The Effects of L1 Transfer and Processing Strategies on L2 Acquisition of Japanese *Wh*-Constructions

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Abstract

L2 learners of Japanese have been said to resolve scope ambiguity in question fragments in a manner similar to native speakers; they use the processing strategy that requires shorter dependency between a *wh*-phrase and a question morpheme -KA (Lieberman *et al*. 2006). This study investigates how L2 learners perform with regard to ambiguous *wh*-sentences in Japanese when more than one processing strategy is involved. We have demonstrated that not only the strategy to require shorter dependency but also the strategy related to case particle affects acceptability judgments of Japanese *wh*-questions. In addition, we suggested that a specific L1 property (clausal typing in L1) may be a determinant in the selection of processing strategies.

Keywords: Second Language Acquisition, Interrogative Sentence, L1 Transfer, Clausal Typing Hypothesis, Processing Strategy

Introduction

One of the central issues of L2 sentence processing concerns transfer effects from the first language (L1) to the second language (L2) (Felser *et al.* 2003, Juffs 1998, Papadopoulou & Clahsen 2003, among many others). Based on the study of Japanese sentence processing by adult native speakers in Aoshima *et al.* (2004), Lieberman *et al.* (2006) investigate how English-speaking learners of Japanese treat *wh*-scope ambiguity. In English, it is broadly assumed that a *wh*-phrase has to move to a clause initial position, and this movement leaves a trace as shown in (1). In (1a), *what* is interpreted in the embedded clause, at its base-generated position. In (1b), *when* can be interpreted both in the matrix and embedded clause. In the case in which a *wh*-

question is ambiguous, a parser (a reader or a hearer) prefers to interpret the *wh*-phrase in the matrix clause because the trace in the matrix clause is closer to the *wh*-phrase (Phillips *et al*. 2005).

(1) a. What$_i$ do you think [t_i is in the bag]?
b. When$_i$ did you ask <t_i> [that Mary broke her leg <t_i>]?

This locality bias holds in a *wh* in-situ language such as Japanese. As illustrated in (2), a *wh*-phrase does not have to move in Japanese. Although *wh*-phrases in (2a, b) are in the same positions, they are interpreted differently depending on the positions of the question morpheme (QM) -KA; a *wh*-sentence is interpreted as a Yes/No-question when QM is in an embedded clause like (2a) and as a *wh*-question when QM is only in the matrix clause as in (2b). Aoshima *et al*. (2004) note that even without movement of a *wh*-phrase, a parser needs to establish a dependency with QM instead of with a trace. Their study showed that participants expected QM in the embedded clause when a *wh*-phrase was introduced in the course of processing. In bi-clausal sentences, there are two possible positions for QM, the right edge of the embedded clause and the right edge of the matrix clause. A parser, however, expects QM to be in the embedded clause because that position is closer to the *wh*-phrase. Lieberman *et al*. (2006) show that L2 learners of Japanese, like native speakers of Japanese, prefer QM to be in the position closer to a *wh*-phrase.

(2) a. John-wa [Mary-ga nani-o suki-ka] iimasita-ka?
John-Top Mary-Nom what-Acc like QM said QM
'Did John say what Mary likes?'
b. John-wa [Mary-ga nani-o suki to] iimasita-ka?
you-Top Mary-Nom what-Acc like that said QM
'What did John say that Mary likes?'

For the sake of convenience, I will refer to this processing strategy as 'SHORT DEPENDENCY' strategy throughout this paper.

(3) ‘SHORT DEPENDENCY’ strategy:
Establish the shorter dependency between a *wh*-phrase and Question Morpheme (QM) when the scope of *wh* is ambiguous.

KumagamiI (2008) tested whether this strategy is used in *wh*-constructions such as (4) by L1 Korean and L1 Chinese learners of Japanese.

(4) Jiro-ga dare-ni Taro-ga okotta-KA kikimasita-KA?
Jiro-Nom who-Dat Taro-Nom got mad QM asked QM
a. Jiro-ga [dare-ni Taro-ga okotta-KA] kikimasita-KA?
'Did Jiro ask who Taro got mad at?'
b. Jiro-ga dare-ni [Taro-ga okotta-KA] kikimasita-KA?
'Who did Jiro ask whether Taro got mad?'

Sentence (4) is structurally ambiguous allowing two interpretations (4a) and (4b). If the strategy in (3) is used to process this sentence, it must be interpreted as in (4a), because QM -KA in the embedded clause is linearly closer to the *wh*-phrase *dare-ni* than -KA in the matrix clause.

Kumagami (2008) also focuses on another strategy, which is called the 'CASE PARTICLE' strategy in this study. Kumagami (2008) considers the idea that this strategy may be utilized to process (4). If this is the case, the interpretation in (4b) is preferred, because the onset of the embedded clause is established at the nominative NP *Taro-ga*, and the *wh*-phrase *dare-ni* is excluded from the embedded clause.

(5) ‘CASE PARTICLE’ strategy:
Mark the onset of the embedded clause at the position of a Nominative NP.
(Modified from Miyamoto, 2002)

Kumagami (2008) conducted experiments to test which strategy is preferably used to process a sentence like (4), and shows that Korean and Chinese learners of Japanese also use the 'SHORT DEPENDENCY' strategy like the participants of Lieberman *et al.* (2006) when they interpret scopally ambiguous *wh*-sentences. However, the 'CASE PARTICLE' strategy is utilized when sentences are structurally ambiguous, even though the 'SHORT DEPENDENCY' strategy remains applicable. In other words, when processing structurally ambiguous sentences, the 'CASE PARTICLE' strategy seems preferable as compared to the 'SHORT DEPENDENCY' strategy. Moreover, Kumagami (2008) shows that Chinese speaking learners behaved differently from native speakers of Japanese and also Korean speaking learners. This suggests that the 'SHORT DEPENDENCY' strategy is not always utilized; furthermore, the functioning

of the 'CASE PARTICLE' strategy is restricted by a particular property of L1 grammar, namely the presence of case particles.

(6) Hypothesis of Kumagami (2008)
The relevant L1 property, the presence of case particles, determines the choice of the processing strategies: L2 learners use the 'CASE PARTICLE' strategy if they have case particles in their L1. Otherwise, the use of the strategy is optional.

To strengthen this claim, one needs to look at leaners in order to test whether the presence of case particles in L1 is really a determinant in the selection of processing strategies in L2 Japanese. The present study, thus, conducted the experiment with English speaking learners of Japanese, using the same method as Kumagami (2008). Since English, like Chinese, does not have case particles, it would be expected that they perform in a way similar to Chinese speaking learners of Japanese as reported in Kumagami (2008).

Table 1. Properties of L1s (Cheng 1991)

	Word Order	*Wh*-Move	Case Particle	QM (Yes/No)	QM (*wh*)
JPN	SOV	×	√	-ka	-ka
KOR	SOV	×	√	-ci	-ci
CHI	SVO	×	×	-ma	-ne/ϕ
ENG	SVO	√	×	×	×

However, based on the results of this study, I argue -- contrary to the hypothesis in Kumagami (2008) -- that it is not the presence or absence of case particles that determines which processing strategy learners use, but the optionality of scope marking elements.

Background

Following Aoshima *et al.* (2004), Lieberman *et al*. (2006) conducted an experiment with a sentence completion task, showing that L1-English/L2-Japanese learners exhibit a strongly native-like locality bias when they complete sentence fragments as in (7). They preferred to produce a sentence such as (7a), where the QM and *wh*-phrase are in the same clause, although, from the same fragment, the participants

could have generated a sentence like (7b).

(7) Sensei-ga seito-ga tosyositu-de dare-ni...
teacher-Nom student-Nom library-at who-Dat...
a. Sensei-ga [seito-ga toshyositu-de dare-ni atta-KA] iimasita.
teacher-Nom student-Nom library-at who-Dat saw QM said
'The teacher said who the student saw in the library.'
b. Sensei-ga [seito-ga toshyositu-de dare-ni atta-to] iimasita-KA?
teacher-Nom student-Nom library-at who-Dat saw that said QM
(8) 'Who did the teacher say that the student saw in the library?'
a. John bought what?
b. He bought a book.

In English echo-questions such as (8a), a *wh*-phrase remains in-situ, and the answer to this question should be like (8b); the value of the *wh*-phrase must be filled. If English speaking learners of Japanese treated the in-situ *wh*-phrase *dare-ni* as an in-situ *wh*-phrase in an English echo-question, relying on surface parallels, they would prefer to interpret (7) as a *wh*-question. However, they did not prefer the *wh*-question interpretation of (7). Given this result, Lieberman *et al*. (2006) suggest that L2 learners of Japanese also use the 'SHORT DEPENDENCY' strategy, and that L2 learners may use the same mechanisms they use to process L1, referring to the universal locality principle.

Kumagami (2008) conducted an experiment with Japanese native speakers and Korean and Chinese speaking learners of Japanese, using sentences such as (9). Note that both the 'SHORT DEPENDENCY' strategy and the 'CASE PARTICLE' strategy may be applicable. (9) can be interpreted as either a Yes/No-question as in (9a) or a *wh*-question as in (9b).

(9) Taro-wa dare-ni Hanako-ga okotta KA kikimashita KA?
Taro-Top who-Dat Hanako-Nom got mad QM asked QM
a. Taro-wa [dare-ni Hanako-ga okotta-KA] kikimasita-KA?
'Did Taro ask at whom Hanako got mad?'
b. Taro-wa dare-ni [Hanako-ga okotta-KA] kikimasita-KA?
'Who did Taro ask whether Hanako got mad?'

If L2 learners utilize the 'SHORT DEPENDENCY' strategy to interpret this structurally ambiguous sentence, they must interpret it as a Yes/No question, because the *wh*-phrase is linearly closer to the first QM than the second QM. However, if learners utilized the 'CASE PARTICLE' strategy: the sentence is more likely to be interpreted as a *wh*-question.

Kumagami (2008) conducted two other experiments: (i) a sentence completion task similar to the one reported in Lieberman *et al*., and (ii) a judgment task with structurally non-ambiguous sentences to check whether the participants can distinguish Yes/No-questions and *wh*-questions in Japanese. The details are presented in the following section, as the present study used the same method. Kumagami (2008) finds that all participant groups seem to use the 'SHORT DEPENDENCY' to complete the sentence fragments like the participants of Lieberman *et al.* (2006), but the 'CASE PARTICLE' strategy may be used in structurally ambiguous cases like (4) by Japanese and Korean participants only. Half of the Chinese learners preferred *wh*-question interpretation, and the other half preferred Yes/No-question interpretation. Given the findings, Kumagami (2008) considers the differences of L1 properties, and hypothesizes that the absence of case particles in Chinese limits the use of the 'CASE PARTICLE' strategy.

Present Study

The aim of this study is to test the hypothesis in Kumagami (2008), repeated in (10), by conducting the same experiments with English speaking learners of Japanese.

(10) Hypothesis of Kumagami (2008)

> The relevant L1 property, the presence of case particles, determines the choice of the processing strategies: L2 learners use the 'CASE PARTICLE' strategy if they have case particles in their L1. Otherwise, the use of the strategy is optional.

This hypothesis explains why Chinese L2 learners of Japanese behaved differently from Japanese native speakers and Korean learners. If this is the case, English learners of Japanese should also optionally choose either of two strategies, the 'CASE PARTICLE' strategy or the 'SHORT DISTANCE' strategy, that is, they should not show the tendency to prefer one of them.

I conducted the pilot study with 6 English speaking learners of Japanese.[1, 2, 3] They were enrolled in Japanese language courses at American universities. All of them were

tested in the United States.

Experiment 1

Purpose

The aim of Experiment 1 is to investigate whether the participants utilize the 'SHORT DEPENDENCY' strategy, in cases in which structural ambiguity is irrelevant.

Materials

The materials consist of 3 types of sentence fragments as shown in (11). In this task, Kumagami (2008) used the same test items as Lieberman *et al*. (2006) in order to ascertain that her participants also show locality bias to resolve scope ambiguities in a manner similar to the participants in Lieberman *et al.* Type 1 and Type 1' items are identical except for the first NP; the first NP in Type1 is marked as nominative and that of Type 1' is marked as topic, because the sequence, *NP-Top NP-Nom WH-Dat*, is more natural than the sequence, *NP-Nom NP-Nom WH-Dat*. However, since there were no significant differences between these two types, I treat them as one type. In Type1 and Type 1', the first two NPs are subject NPs, so that the second NP must belong to the embedded clause. Therefore *WH*-dat following the second NP also belongs to the embedded clause. On the other hand, in the case of Type 2, *WH*-nom which is placed in the sentence initial position must belong to the matrix clause, as Nishigauchi (1991) suggests. Items of Type 2 are used to determine whether the participants know this property of QM.

(11) Stimuli in Experiment 1

Type 1: NP-Nom NP-Nom *WH*-Dat
Sensei-ga seito-ga tosyositu-de dare-ni...
teacher-Nom student-Nom library-at who-Dat

Type 1': NP-Top NP-Nom *WH*-Dat
Sensei-wa seito-ga tosyositu-de dare-ni...
teacher-Top student-Nom library-at who-Dat

Type 2: *WH*-Nom NP-Dat NP-Nom
Dare-ga sensei-ni seito-ga tosyositu-de...
who-Nom teacher-Dat student-Nom library-at

The possible grammatical sentences, thus, are as in (12).

(12) Possible grammatical sentences:

a. Sensei-ga/wa [seito-ga tosyositu-de dare-ni atta-KA] iimasita. (Embedded[4])
teacher-Nom/Top student-Nom library-at who-Dat saw QM said
'The teacher said who the student saw in the library.'

b. Sensei-ga/wa [seito-ga tosyositu-de dare-ni atta-to] iimasita-KA? (Matrix)
teacher-Nom/Top student-Nom library-at who-Dat saw that said QM
'Who did the teacher say that the student saw in the library?'

c. Sensei-ga/wa [seito-ga tosyositu-de dare-ni atta-KA] iimasita-KA? (Both)
teacher-Nom/Top student-Nom library-at who-Dat saw QM said QM
'Did the teacher say who the student saw in the library?'

d. Dare-ga [sensei-ni seito-ga tosyositu-de atta-to] iimasita-KA? (Matrix)
who-Nom teacher-Dat student-Nom library-at saw that said QM
'Who said that the student saw the teacher in the library?'

e. Dare-ga [sensei-ni seito-ga tosyositu-de atta-KA] iimasita-KA? (Both)
who-Nom teacher-Dat student-Nom library-at saw QM said QM
'Who said whether the student saw the teacher in the library?'

Procedure

Forty five items (15 tokens of 3 types) were distributed among 3 lists, pseudo-randomized, and presented along with 15 filler sentences. The participants were asked to complete sentence fragments like (11).

Prediction

If the participants also use the 'SHORT DEPENDENCY' strategy, they would prefer QM in the embedded clause in Type 1 sentences.

Results

As mentioned above, since there were no significant differences between Type 1 and Type1', I simply present the results of Type 1 and Type 2. The English learners put QM (i) onto the right edge of the matrix clause in Type 2 and (ii) onto the embedded clause in Type1, as shown in Figure 1. This suggests that they seem (i) to know that QM must be in the position higher than a *wh*-phrase, and (ii) to use the 'SHORT DEPENDENCY' strategy as well, to resolve a scope ambiguity like the participants of Lieberman *et al.* (2006) and Kumagami (2008).

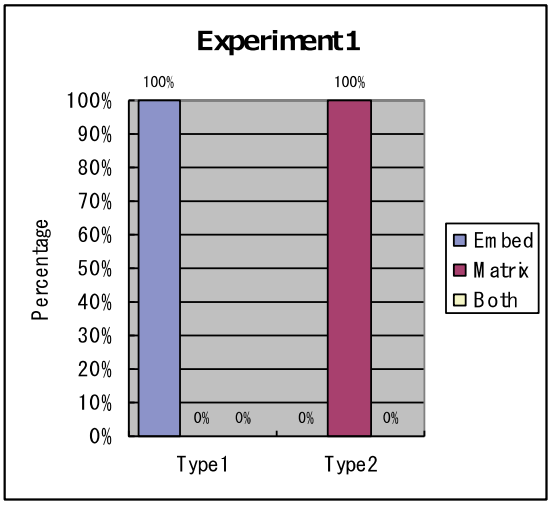

Figure 1. Percentage of positions of QM in completions of sentences

Experiment 2

Purpose

I conducted Experiment 2 to investigate whether the participants can distinguish two types of Japanese questions: Yes/No questions and *wh*-questions, and whether they can comprehend non-ambiguous sentences in a manner similar to native speakers, without any preference for either Type.

Materials

Since the verb of the embedded clause is intransitive, (13a) and (13b) are unambiguous. The *wh*-phrase *dare-ga* in (13a) is interpreted only as an item of the embedded clause and the scope of the *wh*-question is the embedded clause; that is, this sentence is a Yes/No question. On the other hand, the *wh*-phrase *dare-ni* in (13b) is in the matrix clause, and the sentence is interpreted as a *wh*-question.

(13) a. *Y/N-Q* : Type 1 (with Answer (i)) & 2 (with Answer (ii))
Taro-wa Hanako-ni [dare-ga neta-KA] kikimasita-KA?
Taro-Top Hanako-Dat who-Nom slept QM asked QM
'Did Taro ask Hanako who slept?'
i. Grammatical Answer: Hai. 'Yes.'
Yes
ii. Ungrammatical Answer: *Jiro-ga desu. 'Jiro (slept).'
Jiro-nom copula

b. *WH-Q*: Type 3 (with Answer (i)) & 4 (with Answer (ii))

Taro-wa dare-ni [Jiro-ga neta-KA] kikimasita-KA?

Taro-Top who-Dat Jiro-nom slept QM asked QM

'Who did Taro ask whether Jiro slept?'

i. Grammatical Answer: Hanako-ni desu. '(He asked) Hanako.'

Hanako-Dat copula

ii. Ungrammatical Answer: *Hai. 'Yes.'

Yes

Procedure

Twenty four items were distributed between 2 lists, pseudo-randomized, and presented with 12 filler sentences. There were three types of items; each item is a paired question and answer, as in (14). Given a context, the participants were asked to judge whether an answer is acceptable (on 5 point scale, from -2 to +2). A translated version of a sample question is as in (15).

(14) Item Types (Q&A pairs)

	Yes/No-Q	*WH-Q*
Grammatical Answer	Type1 (n=6)	Type3 (n=6)
Ungrammatical Answer	Type2 (n=6)	Type4 (n=6)

(15) Sample question [Type 1]

Context: As the lecture of Mr. Suzuki is very interesting, no one fell asleep in his class. But one day Jiro fell asleep in his class. Taro heard that someone slept in the class. Taro knew Hanako was in the class. So Taro asked Hanako who slept in the class.

Question: Taro-wa Hanako-ni dare-ga neta-KA kikimasita-KA? (= (13a))

'Did Taro ask Hanako who slept?'

Answer: Hai. 'Yes.'

Results

Similar to the participants in Kumagami (2008), English learners judged Type 1 and Type 3 to be acceptable, and Type 2 and Type 4 as unacceptable. This implies that the

learners can distinguish between the two types of Japanese questions, obeying the *wh* island constraint.

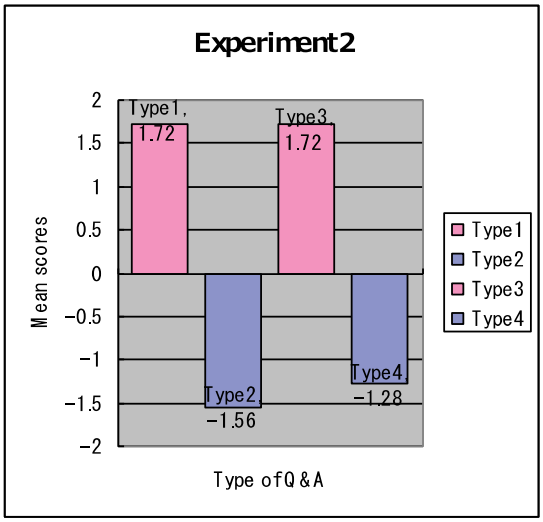

Figure 2. Mean scores of acceptability judgment (5 scales; from -2 to +2)

Experiment 3

Purpose

Using structurally ambiguous sentences, I investigated which strategy the participants preferred to use, the 'SHORT DEPENDENCY' strategy or the 'CASE PARTICLE' strategy.

Materials

As we have seen above, a sentence like (16) can be interpreted as either (16a) or (16b), depending on how the *wh*-phrase is dealt with, as an item of the embedded clause or the matrix clause.

(16) Taro-wa dare-ni Hanako-ga okotta-KA kikimasita-KA?
Taro-top who-dat Hanako-nom got angry QM asked QM

a. **Item Type 1:** *Interpreted as Y/N-question*
Taro-wa [dare-ni Hanako-ga okotta-KA] kikimasita-KA?
'Did Taro ask who Hanako got mad at?'
i. Grammatical Answer: Hai. 'Yes.'
Yes
ii. Ungrammatical Answer: *Jiro-ni desu. '(She got mad at) Jiro.'
Jiro-Dat copula

b. **Item Type 2:** *Interpreted as Wh-question*

Taro-wa dare-ni [Hanako-ga okotta-KA] kikimasita-KA?

'Who did Taro ask whether Hanako got mad?'

i. Grammatical Answer: Hanako-no hahaoya-ni desu. '(He asked) Hanako's mother.'

Hanako's mother-Dat copula

ii. Ungrammatical Answer: *Hai. 'Yes.'

Yes

Procedure

Each sentence was presented with an answer to the question such as (18a-i, ii) and (18b-i, ii). The types of question and answer pairs are shown in (17). Eighteen items (Q & A pairs) were distributed among 3 lists, pseudo-randomized, and presented with 6 filler items. There were 3 types of items; each item is a question and answer pair as in (17). Given a context, the participants were asked to judge whether an answer is acceptable (in 5 scales, from -2 to +2). A translated version of a sample question is as in (18).

(17) Item Types (Q&A pairs)

	Interpreted as Yes/No-Q	*Interpreted as WH-Q*
Grammatical Answer	Type1 (= Type4) (n=6)	Type3 (n=6)
Ungrammatical Answer	Type2 (n=6)	Type4 (n=6)

(18) Sample question [Type 3]

Context: As Hanako is very irritable, she often gets angry at her younger brother Jiro. One day, Jiro spilled juice on Hanako's favorite skirt. Hanako got very angry at him. Then, their mother came, and appeased her anger. Later, Taro, Hanako's classmate, visited her house, and saw her in a bad mood. So, he asked Hanako's mother whether she got angry today, and if so, who she got angry at.

Question: Taro-wa dare-ni Hanako-ga okotta-KA kikimasita-KA? (= (17))

'Who did Taro ask whether Hanako got mad?'

Answer: Hanako-no hahaoya-ni desu.

'(He asked) Hanako's mother.'

Results

As shown in Figure 3, the English speaking learners of Japanese preferred the *wh*-question interpretation of the materials, as they readily accepted Type 3.

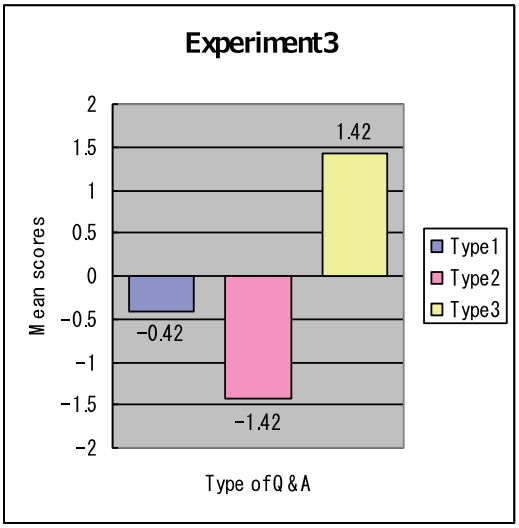

Figure 3. Mean scores of acceptability judgment (5 scales; from -2 to +2)

Discussion

Contrary to the prediction from Kumagami's (2008) hypothesis, English speaking learners of Japanese did not behave like Chinese speaking learners of Japanese; that is, the hypothesis must be revised to explain the exceptional results of Chinese learners. Considering the properties of Chinese, although Chinese is a *wh* in-situ language like Japanese, there are differences between these two languages. For instance, Huang (1982) notes that Chinese does not show *wh*-island effects[5], while Japanese *wh* in-situ is subject to *wh*-island[6, 7].

(19) ni xian-zhidao shei mai-le shenme?
you wonder who bought what
'For which x, x is a thing, you wonder who bought x'

However, the crucial difference between Chinese and Japanese is the properties of QM. In a typological study of *wh*-scope marking, Cheng (1991) points out that Chinese has two QMs; *-ma* for a Yes/No-question and *-ne* for a *wh*-question, while Japanese has only one QM for both types of questions. Moreover, Cheng (1991) notes that QM for a *wh*-question is optional. The summary of the relevant properties of

languages, not only Japanese and Chinese but also Korean and English, are shown in Table 2.

Table 2. Properties of L1s (Cheng 1991)

	Word Order	*Wh*-Move	Case Particle	QM (Yes/No)	QM (*wh*)
JPN	SOV	×	√	-ka	-ka
KOR	SOV	×	√	-ci	-ci
CHI	SVO	×	×	-ma	-ne/ϕ
ENG	SVO	√	×	×	×

Cheng (1991) proposes the Clause Typing Hypothesis shown below;

(20) Clausal Typing Hypothesis:

Every clause needs to be typed. In the case of typing a *wh*-question, either a *wh*-particle in C^0 is used or else fronting of a *wh*-word to the Spec of C^0 is used, thereby typing a clause through C^0 by Spec-head agreement.

(Cheng 1991, p. 29 (9))

Regardless of whether a language has overt *wh*-movement, this hypothesis states that a clause must be marked. English employs *wh*-movement as its clause typing element. Japanese and Korean, on the other hand, have the obligatory QMs to type a clause. However, Chinese employs a clause typing strategy that is partially optional: the QM for a *wh*-question can be omitted. Focusing on this property of Chinese, I, thus, give the possible account that Chinese learners of Japanese interpret the sentences as Yes/No-question, because QM is obligatory in Yes/No-questions but optional in *wh*-questions in Chinese.

Concluding Remarks

As we have seen in the previous sections, the choice of processing strategy is restricted by the property of L1 grammar: the uniqueness of QM in Chinese. Therefore, it may be true that in language acquisition, learners can use general strategies, such as the 'SHORT DEPENDENCY' strategy, regardless of L1, but the use of linguistic/language specific strategies, such as the 'CASE PARTICLE' strategy may be restricted by the L1 grammar.

Although this study sheds some light on the mechanism of L2 sentence processing and the effects of L1 transfer on it, some questions still remain. Firstly, I have not tested whether L2 learners of Japanese show the same tendency or preference in an on-line task. The processing strategies must affect the L2 learners' performance in this study. But, since the tasks of this study are not on-line tasks, it is difficult to recognize what a parser does in word by word processing, and which word triggers the use of the strategy. Secondly, I need to find stronger evidence for the proposed account for the Chinese learners.

The only difference that I have found in this study is the optionality of Chinese QM. So it is plausible to say that this difference is correlated with the difference in performance of the Chinese learners. In order to substantiate this claim, I need Chinese learners who always omit *Wh* QM in L1 Chinese, and to test whether they interpret sentences such as (21) (22) as Yes/No-question in L2 Japanese. Finally, I should investigate whether other factors, e.g., prosody, affect scope interpretation. It is proposed that the length of phrases affects the establishment of clause boundaries (Hirose, 1999). For instance, when a subject NP is long, such as a coordinated NP, a parser tends to establish a prosodic phrase boundary after it. If the subject NPs in (21) (22) were longer, the prosodic phrasing described above predicts that the *wh*-phrase will not be in the same phrase as the subject NP. The *wh*-phrase may be interpreted in the embedded clause, and (21) (22) would have Yes/No-question reading. By using a long subject NP, I can test the effect of prosody on scope interpretation.

(21) a. Taro-wa [$_{IP}$ Hanako-ga dare-ni denwasita]-KA kikimasita-KA?
Taro-Top Hanako-Nom who-Dat called QM asked QM
'Did Taro ask who Hanako called?'

b. Taro-wa dare-ni$_i$ [Hanako-ga t_i denwasita]-KA kikimasita-KA?
Taro-Top who-Dat Hanako-Nom called QM asked QM
'Did Taro ask who Hanako called?'

c. Dare-ni$_i$ [Taro-wa [$_{IP}$ Hanako-ga t_i denwasita]-KA kikimasita]-KA?
who-Dat Taro-Top Hanako-Nom called QM asked QM
'Did Taro ask who Hanako called?'

(22) a. Taro-wa dare-ni [Hanako-ga denwasita-KA] kikimasita-KA?
Taro-Top who-Dat Hanako-Nom called QM asked QM
'To whom did Taro ask whether Hanako called (someone)?'

b. Dare-ni$_i$ Taro-wa t_i [Hanako-ga denwasita-KA] kikimasita-KA?
who-Dat Taro-Top Hanako-Nom called QM asked QM
'To whom did Taro ask whether Hanako called (someone)?'

Furthermore, I also need to check if any other factors, e.g., types of *wh*-phrases, influence L2 processing, and if so, I need to figure out how those factors relate to each other. I will give answers to these questions in future studies.

Notes

1. More than 6 learners participated in this study, but those who completed all the experiments were the 6 learners described above.
2. They have studied Japanese for 3-7 years. Three of them have been to Japan; one visited Japan once for about 2 months, the other two visited 3 times for 1-2 months each, and 5-6 weeks in total, respectively. But no one has a history of residence in Japan.
3. Scores of Japanese language tests such as Japanese Language Proficiency Test were not available. However, the question of this study is how tendencies/preferences that L2 leaners show in 3 experiments relate to each other, rather than how the proficiency of learners correlates to their performance. I, thus, did not deal with proficiency as the crucial factor to analyze the data in this pilot study.
4. Embedded, Matrix, and Both mean the position where QM is placed.
5. Huang noted that *wh*-adjuncts are subject to the *wh*-island constraint, while *wh*-arguments are immune to the *wh*-island constraint. (see also Tsai 1994)
6. Many studies pointed out that Subjacency effects are observed even in a *wh* in-situ language such as Japanese (Lasnik & Saito 1984, Nishigauchi 1986, Watanabe 1992 among others).
7. Additionally, Chinese has different properties in quantifier construction as in (1). Compared with Japanese examples (2) and (3), repeated below, both (1a) and (2a) are unambiguous, but (2b), which is derived from (2a) as the Scrambling operation has been applied, can have ambiguous interpretation. According to Hoji (1985), (3a) is unacceptable, while the Chinese counterpart (1c) is acceptable.

(1) a. Meige nanren dou xihuan yige nuren. [unambiguous; every>a]
every man all like one woman
'Every man loves a woman.'

b. Shei gei Zhangsan maile meige dongxi? [unambiguous; who>every]
who for Zhangsan bought every thing
'Who bought everything for Zhangsan?'

c. Meigeren dou gei Zhangsan maile shenme? [unambiguous; Hoji, 1985]
everyone all for Zhangsan bought what
'What did everyone buy for Zhangsan?'

(2) a. Dareka-ga daremo-o semeta. [ambiguous]
someone-Nom everyone-Acc criticized
'Someone criticized everyone.'

b. Daremo-o$_i$ dareka-ga t_i semeta. [unambiguous; Hoji, 1985]
everyone-Acc someone-Nom criticized
'Someone criticized everyone.'

(3) a. ??Daremo-ga nani-o kaimasita ka? [ambiguous; Hoji, 1985]
everyone-Nom what-Acc bought QM
'What did everyone buy?'

b. Nani-o$_i$ daremo-ga t_i kaimasita ka? [unacceptable; Hoji, 1985]
what-Acc everyone-Nom bought QM
'What did everyone buy?'

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