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Acquisition of Scope-marking Strategies in Complex Japanese *Wh*-questions by English-speaking Second Language Learners of Japanese*

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1 Introduction

The current study examined the second language (L2) acquisition of *wh*-questions in Japanese by native (L1) English speakers, specifically focusing on crosslinguistic differences in how the scope of *wh*-phrases is determined in Japanese and English. Building upon two previous studies (Lieberman, Aoshima, and Phillips 2006; Umeda 2008), we examined the comprehension of bi-clausal *wh*-questions in L2 Japanese in order to examine whether L2 learners transfer from the L1 in their interpretation of *wh*-questions, and whether they can ultimately acquire the property in the L2. According to the Full Transfer/Full Access Hypothesis (e.g. Schwartz and Sprouse 1996; White 1985, 1989), the initial state of the L2 grammar is set based on the learner's L1 (Full

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Transfer), but properties that are unique to the L2 can ultimately be acquired as long as the learners are exposed to relevant input (Full Access). Previous studies (e.g. Lieberman et al. 2006; Umeda 2008), have examined these issues but have shown mixed results; these studies have also used different methodologies and tested different kinds of *wh*-questions, which makes them difficult to compare. Thus, our goal was to revisit the questions of transfer and ultimate attainment in the interpretation of *wh*-phrases in L2 Japanese with a revised methodology.

1.1 *Wh*-questions in Japanese

Japanese is a *wh*-in-situ language (e.g. Nishigauchi 1990), and *wh*-phrases tend to stay in their thematic position without moving to the front of clause[1]. Thus, instead of relying on the syntactic position of the *wh*-phrase, the scope of a *wh*-question is determined by the type of morphosyntactic marker given on the embedded verb.

(1) a. *otokonoko-wa* ***dare****-ni* *tegami-o* *kaita-to* *otoosan-ni* *iimashita-ka*?
boy-TOP **who**-DAT letter-ACC wrote-COMP father-DAT told-QM
'Who did the boy tell the father that he wrote a letter to?'
b. *otokonoko-wa* ***dare****-ni* *tegami-o* *kaita-ka* *otoosan-ni* *iimashita-ka*?
boy-TOP **who**-DAT letter-ACC wrote-QM father-DAT told-QM
'Did the boy tell the father who he wrote a letter to?'

For example, in (1a), when the embedded verb *kaita* 'wrote' is marked by the complementizer *-to*, the *wh*-phrase *dare* 'who' is associated with the matrix clause, asking 'who the boy told the father that he wrote a letter to.' On the other hand, when the embedded verb is marked by a question-marking particle (QM) as in (1b)[2], it indicates that the *wh*-phrase is now associated with the embedded clause, asking 'whether the boy told the father who he wrote a letter to.'

1.2 *Wh*-questions in English

In contrast, English is a *wh*-movement language, and the surface location of the *wh*-phrase indicates the scope of bi-clausal *wh*-questions.

(2) a. **Who**$_1$ did the boy tell the father that he wrote a letter to t_1?
b. Did the boy tell the father **who**$_1$ he wrote a letter to t_1?'

When the *wh*-phrase 'who' moves up to the top of the matrix clause from its thematic position as in (2a), it indicates that the sentence is a matrix *wh*-question. When the *wh*-phrase is at the top of the embedded clause as in (2b), the *wh*-phrase is associated with the embedded clause. Crucially, although English usually requires *wh*-phrases to move up from their thematic positions, *wh*-in-situ constructions are actually allowed in limited contexts. One example of this comes from *echo questions*, which are formed by substituting a constituent in a non-question statement with a *wh*-phrase. For example, in (3), speaker B is clarifying what A said, regarding the thing that John

[1] It is also possible for *wh*-phrases in Japanese to undergo fronting, known as *wh*-scrambling; however, scrambling does not affect the scope of *wh*-questions in the same way as in English.

[2] When one sentence has multiple QMs as in (1b), the one closest to the *wh*-phrase (i.e. the *-ka* on the embedded verb *kaita*) is associated with the *wh*-phrase (e.g. Nishigauchi 1990; Shimoyama 2001).

bought by substituting *a new car* with the *wh*-phrase *what*, while maintaining the structure of the sentence given by A. The meaning of the sentence given by B is the same as a regular bi-clausal matrix question asking: '**What** did you just remember that John bought yesterday?'

(3) A: 'I just remembered that John bought a new car yesterday.'
B: 'You just remembered that John bought **what** yesterday?'

In echo questions *wh*-phrases are always associated with the matrix clause rather than the embedded clause (see discussion in Lieberman et al. 2006). Thus, *wh*-in-situ structures in English are matrix questions rather than embedded questions in most cases[3], while they can be either matrix or embedded questions in Japanese. Based on these crosslinguistic differences, Lieberman et al. (2006) hypothesized that *wh*-in-situ constructions may be specifically associated with matrix *wh*-questions for L1 English speakers; thus, when they learn Japanese as an L2, this L1 property may be transferred. If that is the case, English-speaking learners of Japanese may always interpret Japanese bi-clausal *wh*-questions like (1a) and (1b) as matrix *wh*-questions, which would lead to an incorrect interpretation when the embedded verb is marked by QM *-ka* in (1b). If this hypothesis is on the right track, English-speaking learners of Japanese must overcome the properties of their L1 grammar with respect to *wh*-in-situ constructions and acquire the scope-marking strategy in L2 Japanese that relies on morphosyntactic markers on the embedded verb. In the following section, we review two previous studies (Lieberman et al. 2006; Umeda 2008) that have examined this issue.

2 Background Literature

Lieberman et al. (2006) examined how advanced English-speaking Japanese learners resolve *wh*-scope ambiguities in L2 Japanese, examining whether Japanese learners show a native-like 'locality bias' in the processing of *wh*-questions. Building on research on *wh*-movement languages which argued that the parser initiates a search for a gap when encountering a *wh*-phrase (Crain and Fodor 1985; Stowe 1986), Miyamoto and Takahashi (2002) argued that in Japanese, the parser initiates a search for QM *-ka* after encountering a *wh*-phrase. Using a sentence completion task, Aoshima, Phillips, and Weinberg (2004) asked L1 Japanese speakers to complete ambiguous, fragment sentences similar to the one given in (4), which can potentially be completed as either a matrix *wh*-question as in (4a) or an embedded *wh*-question as in (4b), depending on the morpheme affixed to the embedded verb. Aoshima et al. found that L1 Japanese speakers preferred providing the QM *-ka* on the embedded verb, showing a locality bias in processing *wh*-questions as the *wh*-phrase is associated with the embedded clause.

(4) *sensei-wa* *seito-ga* *toshoshitsu-de* ***dare-ni…***
teacher-TOP student-NOM library-LOC **who**-DAT…

[3] When a sentence has multiple *wh*-phrases (e.g. *John knew who bought what.*), an in-situ *wh*-phrase can be associated with the embedded clause. However, when a sentence has only one in-situ *wh*-phrase (i.e. echo questions) it is always associated with matrix clauses (Lieberman et al. 2006).

a. *sensei-wa* *seito-ga* *toshoshitsu-de* ***dare**-ni* *atta-<u>to</u>* *iimashita-ka*?
teacher-TOP student-NOM library-LOC **who**-DAT met-COMP said-QM
'Who did the teacher say that a student met at the library?' (Matrix *wh*-question)
b. *sensei-wa* *seito-ga* *toshoshitsu-de* ***dare**-ni* *atta-<u>ka</u>* *iimashita-ka?*
teacher-TOP student-NOM library-LOC **who**-DAT met-QM said-QM
'Did the teacher say who a student met at the library?' (Embedded *wh*-question)

Lieberman et al. (2006) predicted that if L1 English L2 Japanese speakers were native-like in resolving the structural ambiguity of Japanese bi-clausal *wh*-questions, they would demonstrate the same pattern and produce sentences similar to (4b) more often than sentences such as (4a). Alternatively, if L1 English showed evidence of transfer, they were expected to complete sentences such as (4) as matrix *wh*-questions (as in (4a)) more often than as embedded *wh*-questions (as in (4b)). This is because, as discussed above, in English, *wh*-in-situ phrases are almost always associated with the matrix clause. The results showed that, similar to L1 Japanese speakers, L2 learners also showed a strong preference for producing embedded *wh*-questions by attaching *-ka* to the embedded verb. Thus, L1 transfer was not observed, and Lieberman et al. concluded that the learners were native-like in determining the scope of *wh*-phrases in bi-clausal Japanese *wh*-questions[4].

However, there are several open questions. One question is whether the participants in Lieberman et al. (2006) may have been too advanced to show evidence of L1 transfer. According to the authors, many of their participants self-reported that they had passed N1 (highest) or N2 (the second highest) in the Japanese Language Proficiency Test (JLPT). Thus, there is a possibility that the L2 learners had already moved from a point in development where they may have shown transfer from English. Another question is whether the L2 learners were aware of the interpretative difference between the complementizer *-to* and QM *-ka.* The focus of Lieberman and colleagues was examining how leaners would resolve the structural ambiguity in bi-clausal Japanese *wh*-questions in production, and they did not include a comprehension task. Therefore, it is not clear whether L1 English L2 Japanese learners are aware of the interpretive difference between the two morphosyntactic markers in determining the scope of *wh*-phrases.

A later study by Umeda (2008) also examined bi-clausal *wh*-questions in L2 Japanese and did examine comprehension. Umeda utilized a Question-Answer pair (Q/A) acceptability judgment task to test whether L2 Japanese learners were aware of the role of *-to* and *-ka* in the interpretation of bi-clausal *wh*-constructions; examples are given in (5) and (6). In this task, there is a story context, followed by a *wh*-question (either a matrix question as in (5) or an embedded *wh*-question as in (6)) and an answer to the question (either a 'content' response as in (5a/6b) or a Yes/No response as in (5b/6a)). Participants were asked to judge whether the given answer was appropriate as a response to the question, using a five-point Likert scale. When a matrix *wh*-question like (5) was provided, the content response as in (5a) was expected to be rated as appropriate and the

[4] Lieberman et al. (2006) also included a control condition in which the *wh*-phrase is marked by the Nominative case marker *-ga* (e.g. *dare-ga* 'who-NOM' *sensei-ni* 'teacher-DAT' *seito-ga* 'student-NOM' *toshoshitsu-de* 'library-LOC'...), and the sentence should unambiguously be completed as a matrix *wh*-question. L2 Japanese speakers indeed produced matrix *wh*-questions correctly in this control condition, which suggests it is not the case that the learners were simply providing the QM *-ka* at the embedded verb in all contexts.

Yes/No response as in (5b) was expected be rated as inappropriate by native speakers. On the other hand, when an embedded *wh*-question like (6) was given, the Yes/No response as in (6a) was expected to be rated as appropriate and the content response as in (6b) was expected be rated as inappropriate.

(5) *Masami-wa* ***dare****-o* *shootaishita-to* *iimashita-ka?* (Matrix *wh*-question)
Masami-TOP **who**-ACC invited-COMP said-QM
'Who did Masami say that she invited?'
a. *Kenji-o* *shootaishita-to* *iimashita-yo.* (Appropriate answer to (5))
Kenji-ACC invited-COMP said-SFP[5]
'(She) said that she invited Kenji.'
b. ?*hai,* *iimashita-yo.* (Inappropriate answer to (5))
yes, said-SFP
'Yes, (she) said.'

(6) *Miki-wa* ***nani****-o* *nonda-ka* *iimashita-ka?* (Embedded *wh*-question)
Miki-TOP **what**-ACC drank-QM said-QM
'Did Miki say what she drank?'
a. *hai,* *iimashita-yo.* (Appropriate answer to (6))
yes, said-SFP
'Yes, (she) said.'
b. ?*biiru-o* *nonda-ka* *iimashita-yo.* (Inappropriate answer to (6))
beer-ACC drank-QM said-SFP
'(She) said whether or not she drank beer.'

Umeda (2008) also tested whether or not L2 learners showed evidence of transfer from the L1 English. Umeda predicted that if there is transfer, L1 English L2 Japanese learners would always treat Japanese *wh*-questions like (5) and (6) as matrix questions, regardless of the morphemes on the embedded verb. Specifically, the learners were expected to accept content responses, instead of Yes/No responses, as an appropriate response to both types of *wh*-questions in (5) and (6), which would lead to non-native responses when they are given embedded *wh*-questions like (6). The results did not show evidence of L1 transfer. In the matrix *wh*-question condition, both intermediate and advanced learners correctly rated content responses higher than Yes/No responses, although the contrast was less categorical than it was for the L1 Japanese group. In the embedded *wh*-question condition, advanced learners were similar to the native speakers in rating Yes/No responses higher than content responses, but learners at an intermediate level of proficiency struggled with this condition. The intermediate learners rated the two types of answers similarly, which is not target-like, but is also not consistent with the transfer predictions.

However, there was a possible design issue in the experiment, particularly in the embedded *wh*-question condition as in (6), which was critical to the test of the predictions for L1 transfer. The prediction was that the L2 learners would incorrectly reject Yes/No responses and incorrectly accept content responses in the embedded *wh*-question condition in (6), because of potential L1 transfer from English (i.e. treating both the questions in (5) and (6) as matrix *wh*-questions). In the

[5] SFP = sentence final particle

experiment, (6b) was supposed to be a content response which would mismatch with the question in (6) and be rated as inappropriate. However, the kind of response given in (6b) (*biiru-o nonda-ka iimashita-yo* '(She) said whether or not she drank beer') is actually not a content reponse, as it would *not* be appropriate as an answer to a matrix *wh*-question like *Miki-wa nani-o nonda-to iimashita-ka?* 'What did Miki say that she drank?,' either. For (6b) to be a content response similar to (5a), the embedded verb *nonda* 'drunk' should have the complementizer *-to* as in *biiru-o nonda-to iimashita-yo* '(She) said that she had beer.' Therefore, the design did not allow for a fair test of whether embedded *wh*-questions would be incorrectly treated as matrix *wh*-questions by L1 English L2 Japanese learners. In addition, ideally the matrix *wh*- and embedded *wh*-questions should be tested using the same lexical items so that there is a controlled comparison between the different conditions.

Therefore, in the current study, we re-examined the comprehension of Japanese bi-clausal *wh*-questions by English speakers by modifying the Q/A acceptability judgment task used in Umeda (2008). In the revised task, we controlled the comparison of the matrix and embedded *wh*-questions by using the same lexical items so that the only difference in the two kinds of questions was the *-to* or *-ka* marking on the embedded verb. We also addressed the issue raised above with respect to (6b) by using the same content and Yes/No responses in both the matrix *wh*- and embedded *wh*-conditions. Finally, we used *wh*-constructions more similar to those tested in Lieberman et al. (2006), so that we can make a better comparison between the performance of L2 learners in a production task and comprehension task.

The goal of the study was to examine whether L2 Japanese learners transfer their L1 English knowledge of *wh*-in-situ constructions and incorrectly interpret Japanese embedded *wh*-questions as matrix questions, or whether they are aware of the interpretive difference between *-to* and *-ka* at the embedded verb of bi-clausal *wh*-questions, similar to L1 Japanese speakers.

3 Current Study

3.1 Participants and Method

The participants were twenty-six L1 Japanese speakers who served as a control group and twenty-four L1 English L2 Japanese speakers (age range: 18;6 to 34;9, M = 24;2). The L2 speakers were recruited from universities in the United States and through personal contacts, and they all had taken Japanese language course(s) at the university level. The average length of studying Japanese is 5.8 years (range: 2 to 13 years). Fourteen of them reported that they had spent longer than a month in a Japanese-speaking country/region (average: 9 months; range: 2.5 to 28 months). L1 speakers were recruited through personal contacts and social media.

As a proficiency measurement, a cloze test was adopted from Kume (2021), which is based on the proficiency measurement in Marsden (2005). Participants read three kinds of passages with forty-two blanks in them, and they were asked to fill in the blanks by choosing one answer from four multiple choices. The L2 learners' average score was 25.08 out of a possible 42, ranging from 15 to 38. Thus, the participants ranged in proficiency from intermediate to advanced.

3.2 Materials

3.2.1 Question-Answer Pair (Q/A) Acceptability Judgment Task

In the Question-Answer pair (Q/A) acceptability judgment task, participants saw a story context, followed by a *wh*-question and a response to the question, which were all given in Japanese (see example below). Participants were told that an L1 Japanese speaker was asking a question, and an L2 Japanese learner was providing a response. They were also told that the L2 Japanese learner sometimes responds in an inappropriate way. The task of the participants was to evaluate whether the response given by the learner was appropriate using a five-point Likert scale (1: Definitely not appropriate, 5: Definitely appropriate). Following Umeda (2008), there were two types of *wh*-questions (Matrix and Embedded *wh*-question), and there were two types of answers (Content and Yes/No response). However, in this revised 2x2 (*Wh*-question type x Response type) design, we controlled the story context across all four conditions, and the matrix *wh*-question and embedded *wh*-question differed only in the *-to* or *-ka* marking on the embedded verb.

Story context (identical across conditions): *otokonoko-to-otoosan-ga hanashiteimasu. otokonoko-wa otoosan-ni, mikkamae, tegami-o aru-hito-ni kaitakoto-o hanashimashita. sore-o-kiite, otoosan-wa totemo odoroitayoo-deshita. sonohito-ga totemo yuumee-na hito-datta-kara-desu.*
'A boy and his father are talking. The boy told the father that three days ago he wrote a letter to a certain person. Upon hearing that, the father looked very surprised. This is because the person was a very famous person.'

Matrix *wh*-question condition:

(7) *otokonoko-wa* ***dare****-ni* *tegami-o* *kaita-<u>to</u>* *otoosan-ni* *iimashita-ka?*
boy-TOP **who**-DAT letter-ACC wrote-COMP father-DAT told-QM
'Who did the boy tell the father that he wrote a letter to?'
a. *sooridaijin-ni-desu*. (Content response, match with (7))
prime minister-DAT-COP
'To the prime minister.'
b. ?*hai, iimashita*. (Yes/No response, mismatch with (7))
yes told
'Yes, (he) told.'

Embedded *wh*-question condition:

(8) *otokonoko-wa* ***dare****-ni* *tegami-o* *kaita-<u>ka</u>* *otoosan-ni* *iimashita-ka?*
boy-TOP **who**-DAT letter-ACC wrote-QM father-DAT told-QM
'Did the boy tell the father who he wrote a letter to?'
a. *hai, iimashita*. (Yes/No response, match with (8))
yes told
'Yes, (he) told.'
b. ?*sooridaijin-ni-desu*. (Content response, mismatch with (8))
prime minister-DAT-COP
'To the prime minister.'

The content of each story involved two people talking. One of them (e.g. a boy in the example above) told the other person (e.g. his father) that they (e.g. the boy) did something (e.g. writing a letter) for/to 'a certain person.' The information about who the 'certain person' is was not given in the story, so that matrix *wh*-questions could be asked felicitously and that participants would not be biased to accepting content answers. At the end of each story, there was always a sentence indicating how the person who received the information (e.g. the father) reacted to what the other person (e.g. the boy) said, to imply that the information about who the 'certain person' was had been conveyed to the hearer (e.g. the father), while it was unknown for the participants in the task.

We updated the design of the Q/A acceptability judgment task compared with the original one in Umeda (2008) in several ways. Most importantly, in the Embedded *wh*-question condition, we used the actual content answer (e.g. 'To the prime minister') as the inappropriate/mismatching answer to the question, and this response was identical in both the Matrix and Embedded *wh*-question conditions. For other modifications, we simplified the story contexts by avoiding using multiple proper names. Additionally, to make the sentence structure more similar to what Lieberman et al. (2006) used in their production task, we consistently used a *wh*-phrase *dare* 'who' with the Dative case marking particle *-ni* in all the target items, while Umeda (2008) used several types of *wh*-phrases that were marked by different kinds of particles.

For predictions, in the Matrix *wh*-question condition as in (7), Content responses such as (7a) were expected to be rated higher than Yes/No responses such as (7b) by L1 Japanese speakers. L2 speakers were also expected to show the same pattern because *wh*-in-situ constructions should be associated with matrix *wh*-questions and thus, the predictions for L1 transfer and targetlike performance are similar in this condition. In the Embedded *wh*-question conditions as in (8), L1 speakers were expected to rate Yes/No responses such as (8a) higher than Content responses such as (8b)[6]. As for L2 speakers, if there is L1 transfer and learners incorrectly treat embedded *wh*-questions as matrix *wh*-question, they are expected to show the opposite rating pattern by rating Content responses higher than Yes/No responses (Lieberman et al. 2006; Umeda 2008).

There were twenty-four unique item sets made up of a story context and four conditions. Items were distributed across four Latin-square lists. Thus, each participant responded to six items for each of the four target conditions and they saw no more than one item from each set. We also included twelve filler items, which also consisted of a story context and a question and a response, similar to the target items. Two types of filler items were created as in (9) and (10) below.

Filler type1

Story context: *okaasan-to-kodomo-ga hanashiteimasu. okaasan-wa kodomo-ni, 'kinoo, tomodachi-to donna-manga-o yonda-no?' to-kikimashita. demo, kodomo-wa manga-no-namae-o iimasendeshita. okaasan-ga sono-manga-ga sukijyanai-toiu-koto-o, kodomo-wa shitteita-kara-desu.*

'A mother and her child are talking. The mother asked the child "Yesterday, what kind of comic/*manga* did you read with your friends?" However, the child did not say the name of the book. This is because the child knew that their mother didn't like the comic/*manga*.'

[6] 'To the prime minister' is supposed to be rated as mismatch as a response to the embedded *wh*-question interpreted literally. However, the response may be pragmatically acceptable, since giving such a content response presupposes that the response to the embedded question is yes.

(9) a. *kodomo-wa* ***donna****-manga-o* *yonda-ka* *okaasan-ni* *iimashita-ka?*
child-TOP **what kind of**-comic-ACC read-QM mother-DAT told-QM
'Did the child tell the mother what kind of comic they had read?'
b. *iie, iim-asen-deshi-ta.*
no tell-NEG-COP-PST
'No, they didn't tell.'

In Filler type 1, the stories involved a person (e.g. the child in the example above) who did *not* provide the information that another person (e.g. the child's mother) asked for. The following question was always a Yes/No-question like (9a), and the response given to it was 'No, they didn't tell' as in (9b). The responses in Filler type 1 were always negative, because the Yes/No questions in the target items should always be responded to with 'Yes.' These filler items also served to make the Yes/No conditions in the target items more felicitous as it was not always the case that the individual in the story did provide the information that was asked about.

Filler type 2
Story context: *musume-to-otoosan-ga hanashiteimasu. musume-wa otoosan-ni, kinoo, hon-o-katta-koto-o hanashimashita. sore-o kite, otoosan-wa totemo ureshiso-deshita. musume-ga itsumo-keitaidenwa-o-miteiru-koto-o, otoosan-wa shinpaishiteita-kara-desu.*
'A daughter and her father are talking. The daughter told the father that yesterday she bought a book. Upon hearing that, the father looked very happy. This is because he had been worried about the daughter always looking at her mobile phone.'

(10) a. *musume-wa* ***nani****-o* *katta-to* *otoosan-ni* *iimashita-ka*?
daughter-TOP **what**-ACC bought-COMP father-DAT told-QM
'What did the daughter tell her father that she bought?'
b. *hana-o* *katta-to* *iimashita*.
flower-ACC bought-COMP told
'(She) told that she bought flowers.'

The other half of the filler items had a matrix *wh*-question like (10a) and a content answer that did not match what was told in the story context. In the example (10), the answer incorrectly says '(She) told that she bought flowers' while it is a book that she bought in the preceding story. Filler type 2 was designed to make sure that participants paid attention to the stimuli and could handle the complexity of the story contexts in Japanese.

3.2.2 Translation Task

A translation task was included only for L2 learners. This very brief task was included to see if learners could distinguish between *wh*-questions with the complementizer *-to* and QM *-ka* at the embedded verb. Participants were asked to translate two Japanese bi-clausal *wh*-questions into English, which differed only in the morphosyntactic markers at the embedded verb as in (11).

(11) a. *onnanoko-wa,* ***dare****-ni* *purezento-o* *ageta-to* *okaasan-ni* *iimashita-ka*?
girl-TOP **who**-DAT present-ACC gave-COMP mother-DAT told-QM
'Who did the girl tell her mother that she gave a present to?'
b. *onnanoko-wa,* ***dare****-ni* *purezento-o* *ageta-ka* *okaasan-ni* *iimashita-ka*?
girl-TOP **who**-DAT present-ACC gave-QM mother-DAT told-QM
'Did the girl tell her mother who she gave a present to?'

Once the translation of one sentence was completed, the other was given in the next page of the survey. The order of (11a) and (11b) was counterbalanced across participants. This task was given after the main experimental task so as to not draw participants' attention to the point of the experiment.

3.3 Procedures

The experiment was conducted remotely using Qualtrics (Qualtrics, Provo, UT). Participants signed a consent form and filled out a background questionnaire before moving to the main tasks. The instructions for the Q/A acceptability judgment task included two example items and four practice items. After the practice, participants completed the Q/A acceptability judgment task, the translation task (only for the L2 group), and the cloze test in this order. The entire experiment took about 60 to 90 minutes in total, and participants were given $10 (L2 learners) or 1000 yen (L1 Japanese speakers) for their participation.

4 Results

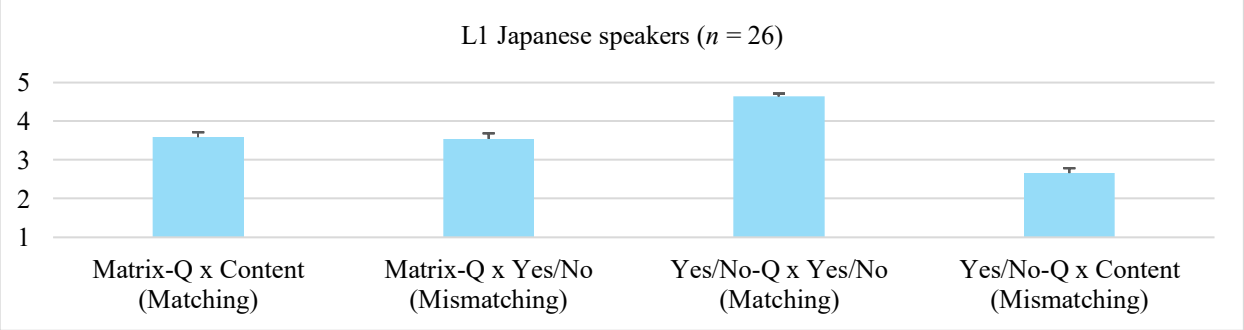

Figure 1: Mean rating scores of each condition in the L1 control. 'Match/Mismatch' indicates whether the *Wh*-question type and Response type match or not. The error bars indicate standard error.

Figure 1 presents the mean rating scores by condition for Japanese native speakers in the Q/A acceptability judgment task. In the Embedded Yes/No *wh*-question condition, they demonstrated the expected pattern by rating Yes/No responses (i.e. matching) higher than Content responses (i.e. mismatching) as predicted. In the Matrix *wh*-question condition, however, it turned out that they did not differentiate the two response types, which was unexpected.

Looking into patterns in the individual data for the L1 Japanese speakers, it was observed that five L1 Japanese speakers incorrectly treated matrix *wh*-questions as embedded *wh*-questions consistently. This may indicate that these native speakers did not pay careful attention to the complementizer *-to* at the embedded verb and thus, interpreted all questions as embedded *wh*-

questions. Also, there was one L1 speaker who rejected sentences across all conditions. Therefore, these six native speakers were excluded from statistical analyses. The summary of the results for the twenty L1 speakers who remained after the exclusion is provided in Figure 2. The twenty L1

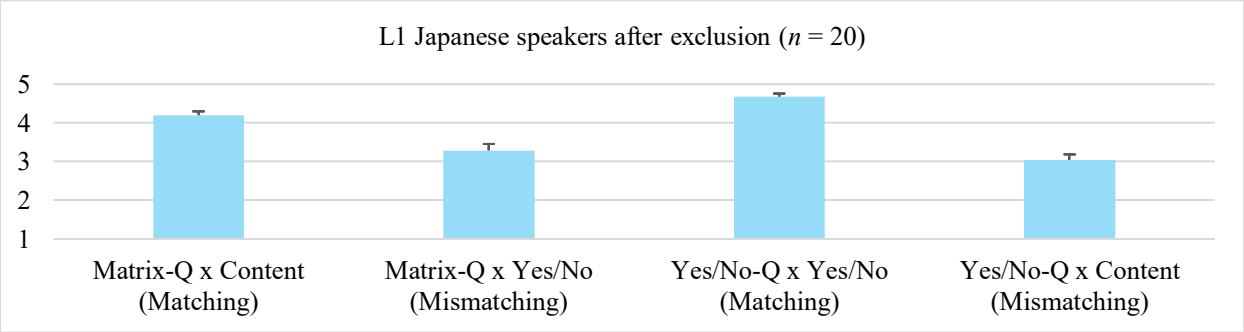

Figure 2: Mean rating scores of each condition in the subset of L1 Japanese speakers after exclusion. The error bars indicate standard error.

speakers showed the expected patterns in both the Matrix and Embedded *wh*-question conditions by rating Content responses higher than Yes/No responses in the Matrix *wh*-question condition and showing the opposite pattern in the Embedded *wh*-question condition.

A linear mixed-effects model was fit by having z-transformed rating scores (Schütze and Sprouse 2013) as the dependent variable and *Wh*-question type (i.e. Matrix x Embedded) and Match/Mismatch (i.e. Response type) as independent variables (see Table 1). Participants and items were included as random factors. The L1 control group (n = 20) showed a significant main effect of Match/Mismatch as expected; however, there was also an interaction between *Wh*-question type and Match/Mismatch. Follow up analyses revealed that the effect of Match/Mismatch was significant for the embedded *wh*-questions ($p < .001$), and it was marginally significant for the matrix *wh*-questions ($p = .050$). Taken together, L1 Japanese speakers demonstrated the expected pattern, while the contrast between Match and Mismatch was more categorical for the embedded *wh*-questions compared with the matrix *wh*-questions.

	β	*SE*	*t*	*p*
Intercept	<.001	.038	0	1
Wh-question type	-.082	.097	-.848	.406
Match/Mismatch (i.e. Response type)	.842	.201	4.178	<.001***
Wh-question type x Match/Mismatch	-.482	.144	-3.347	<.001***

Table 1: The results of statistical analysis in L1 Japanese speakers after excluding the six participants (n = 20).

With respect to the L2 Japanese learners, Figure 3 presents the mean rating scores by condition for all L2 speakers; the L2 group (n = 24) demonstrated the expected pattern in both the Matrix and Embedded *wh*-question conditions by rating matching answers significantly higher in both conditions, not showing the L1 transfer effects regarding *wh*-in-situ constructions.

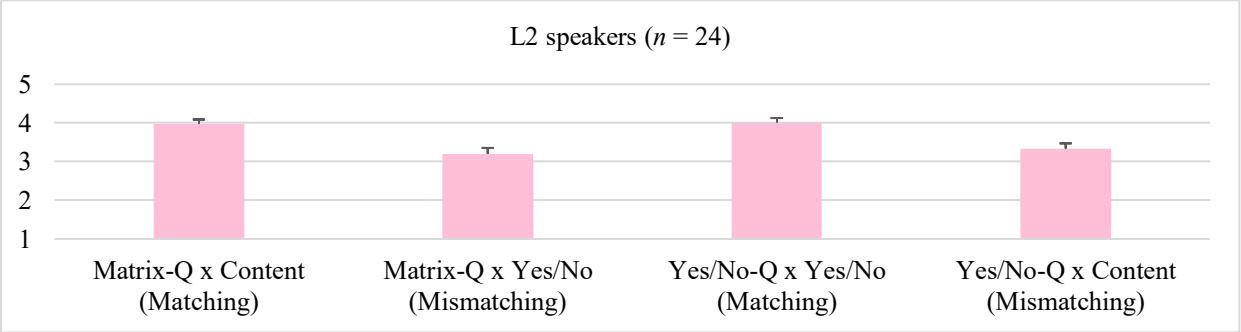

Figure 3: Mean rating scores of each condition in L2 Japanese speakers. The error bars indicate standard error.

We also examined the results of the translation task, in order to see how many learners were able to distinguish *wh*-questions with *-to* and *-ka*. Out of the twenty-four L2 Japanese learners, seven participants successfully translated both matrix and embedded Japanese *wh*-questions (11) into English, showing their awareness of interpretive difference between the complementizer *-to* and QM *-ka*. The remaining seventeen learners could not differentiate (11a) and (11b) and incorrectly translated both sentences as the embedded Yes/No-question (11b). Because of the difference in sensitivity to the interpretive difference between *-to* and *-ka* among the learners, we ran two analyses for the Q/A acceptability judgment task: one with all L2 learners (n = 24) (see Table 2) and one with only the learners who passed the translation task (n = 7) (see Table 3).

	β	*SE*	*t*	*p*
Intercept	-.001	.043	-.025	.980
Wh-question type	-.044	.074	-.589	.562
Match/Mismatch (i.e. Response type)	.460	.183	2.510	<.050*
Wh-question type x Match/Mismatch	.073	.148	.494	.621

Table 2: The results of statistical analysis in L2 Japanese speakers (n = 24).

Looking into the data from the seven learners who passed the translation task (Figure 4), it was revealed that the overall native-like judgment pattern in L2 speakers (Figure 3) was strongly influenced by these seven learners. As can be seen in Figure 4, their judgments were even more categorical than those of the L1 Japanese speakers. As is shown in Tables 2 and 3, linear mixed-effects models revealed that both the whole L2 group (n = 24) and its subset who passed the

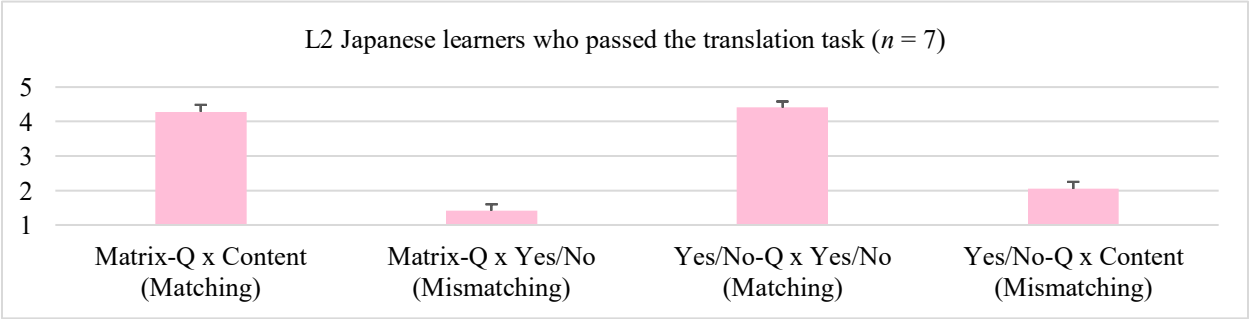

Figure 4: Mean rating scores of each condition in the subset of L2 Japanese speakers who correctly translated both matrix and embedded *wh*-questions into English. The error bars indicate standard error.

translation task (n = 7) showed a significant effect of Match/Mismatch (i.e. Response type). Neither showed interactions between *Wh*-question type and Match/Mismatch.

	β	*SE*	*t*	*p*
Intercept	-.005	.077	-.066	.949
Wh-question type	-.065	.150	-.435	.691
Match/Mismatch (i.e. Response type)	1.395	.176	7.917	<.001***
Wh-question type x Match/Mismatch	.183	.198	0.924	.357

Table 3: The results of statistical analysis in the L2 Japanese speakers who passed the translation task (n = 7).

As stated above, the targetlike results for the whole group were driven by the seven learners who passed the translation task. For the remaining L2 participants (n = 17), who could not differentiate the two types of *wh*-questions in the translation task, they rated all the conditions in a similar way on the Q/A acceptability judgment task (see Figure 5). Thus, these learners were not native-like, but the pattern was also not consistent with the predictions of L1 transfer.

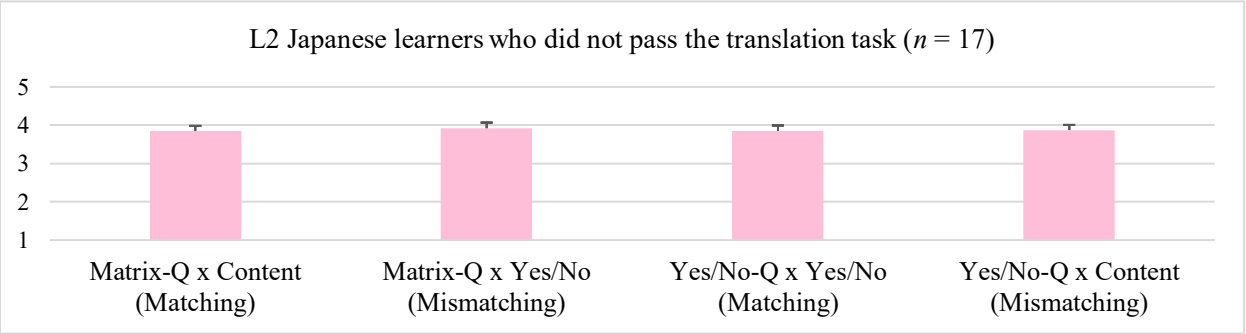

Figure 5: Mean rating scores of each condition in the seventeen L2 Japanese speakers, who did not pass the translation task. The error bars indicate standard error.

5 Discussion

The main goal of the study was to examine whether L1 English L2 Japanese speakers are aware of the interpretive difference in having the complementizer *-to* and QM *-ka* at the embedded verb in bi-clausal *wh*-questions or whether their interpretations were impacted by L1 transfer. Our results did not show any evidence of L1 transfer. Rather, the seven learners who successfully passed the translation task also showed targetlike interpretations of both matrix and embedded *wh*-questions in Japanese and the remaining L2 learners simply did not show any differences across conditions.

We will first address the seven L2 learners who were so successful, showing judgments that were even more categorical than the L1 Japanese speakers. Previous studies have observed that L2 speakers sometimes 'outperform' native speakers particularly in the domain of morphology / morpho-syntax (e.g. Davies and Kaplan 1998). Interestingly, not all of the seven learners scored high on the cloze test used as a proficiency measure; their scores ranged from 19-38 out of a possible 42. Moreover, it is not the case that these seven learners had any specific advantage as compared to the other L2 learners with respect to years of Japanese study or time spent in a

Japanese-speaking country/region. The seven learners spent an average of 5.71 years studying Japanese (as compared to 5.44 years for the other seventeen learners). Among the seven learners, the average length of time spent in a Japanese-speaking country/region was 4.67 months (as compared to 5.65 months for the other seventeen learners), and three of them even had no experience of staying there longer than a month. Given their performance in the translation task, we speculate that these seven learners have higher metalinguistic abilities which allowed them to pay attention to the subtle difference derived from the two morphosyntactic markers *-to* and *-ka.* The literature also suggests that there is a correlation of L2 knowledge and metalinguistic knowledge (e.g. Roehr 2007). In fact, three of the seven L2 learners reported that they had studied Latin, while no learners in the remaining group of seventeen had this experience. Considering that Latin requires careful attention to cases and inflections, such experiences might have contributed to their high metalinguistic abilities.

As for the remaining L2 speakers, who did not pass the translation task, they treated all the four conditions similarly in the Q/A acceptability judgment task, not showing sensitivity to *-to* and *-ka* at the embedded verb. Nevertheless, on the translation task, they actually showed an embedded question bias by translating both *-to* and *-ka* sentences as in (11) as embedded *wh*-questions. Moreover, the five L1 speakers who were excluded from the analysis also showed the same bias, as they consistently treated matrix *wh*-questions as embedded questions incorrectly. Thus, these results might suggest that associating *wh*-phrases with the embedded verb/clause is easier, which is also in line with the locality bias observed in the production task in Lieberman et al. (2006).

We did not observe any evidence for L1 transfer effects in our participants, but possibly for several different reasons. For the seven learners who showed target-like responses, it is possible that these learners may have already moved beyond the state where they rely on syntactic position to determine the scope of *wh*-phrases, and we may have missed the window to observe L1 transfer. For the seventeen learners who did not show any distinction among the four conditions in the Q/A acceptability judgment task, the bi-clausal *wh*-questions might have been too complex for them. In fact, there is not a lot of exposure to bi-clausal *wh*-questions in the Japanese language classroom context. While bi-clausal embedded *wh*-sentences are usually introduced in intermediate level textbooks (Lieberman et al. 2006), the sentences in textbooks are simpler than the ones that we used in the stimuli. Finally, there is also the possibility that the prediction for L1 transfer of *wh*-in-situ constructions that was tested may not be on the right track, considering that Lieberman et al. (2006) and Umeda (2008) also did not observe L1 transfer effects in their L1 English L2 Japanese learners.

6 Conclusion

To conclude, our findings revealed that comprehension of bi-clausal *wh*-questions in Japanese and mastering the interpretive difference between the complementizer *-to* and QM *-ka* is challenging for many English-speaking learners of Japanese. However, as the seven L2 learners demonstrated, acquisition of the property is ultimately possible, as is suggested by the Full Access Hypothesis (e.g. Schwartz and Sprouse 1996; White 1985, 1989). As we did not observe any L1 transfer effects, we speculate that the challenges of mastering the property may come from other factors such as complexity of the structure and lack of exposure to bi-clausal *wh*-questions in the classroom

context. It is also possible that metalinguistic abilities might be facilitative in the course of acquiring the role of *-to* and *-ka* in the interpretation of bi-clausal *wh*-questions.

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