
 Taroo-NOM self-GEN computer-ACC destroyed  
 ‘Taroo<sub>1</sub> destroyed his<sub>1</sub> computer.’
- b. Hanako-mo [VP [DP e ] kowasita. ]  
 Hanako-also destroyed

(19) *In the LF Component:*

- a. Taroo-ga [VP [DP zibun-no konpyuutaa-o ] kowasita. ]  
 Taroo-NOM self-GEN computer-ACC destroyed
- ↓ *LF Copy*
- b. Hanako-mo [VP [DP **zibun-no konpyuutaa-o** ] kowasita. ]  
 Hanako-also self-GEN computer-ACC destroyed

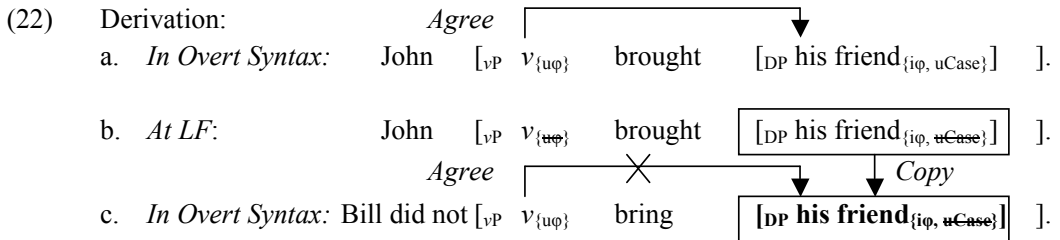
This way, Oku (1998) and Takahashi (2008) attribute both the availability of scrambling and that of Argument Ellipsis to a single parametric property of Japanese: the property that  $\theta$ -features are weak.

In contrast, building on Kuroda’s (1988) proposal that the main source of the various differences between English and Japanese is the presence vs. absence of obligatory agreement, Saito (2007) claims that Argument Ellipsis in Japanese stems from the absence of overt agreement in this language. This “anti-agreement approach” adopts Chomsky’s (2000) system of agreement, in which agreement is a probe-goal relation induced by a set of uninterpretable  $\phi$ -features on the functional heads of T and  $v$ . In the case of object agreement illustrated in (20), the uninterpretable  $\phi$ -features of  $v$  agree with the matching, interpretable  $\phi$ -set of the object DP. The object satisfies the condition that the goal must have an uninterpretable Case feature (the Activation Condition), and hence qualifies as a goal. The agreement relation results in the deletion of the uninterpretable  $\phi$ -features on  $v$  and the uninterpretable Case feature of the DP.

- (20) a. ... [VP  $v_{\{\text{u}\phi\}}$  [VP V DP<sub>\{\text{i}\phi, \text{uCase}\}}</sub> ]]
- b. ... [VP  $v_{\{\text{u}\phi\}}$  [VP V DP<sub>\{\text{i}\phi, \text{uCase}\}}</sub> ]]

Saito (2007) argues that the agreement relation illustrated above is obligatory in languages like English and Spanish, and that this obligatory nature of agreement excludes Argument Ellipsis from these languages. For example, the derivation of the English examples in (21) proceeds as shown in (22). The object DP *his friend* in (21a) must be copied into the object position of (21b) for the latter sentence to be properly interpreted. If we assume that only LF objects can be employed in LF-copying, the DP *his friend* must be copied into (21b) from the LF representation of (21a).<sup>5</sup> However, this DP has already agreed with its *v* in (21a) and hence, the uninterpretable Case feature that rendered this DP active has already been deleted. Then, given the Activation Condition, it does not qualify as a goal in the required Agree relation in (21b), and consequently, the derivation crashes due to the remaining uninterpretable  $\phi$ -features of *v*.

- (21) a. John brought [DP his friend].  
 b.\* But Bill did not bring \_\_\_\_\_.



The corresponding derivation converges in Japanese, however, given that Japanese lacks overt agreement, which, according to Saito (2007), indicates that the uninterpretable  $\phi$ -features on T and *v* are optional in this language. The derivation of the Japanese examples in (23) proceeds as shown in (24). In (23), the object DP *zibun-no tomodati* ‘self’s friend’ is copied from the LF representation of (23a) into the object position of (23b), as in (24c). Since  $\phi$ -features on a functional head are optional, *v* in (23b) need not have uninterpretable  $\phi$ -features. Thus, the object DP in (23a) can be successfully copied into (23b) even though its uninterpretable Case feature has already been deleted, and the derivation converges.

- (23) a. John-wa [DP zibun-no tomodati-o ] turetekita.  
 John-TOP self-GEN friend-ACC brought  
 ‘John<sub>1</sub> brought his<sub>1</sub> friend.’
- b. Demo Mary-wa \_\_\_\_\_ tureteko-nakatta.  
 but Mary-TOP brought-not  
 ‘But Mary<sub>2</sub> did not bring her<sub>2</sub> friend.’

<sup>5</sup> See Saito (2007) for evidence that only LF objects can be employed in the LF-copying operation involved in Argument Ellipsis.



(24) Derivation:

a. *In Overt Syntax:*

John-wa	[ <sub>VP</sub>	[ <sub>DP</sub> zibun-no	tomodati-o <sub>{iφ, uCase}</sub> ]		turetekita	v <sub>{uφ}</sub> ].
John-TOP		self-GEN	friend-ACC		brought	

b. *At LF:*

John-wa	[ <sub>VP</sub>	[ <sub>DP</sub> zibun-no	tomodati-o <sub>{iφ, uCase}</sub> ]		turetekita	v <sub>{uφ}</sub> ].
John-TOP		self-GEN	friend-ACC		brought	

c. *In Overt Syntax:*

Mary-wa	[ <sub>VP</sub>	[ <sub>DP</sub> zibun-no	tomodati-o <sub>{iφ, uCase}</sub> ]		tureteko-nakatta	v <sub>{...}</sub> ].
Mary-TOP		self-GEN	friend-ACC		brought-not	

To summarize this section, we have reviewed two major proposals concerning the parametric variation in Argument Ellipsis. The scrambling approach, adopted by Oku (1998) and Takahashi (2008), proposed that the existence of Argument Ellipsis in Japanese and its absence in English and Spanish are correlated with the availability of (Japanese-type) scrambling. In contrast, developing the idea of Kuroda (1998), Saito (2007) proposed the anti-agreement approach, which claimed that the possibility of Argument Ellipsis in Japanese is closely tied to the absence of overt agreement in this language.<sup>6</sup> Even though these proposals significantly differ in their details, they share the fundamental assumption that a parameter of UG establishes a tight connection between the availability of Argument Ellipsis and other prominent properties of Japanese.<sup>7</sup> The experiments to be discussed in Section 5 and 6 attempt to evaluate this basic insight of their proposals, by investigating the acquisition of Japanese.

#### 4. Prediction for Child Japanese

As we have seen in the previous section, theoretical studies on Japanese syntax suggest that Argument Ellipsis is closely tied to other prominent characteristics of Japanese, such as

<sup>6</sup> Şener and Takahashi (2010) provide further support for Saito's (2007) anti-agreement approach by showing that in Turkish, only subjects (but not objects) resist Argument Ellipsis, which is expected in light of the observation that only subjects agree with predicates in finite clauses. Otaki et al. (in press) also confirm the validity of this approach by demonstrating that in a Mayan language called Kaqchikel, which exhibits overt subject and object agreements, neither null subjects nor null objects permit sloppy interpretation.

In contrast, null subjects in languages like Javanese, Bangla, and Hindi seem to disallow sloppy interpretation, despite the absence of overt agreement between the subject DPs and the predicates. See Sato (2012) and Simpson et al. (under review) for a detailed discussion.

See also Kitahara (2011) for conceptual problems of Saito's (2007) anti-agreement approach, and an alternative, agreement-based approach to the cross-linguistic variation in Argument Ellipsis.

<sup>7</sup> See Otaki (2012) for an approach that relates the availability of Argument Ellipsis to the absence of fusional case morphology.

scrambling or the lack of overt agreement. Previous acquisition literature reports that both scrambling and agreement are acquired fairly early, at least by the age of three. For example, using an act-out task, Otsu (1994) investigated whether Japanese-speaking three- and four-year-olds can correctly interpret scrambled sentences as in (25b). The results showed that young children had virtually no difficulty in understanding scrambled sentences, once the discourse context was provided by adding a sentence as in (25a).<sup>8</sup>

- (25) a. Kooen-ni          ahirusan-ga      imashita.  
          park-in            duck-NOM        was  
          ‘There was a duck in the park.’
- b. Sono          ahirusan-o      kamesan-ga      osimashita.  
          the          duck-ACC        turtle-NOM        pushed  
          ‘A turtle pushed the duck.’

Hyams (2002) summarizes the results of various acquisition studies, and observes that children acquiring “rich” agreement languages such as Italian and Catalan obey subject-verb agreement requirements from the earliest stage (before or around the age of two), even before they produce all the forms in a paradigm. For example, singular verb morphology is typically acquired before plural morphology, and first- and third-person forms appear earlier than second-person forms. Nevertheless, agreement is almost always correct for those forms that are used. According to Hyams (2002), across children and languages, agreement errors are under 4%, as shown in Table 1. Given the finding that agreement errors are extremely rare in the acquisition of “rich” agreement languages, we can reasonably speculate that children acquiring agreementless languages like Japanese would also be sensitive to the absence of overt agreement from the early stages of acquisition.

Given that we have reasons to believe that the properties that are allegedly connected to Argument Ellipsis are acquired before the age of three, both of the approaches to the parameter of Argument Ellipsis discussed in the previous section should make the following prediction:

- (26) Prediction for Child Japanese:  
       Japanese-speaking preschool children have knowledge of Argument Ellipsis.

The next two sections report results of experiments which evaluate the validity of this prediction: Section 5 investigates whether children permit sloppy interpretation for null objects, and Section 6 examines whether children allow this type of interpretation for embedded null subjects.

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<sup>8</sup> See also Murasugi and Kawamura (2005) and Sano (2007) for early acquisition of scrambling in Japanese.

<i>Child</i>	<i>Language</i>	<i>Age</i>	<i>n</i>	<i>% error</i>	<i>Source</i>
Simone	German	1;07-2;08	1732	1	Clahsen and Penke 1992
Martina	Italian	1;08-2;07	478	1.6	Guasti 1994
Diana	Italian	1;10-2;06	610	1.5	Guasti 1994
Guglielmo	Italian	2;02-2;07	201	3.3	Guasti 1994
Claudia	Italian	1;04-2;04	1410	3	Pizzuto and Caselli 1992
Francesco	Italian	1;05-2;10	1264	2	Pizzuto and Caselli 1992
Marco	Italian	1;05-3;00	415	4	Pizzuto and Caselli 1992
Marti	Catalan/Spanish	1;09-2;05	178	0.56	Torrens 1992
Josep	Catalan/Spanish	1;09-2;06	136	3	Torrens 1992
Gisela	Catalan	1;10-2;06	81	1.2	Torrens 1992
Guillem	Catalan	1;09-2;06	129	2.3	Torrens 1992

Table 1: Percentage of Subject-Verb Agreement Errors in Child Language (Hyams 2002:231)

## 5. Experiment 1: Ellipsis of Object DPs

### 5.1. Subjects and Method

In order to determine whether Japanese-speaking preschool children permit sloppy interpretation as a consequence of Argument Ellipsis, an experiment was conducted with 10 Japanese-speaking children, ranging in age from 3(years);01(month) to 5;07 (mean age 4;05).<sup>9</sup> The experiment employed a modified version of the Truth-Value Judgment Task (Crain and Thornton 1998). In this task, each child was told a story, which was accompanied by a series of pictures presented on a laptop computer. At the end of each story, a puppet described verbally what he thought had happened in the story. The task for the child was to judge whether the puppet's description was true or false, by feeding him either a nice strawberry or a horrible green pepper. The experiment contained (i) two sentences with null objects, and (ii) two sentences with overt pronouns, in order to determine whether children allow the sloppy interpretation for null objects while disallowing that interpretation for overt pronouns. A sample story and the test sentences that followed this story are presented in (27) and (28).

(27) *Sample Story:*

Today, Panda and Pig enjoyed riding on their favorite tricycles. Now they decided to wash them. Panda said, "Oh! My tricycle is very dirty." Pig said, "Shall I help you wash your tricycle?" Panda replied, "No, thanks. I will try to do it by myself, so you can work on your own." They started washing their favorite tricycles.

<sup>9</sup> The experiment reported in this section is based on Sugisaki (2007).



(28) *Sample Test Sentences:*

- a. Pandasan-ga      zibun-no      sanrinsya-o      aratteru      yo.  
     panda-NOM      self-GEN      tricycle-ACC      washing      PRT

‘A panda<sub>1</sub> is washing his<sub>1</sub> tricycle.’

- b. Butasan-mo      *e* /      sore-o      aratteru      yo.  
     pig-also                      it-ACC      washing      PRT

‘A pig is also washing *e* / it.’

## 5.2. Results and Discussion

The results are summarized in Table 2.

Sloppy-identity Interpretation of Null Objects	90% acceptance (18/20)
Sloppy-identity Interpretation of Overt Pronouns	85% rejection (17/20)

Table 2: Summary of the Results of Experiment 1

The obtained results clearly indicate that Japanese-speaking preschool children permit the sloppy-identity interpretation for null-object sentences, while disallowing that interpretation for overt pronouns.<sup>10</sup> These results are in conformity with the prediction in (26), and suggest that the knowledge of Argument Ellipsis is already in the grammar of Japanese-speaking preschool children.

However, given that this experiment used sentences involving null objects, there remains a possibility that children may have employed VP-ellipsis, not Argument Ellipsis, to derive the sloppy interpretation. This possibility gains more plausibility in light of the proposal by Takahashi (2008) that Chinese has VP-ellipsis but does not have Argument Ellipsis. As observed by Huang (1991) and Otani and Whitman (1991), null objects in Chinese exhibit the sloppy interpretation: The null object in (29b) can mean either rumors about Zhangsan (strict interpretation) or rumors about Mali (sloppy interpretation). In sharp contrast, according to Takahashi (2008), null subjects in Chinese do not permit sloppy interpretation: The missing

<sup>10</sup> See Matsuo (2007) for a related study which also investigated children’s interpretation of null-object sentences. Otaki and Yusa (2012) confirmed that Japanese-speaking children permit ellipsis of object DPs, by demonstrating that children have access to quantificational interpretation of null objects.

embedded subject in (30b) may refer to Zhangsan's child but cannot refer to Lisi's child.

- (29) a. Zhangsan bu xihuan guany ziji de yaoyan.  
Zhangsan not like about self GEN rumor

'Zhangsan<sub>1</sub> does not like rumors about himself<sub>1</sub>.'

- b. Mali ye bu xihuan e .  
Mali also not like

Lit. 'Mali does not like *e* either.'

- (30) a. Zhangsan shuo ziji de haizi mei na qian.  
Zhangsan say self GEN child take not money

'Zhangsan<sub>1</sub> said that his<sub>1</sub> child did not take money.'

- b. Lisi ye shuo e mei na qian.  
Lisi too say take not money

Lit. 'Lisi also said that *e* did not take money.' (Takahashi 2008:415)

This observation suggests that UG may permit two options to derive the sloppy interpretation of null objects: VP-ellipsis (preceded by overt V-to-T raising) as in Chinese, and Argument Ellipsis as in Japanese (and Korean). In order to make sure that child Japanese is not like adult Chinese and that it indeed has Argument Ellipsis, the experiment reported in the next section makes use of sentences that contain an empty argument in the embedded subject position.

## 6. Experiment 2: Ellipsis of Subject DPs

### 6.1. Subjects and Method

In order to re-evaluate the validity of the prediction in (26), an experiment was conducted with 24 Japanese-speaking children, ranging in age from 4;11 to 6;07 (mean age 5;10).<sup>11</sup> These children were divided into two groups. One group of children (Experimental Group) was presented test sentences involving an embedded clause with a null subject, as in (31). The other group of children (Control Group) was presented test sentences involving an overt pronoun in the embedded subject position, as in (32). Both types of sentences were accompanied by exactly the same stories.

<sup>11</sup> The results of a small-scale pilot experiment suggested that three-year-olds tend to have difficulty in interpreting a sequence of two sentences both of which involve an embedded clause as in (31) and (32) (irrespective of whether the sentence contains a null subject or an overt subject), presumably due to memory limitations. Thus, this experiment focuses on relatively old children. Some refinements of experimental methodology would be necessary to address the question of whether three-year-olds permit the sloppy interpretation of null subjects, which I have to leave for future research.

(31) *Test Sentence with a Null Subject:*

- a. Zousan-wa [ zibun-no e-ga ichiban jyouzuda  
 elephant-TOP self-GEN picture-NOM the-first good  
 to ] omotteru yo.  
 that think PRT

‘The elephant<sub>1</sub> thinks that his<sub>1</sub> picture is the best.’

- b. Raionsan-mo [ e ichiban jyouzuda to ] omotteru yo.  
 lion-also the-first good that think PRT

‘The lion also thinks that e is the best.’

(32) *Test Sentence with an Overt Pronominal Subject:*

- a. Zousan-wa [ zibun-no e-ga ichiban jyouzuda  
 elephant-TOP self-GEN picture-NOM the-first good  
 to ] omotteru yo.  
 that think PRT

‘The elephant<sub>1</sub> thinks that his<sub>1</sub> picture is the best.’

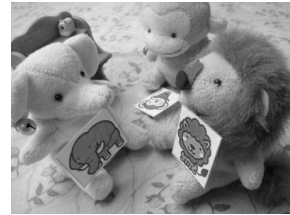
- b. Raionsan-mo [ sore-ga ichiban jyouzuda to ] omotteru yo.  
 lion-also it-NOM the-first good that think PRT

‘The lion also thinks that it is the best.’

Each child was presented with four target trials and two filler trials. Among the four target trials, two of them were aimed at investigating whether children allow sloppy interpretation for null subjects or overt pronouns, and the other two of them were aimed at investigating whether children allow strict interpretation for null subjects or overt pronouns. The task was a modified version of the Truth-Value Judgment Task (Crain and Thornton 1998). In each trial, a child was told a story, which was accompanied by a series of pictures presented on a laptop computer. At the end of each story, a puppet described verbally what he thought had happened in the story, using sentences as in (31) or (32). The task for the child was to judge whether the puppet’s description was correct or wrong, by pointing at one of the cards the puppet had in his hands: ○ (circle, which means ‘correct’) or × (cross, which means ‘wrong’). Sample stories and the test sentences that followed these stories are given in (33) - (36).

(33) *Sample Story 1* (which investigates the availability of sloppy reading):

Elephant, Lion, and Monkey are drawing their portraits. Elephant said to Lion, “Hey, look at this! I think my portrait is the best.” Looking at Elephant’s portrait, Lion replied, “Your portrait looks very good, but I think mine is the best.”



(34) *Puppet:*

- a. Zousan-wa [ zibun-no e-ga ichiban jyouzuda  
 elephant-TOP self-GEN picture-NOM the-first good  
 to ] omotteru yo.  
 that think PRT

‘The elephant<sub>1</sub> thinks that his<sub>1</sub> picture is the best.’

- b. Raionsan-mo [ e / sore-ga ichiban jyouzuda to ]  
 lion-also it-NOM the-first good that  
 omotteru yo.  
 think PRT

‘The lion also thinks that *e* / it is the best.’

(35) *Sample Story 2* (which investigates the availability of strict reading):

Rabbit, Squirrel, and Dog are reading their picture books. Rabbit said to Squirrel, “Hey, look at this! I think my picture book is the most amusing.” Looking at Rabbit’s picture book, Squirrel replied, “Yes, I agree. My picture book is very good, but I think yours is the most amusing.”



(36) *Puppet:*

- a. Usagisan-wa [ zibun-no ehon-ga ichiban omosiroi  
 rabbit-TOP self-GEN picture book-NOM the-first amusing  
 to ] omotteru yo.  
 that think PRT

‘The rabbit<sub>1</sub> thinks that her<sub>1</sub> picture book is the most amusing.’

- b. Risusan-mo [ e / sore-ga ichiban omosiroi to ]  
 squirrel-also it-NOM the-first amusing that  
 omotteru yo.  
 think PRT

‘The squirrel also thinks that *e* / it is the most amusing.’

## 6.2. Results and Discussion

The results are summarized in Table 3. Children permitted a strict-identity interpretation both for the sentences with a null subject and the sentences with an overt pronominal subject. In contrast, children showed a strong tendency to allow sloppy-identity interpretation only when the sentence contains a null subject, and to disallow this reading when the sentence involves an overt pronominal subject. These results are in conformity with the prediction in (26), and suggest that the knowledge of Argument Ellipsis is already in the grammar of Japanese-speaking preschool children. The evidence presented in this section would be more convincing than the one presented in the previous section, given that the experiment reported in this section made use of sentences involving null subjects, and hence that the sloppy interpretation children provided for these empty arguments cannot be attributed to VP-ellipsis.

	<i>strict-identity interpretation</i>		<i>sloppy-identity interpretation</i>	
	# of acceptance	% of acceptance	# of acceptance	% of acceptance
Sentences involving a null subject	23/24	96%	20/24	83%
Sentences involving an overt pronoun	23/24	96%	4/24	17%

Table 3: Summary of the Results of Experiment 2

## 7. Experiment 3: The Ban on Adjunct Ellipsis

### 7.1. A Remaining Question

In the previous two sections, we have obtained evidence that Japanese-speaking preschool children allow the sloppy interpretation for null arguments. Still, a significant question remains as to the exact source for this interpretation. Two possibilities are immediately available. It may be the case that children already have knowledge of Argument Ellipsis, and that the sloppy interpretation stems from this knowledge in an adult-like way. Alternatively, it may be the case that Japanese-speaking children are simply allowing any phrase to be elided, and that the ellipsis of argument DPs is just an instance of that knowledge. In adult Japanese, the latter possibility can be ruled out based on the observation that adjuncts do not undergo ellipsis. The relevant example is provided in (37).

- (37) a. Taroo-wa teineini kuruma-o aratta.  
 Taroo-TOP carefully car-ACC washed

‘Taroo washed a car carefully.’



- b. Demo, Hanako-wa \_\_\_\_\_ kuruma-o arawa-nakat-ta.  
 but Hanako-TOP car-ACC wash-not-PAST

‘But Hanako did not wash a car.’ / \*‘But Hanako did not wash a car carefully.’

While the sentence in (37a) contains the adjunct corresponding to *carefully*, the interpretation of (37b) excludes this adjunct: The sentence in (37b) just means that Hanako did not wash a car, and never means that Hanako didn’t wash it carefully (that is, Hanako washed a car but not in a careful manner).

Then, in order to verify that Japanese-speaking children indeed have knowledge of Argument Ellipsis (and not the knowledge that any phrase can be elided), it has to be demonstrated that they are also adult-like in disallowing the ellipsis of adjuncts.

## 7.2. Subjects and Method

In order to determine whether Japanese-speaking preschool children are sensitive to the ban on adjunct ellipsis, an experiment was conducted with 14 Japanese-speaking children, ranging in age from 3;09 to 5;08 (mean age 5;01).<sup>12</sup> As in the previous experiments, the task was a modified version of the Truth-Value Judgment (Crain and Thornton 1998). In this task, each child was told a story, which was accompanied by a series of pictures presented on a laptop computer. At the end of each story, a puppet described verbally what he thought had happened in the story. The task for the child was to judge whether the puppet’s description was true or false, by pointing at one of the cards the puppet had in his hands: ○ (circle, which means ‘correct’) or × (cross, which means ‘wrong’). The experiment consisted of 2 sentences with adjuncts, 2 sentences without adjuncts, 1 filler and 1 practice item. A sample story and the test sentences that followed this story are presented in (38) and (39). In this story, if children indeed exclude ellipsis of adjuncts, the test sentence without an adjunct should be judged as false, since Squirrel actually ate his apples even though it was not in a quick manner.

### (38) *Sample Story:*

When Frog and Squirrel were about to go out to play soccer, Frog’s mother came out from the house and brought them some nice apples. Frog wanted to play soccer now, so he ate his apple very quickly. Squirrel also wanted to play soccer now, but he was not good at eating fast, so he decided to go out without eating his apple. Looking at it, Frog said to Squirrel, “I can wait for you, so you can take your time to finish up your apple.” Squirrel ate his apple slowly, and then they went out to play soccer.



<sup>12</sup> The experiment reported in this section is based on Sugisaki (in press).

(39) *Sample Test Sentences:*a. Test Sentence with an Adjunct

Kaerusan-wa	ringo-o	isoide	tabeta	kedo,
frog-TOP	apple-ACC	quickly	ate	but
Risusan-wa	ringo-o	isoide	tabe-nakat-ta	yo.
squirrel-TOP	apple-ACC	quickly	eat-not-PAST	PRT

‘Frog ate an apple quickly, but Squirrel did not eat an apple quickly.’

b. Test Sentence without an Adjunct

Kaerusan-wa	ringo-o	isoide	tabeta	kedo,
frog-TOP	apple-ACC	quickly	ate	but
Risusan-wa	ringo-o	_____	tabe-nakat-ta	yo.
squirrel-TOP	apple-ACC		eat-not-PAST	PRT

‘Frog ate an apple quickly, but Squirrel did not eat an apple.’

All the test questions were pre-recorded and came from the laptop computer. In order to make sure that there should be no crucial intonational difference between the sentences with an adjunct and those without (other than the presence of an adjunct itself), the latter were created from the former by deleting the sound corresponding to the adjunct phrase, using Praat (Boersma and Weenink 2010).

### 7.3. Results and Discussion

The results are summarized in Table 4. When presented with a context as in (38), children rejected sentences without an adjunct more than 85% of the time, while they accepted sentences with an adjunct more than 90% of the time. These results succinctly demonstrate that Japanese-speaking four- and five-year-olds do not permit ellipsis of adjuncts, even though experiments reported in the previous sections revealed that Japanese-speaking children allow arguments to be elided. The findings from this experiment, together with the findings from the previous two experiments, suggest that children are sensitive to the argument-adjunct asymmetry in the possibility of ellipsis, and hence corroborate the claim made in the previous sections that Japanese-speaking preschoolers indeed have knowledge of Argument Ellipsis.

Sentences with an Adjunct	92.9% acceptance (26/28)
Sentences without an Adjunct	85.7% rejection (24/28)

Table 4: Summary of the Results of Experiment 3

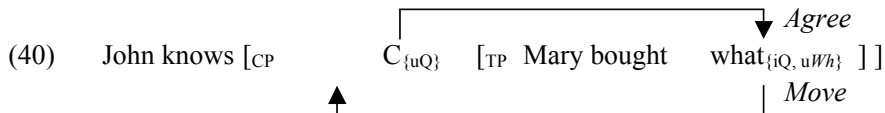
## 8. Experiment 4: The Ban on Eliding *Wh*-phrases

### 8.1. A Consequence of the Anti-agreement Approach to Argument Ellipsis

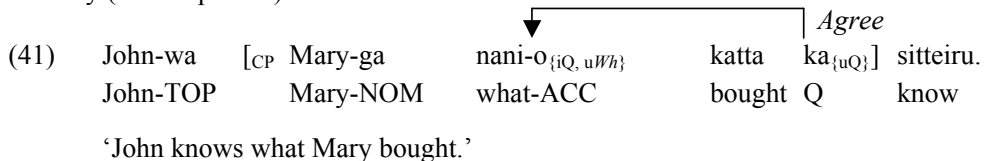
As we have seen in Section 3, there are two major parametric approaches to the cross-linguistic variation in Argument Ellipsis: the scrambling approach, which argues that Argument Ellipsis is available only in those languages with (Japanese-type) scrambling, and the anti-agreement approach, which claims that Argument Ellipsis is permitted only in those languages that lack overt agreement. In this section, we focus on the latter approach, and explore a certain consequence of that approach. We further confirm Japanese-speaking children's knowledge of Argument Ellipsis, by demonstrating experimentally that children are also sensitive to that consequence of the anti-agreement approach.<sup>13</sup>

An immediate consequence of the anti-agreement approach proposed by Saito (2007) and adopted by Şener and Takahashi (2010) is that, if a certain type of phrases must undergo obligatory agreement, then that type of phrases cannot be elliptic even in Japanese. I argue that this expectation is indeed borne out by *wh*-phrases.<sup>14</sup>

Chomsky (2000) analyzes overt *wh*-movement as in English as follows. A *wh*-phrase has an uninterpretable feature  $\{uWh\}$  and an interpretable feature  $\{iQ\}$ . The former activates the *wh*-phrase for agreement and movement, and the latter matches and agrees with the uninterpretable feature  $\{uQ\}$  of an interrogative complementizer.



Developing the proposals by Watanabe (1992) and Hagstrom (1998), Chomsky suggests the possibility that *wh*-in-situ constructions also involve an agreement relation as illustrated in (41): The difference between *wh*-movement and *wh*-in-situ languages lies in whether the entire *wh*-phrase is moved (as in English), or only the head undergoes movement overtly or covertly (as in Japanese).<sup>15</sup>



<sup>13</sup> The experiment reported in this section is based on Sugisaki (2012).

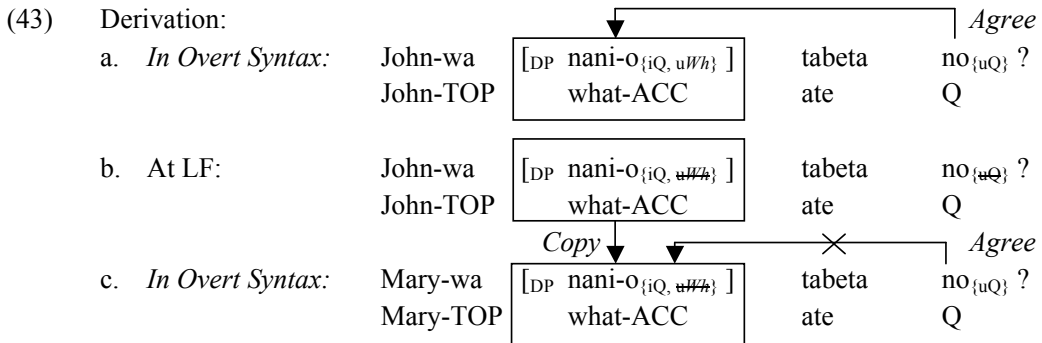
<sup>14</sup> See also Ikawa (in press) for the discussion of why *wh*-phrases are not amenable to Argument Ellipsis.

<sup>15</sup> Watanabe (1992) argues that a null operator undergoes overt movement in Japanese *wh*-in-situ constructions, while Hagstrom (1998) claims that it is the question particle (*ka*) that undergoes syntactic movement from a clause-internal position (by the *wh*-word) to the clause periphery.

The obligatory agreement relation between a *wh*-phrase and an interrogative complementizer provides a very simple account for the observation that Argument Ellipsis of *wh*-phrases is not permitted, as illustrated in (42).

- (42) a. Speaker A: John-wa nani-o tabeta no? Speaker B: Ringo.  
 John-TOP what-ACC ate Q apple  
 ‘What did John eat?’ ‘An apple.’
- b. Speaker A: Dewa, Mary-wa \_\_\_\_\_ tabeta no?  
 then Mary-TOP ate Q  
 ‘Then, did Mary eat something/that?’ / \*‘Then, what did Mary eat?’

The relevant derivation proceeds as shown in (43). The object *wh*-phrase *nani-o* ‘what’ is copied from the LF representation of (42a) into the object position of (42b), as in (43c). However, this *wh*-phrase has already agreed with the Complementizer in (42a) and hence, the uninterpretable feature {*uWh*} that rendered this *wh*-phrase active has already been deleted. Then, given the Activation Condition, the copied *wh*-phrase does not qualify as a goal in the required agreement relation, and consequently, the derivation involving LF-copying of a *wh*-phrase does not converge due to the remaining uninterpretable feature {*uQ*} of the Complementizer.



What the above discussion shows is that the absence of *wh*-phrase ellipsis follows from Saito’s (2007) anti-agreement approach *without any additional cost*, if we adopt Chomsky’s (2000) assumption that *wh*-phrases must undergo agreement with the Complementizer even in *wh*-in-situ languages like Japanese. I must hasten to add the following: I do *not* claim that the derivation in (43) would be the *only* source for the lack of *wh*-phrase ellipsis. Another possible (and plausible) account for this observation is easily available: A *wh*-phrase is inherently focused, and a focused material cannot be subject to ellipsis. What I argue here is that the anti-agreement approach provides an additional way to exclude ellipsis of *wh*-phrases in Japanese, and that the relevant mechanisms automatically follow from (independently motivated) properties of UG. A virtue of deriving the ban on eliding *wh*-phrases from the anti-agreement approach is that we can obtain a clear prediction for children’s knowledge about this constraint: Since the obligatory agreement relation between a *wh*-phrase and an

interrogative complementizer directly follows from UG, it is predicted that those Japanese-speaking preschool children who already have the knowledge about Argument Ellipsis should also have the knowledge that *wh*-phrases cannot undergo this ellipsis. Since we have already established in the experiments discussed in the previous sections that Japanese-speaking preschool children have knowledge of Argument Ellipsis, we can expect that children are also sensitive to the ban on eliding *wh*-phrases. The experiment reported below addresses the question of whether this is actually the case.

## 8.2. Subjects and Method

An experiment was conducted with 16 Japanese-speaking preschool children, ranging in age from 3;09 to 4;07 (mean age 4;01). The task for children was Question-after-Story. In this task, each child was told a short story, which was accompanied by a series of pictures presented on a laptop computer. At the end of each story, a puppet appeared on the screen and asked the child two questions with respect to what had happened in the story. The task for the child was to answer these questions. All the test questions were pre-recorded and came out from the laptop computer.

A sample story is presented in (44).

(44) *Sample Story:*

Duck and Squirrel are playing with their favorite toys. Duck now starts to draw his favorite airplane. Since Squirrel is not good at drawing, he thinks of just taking a look at how well Duck draws the airplane. However, by looking at Duck's drawing, Squirrel now wants to give a try. So Squirrel also starts to draw his favorite train.



Each story was followed by two questions. The first question was always a *wh*-question like (45). The second question, which was posed after a child had answered the first one, had three types: (i) a *wh*-question as in (46a), (ii) a question involving a null object as in (46b), and (iii) a truncated question as in (46c). In adult Japanese, the questions in (46a) and (46c) are interpreted as a *wh*-question (and hence requires a short answer “A train”), while the question with a null object in (26b) is interpreted as a yes/no question.<sup>16</sup>

<sup>16</sup> The truncated question in (46c) is interpreted as a *wh*-question since the preceding question in (45) is also a *wh*-question: It can be interpreted as a yes/no question when the preceding question is also a yes/no question.

- (45) The First Question:      Ahirusan-wa    nani-o      kaita      kana?  
    duck-TOP    what-ACC   draw      Q  
    ‘What did the duck draw?’
- (46) The Second Question:
- a. *Wh*-question:                      Jyaa,    risusan-wa      nani-o      kaita      kana?  
    then    squirrel-TOP    what-ACC   draw      Q  
    ‘Then, what did the squirrel draw?’
- b. Question with a null object: Jyaa,    risusan-wa      \_\_\_\_\_      kaita      kana?  
    then    squirrel-TOP                                      draw      Q  
    ‘Then, did the squirrel draw (something)?’
- c. Truncated question:                      Jyaa,    risusan-wa?  
    then    squirrel-TOP  
    ‘Then, the squirrel?’

One might worry that some intonational difference between a null-object question like (46b) and a *wh*-question as in (46a) may play a role for children to conclude that the former is not a *wh*-question but a yes/no question. In order to make sure that there should be no crucial intonational difference between these two types of questions (other than the presence of a *wh*-phrase), the null-object questions were created from the corresponding *wh*-questions by deleting the sound corresponding the *wh*-phrase, using Praat (Boersma and Weenink 2010).

Truncated questions like (46c) were added to exclude the possibility that children always provide a yes/no answer to questions without an overt *wh*-phrase: If it can be shown that children interpret questions with a null object like (46b) as a yes/no question despite the fact that they interpret truncated questions like (46c) as a *wh*-question, then this would allow us to conclude that children do not rely on a strategy which determines the interpretation of a question based on the presence or the absence of a *wh*-phrase.

The experiment consisted of two trials with a *wh*-question as in (46a), two trials with a null-object question as in (46b), and two trials with a truncated question as in (46c). The order of presentation was pseudo-randomized.

### 8.3. Results and Discussion

The results are summarized in Table 5. Except for the responses from a single child (4;04), all the answers to null-object questions were yes/no answers (more specifically, *yes* answers). In contrast, virtually all the answers to truncated questions were short answers such as “A train”, which suggests that children interpreted these sentences as *wh*-questions. This finding suggests that Japanese-speaking children do not have a strategy to interpret questions without a *wh*-phrase as yes/no questions. The sharp contrast between responses to questions involving a null object and responses to truncated questions suggests that children do not

interpret null-object questions as object *wh*-questions. Thus, the obtained results clearly indicate that Japanese-speaking preschool children already have the knowledge that *wh*-phrases are not allowed to undergo Argument Ellipsis.

	Interpreted as a <i>wh</i> -question	Interpreted as a yes/no question
<i>Wh</i> -questions as in (46a)	100% (32/32)	0% (0/32)
Questions with a null object as in (46b)	6.25% (2/32)	93.75% (30/32)
Truncated questions as in (46c)	96.88% (31/32)	0% (0/32)

Table 5: Summary of the Results of Experiment 4

## 9. Concluding Remarks

This study reported results of four experiments to demonstrate that Japanese-speaking preschool children have fully adult-like knowledge of Argument Ellipsis. The results of Experiment 1 and 2 revealed that children permit sloppy-identity interpretation both for null objects and for null subjects. Experiment 3 verified that the source of this interpretation is indeed knowledge of Argument Ellipsis (and not the knowledge that any phrase can be elided), by showing that children are also adult-like in disallowing the ellipsis of adjuncts. In light of the observation that (Japanese-type) scrambling and agreement are acquired at least before the age of three, these findings lend support to the fundamental part of the parametric proposals by Oku (1998), Saito (2007), and Takahashi (2008) that the availability of Argument Ellipsis in Japanese is closely tied to other prominent characteristics of this language, such as scrambling or the absence of overt agreement.

Experiment 4 focused on the constraint that Argument Ellipsis does not apply to *wh*-phrases, which immediately follows from the anti-agreement approach. The results of this experiment, combined with the results of Experiment 1-3, suggest that not only the knowledge about Argument Ellipsis but also the knowledge about its constraints are in children's grammar from the earliest observable stages. These findings are consistent with the view that the availability of Argument Ellipsis and its constraints directly follow from the principles and parameters of UG, which in turn demonstrates that the acquisition of Argument Ellipsis is a very fruitful area to deepen our understanding about the nature of innate language faculty.

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