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The Acquisition of *Wh*-movement by Advanced Japanese Learners of English

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ABSTRACT

This study examines the extent to which advanced Japanese learners of English are sensitive to Subjacency violations to see if they can acquire feature-driven movement, considering the nature of the operator (*wh*-Q or relative) and the island from which it has been extracted (complex NP, adjunct, etc). Given that English and Japanese vary in the feature specification of functional category C determining how their properties are realised in *wh*-question and relative clause formation, a question in adult SLA research is whether or not advanced Japanese learners can acquire different feature specifications of functional category C in English on the basis of the evidence they receive from the input. Participants in the experiment, as well as native English controls, performed a grammaticality judgement task. To test the potential effect of the participants' L1, another grammaticality judgement task with equivalent sentences in Japanese was given to a different group of native speakers of Japanese. The results showed that advanced Japanese learners can acquire feature-driven *wh*-movement in English questions and relative clauses, although they were affected by L1 in judging some sentences violating Subjacency. This is counterexample to the 'failed functional features hypothesis' proposed by Hawkins (1998; 2000) and Hawkins and Chan (1997).

KEY WORDS

L2 acquisition	Universal Grammar (UG)	feature-driven movement
wh-movement	Subjacency	relative clauses
wh-questions		

1. Introduction

One of the perpetual issues in second language (L2) acquisition research is whether or not 'adult' L2 speakers have full access to Universal Grammar (UG), even in cases where properties of a target L2 actually differ from properties of a first language (L1). There are at least two different kinds of proposals on this issue. One is that very advanced L2 learners have full access to UG. If they get enough positive evidence for certain types of constructions in an L2, even though the constructions do not exist in their L1, they will be able to

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build them. The other view is that some properties of UG which are not activated in an L1 are quite difficult to establish in an L2.

This study examines which of these two views seem to be more plausible by looking at the acquisition of *wh*-movement (i.e., feature-driven movement) in English questions and relative clauses by adult native speakers of Japanese, using a grammaticality judgement task as an instrumental tool and the Minimalist Program (Chomsky, 1995; 1998) as a theoretical framework. In particular, we test a proposal that parametric values associated with functional categories are inaccessible to adult L2 learners after the critical period (Hawkins, 1998; 2000; Hawkins and Chan, 1997).

2. Theoretical Background

Within the Minimalist Program (Chomsky, 1995; 1998), overt movement is only allowed when it is motivated by the presence of a strong formal feature. In *wh*-question and relative clause formation, it is assumed that English and Japanese vary in the feature specifications of functional category C determining how their properties are realised. In the case of *wh*-question formation, English has the features [+wh, +Q] in C, and they are both strong features which force *wh*-operator movement and subject-auxiliary inversion, as in (1). However, a [wh] feature in Japanese is not strong so that it does not need *wh*-operator movement, as in (2), although a [Q] feature has the same property as in English.

(1) What$_i$ are$_j$ you t$_j$ reading t$_i$?

(2) Anata-wa nani-o yonde imasu ka?
You-Top what-Acc reading are Q
'What are you reading?'

In the case of relative clause formation, English has the feature [+R] in C, which drives relative-operator movement, as in (3). In Japanese, however, there is an adjunct/predication type relation with no operator, and no feature-driven movement is required due to the lack of the operator and the feature [+R], as in (4) (Takeda, 1999).

(3) The book [which$_i$ [John bought t$_i$]] was interesting.

(4) [[John-ga katta] hon]-wa omosirokatta
John-Nom bought book-Top interesting was
'The book which John bought was interesting.'

Given these differences between English and Japanese, a question in adult L2 acquisition research is whether or not advanced Japanese learners of English can acquire different feature specifications of functional category C in English on the basis of the evidence they receive from the input. If they are able to learn surface morphological properties of

wh-questions and relative clauses in English, does this mean that they have acquired the strong features [+wh] and [+R] which drive operator movement? Therefore, we need to test a Subjacency constraint, because if they can acquire feature-driven movement, they should be sensitive to sentences violating Subjacency conditions which are constraints on *wh*-operator movement and correctly judge them as ungrammatical. By contrast, even if they have manifested surface morphological properties of *wh*-questions and relative clauses in English, they will not observe the Subjacency constraints unless overt movement is involved in their mental grammars.

3. Review of Literature

Previous studies have suggested that native speakers of Chinese, Korean, Indonesian or Japanese who do not have overt movement in their L1 may or may not acquire feature-driven movement; the results are still mixed. For example, Schachter (1989; 1990), in her studies about Subjacency constraints of various L1 groups of speakers (Chinese, Indonesian, and Korean) learning English as a second language, maintained that they could not acquire *wh*-movement because their performance on Subjacency constraints did not reach the level of native speakers'. Bley-Vroman, Felix and Ioup (1988) and Johnson and Newport (1991) agreed with Schachter (1989; 1990). In addition, Hawkins and Chan (1997) proposed that older L2 learners' mental representations are different from those of native speakers and put forth the 'Failed Functional Features Hypothesis', which states that there is a critical period for the selection of parametrised formal features although principles of UG remain available; formal features not selected during the course of L1 acquisition become inaccessible to enter computations in L2 acquisition in adulthood; and L2 learners may use the morphology of the target language but with the features of L1.

On the other hand, there is a cluster of studies which maintain the view that advanced L2 learners can acquire feature-driven movement, one of which is Martohardjono (1993) (also reported in Epstein, Flynn and Martohardjono, 1996). For her, what is crucial is not that nonnative speakers achieve native-like performance. She looked at the results of native Indonesian speakers' performance in judging sentences with weak and strong island violations (Chomsky, 1986). What she says is that their judging is not the same as native speakers'. However, if we compare the performance on weak and strong islands, we actually find they reject strong islands more strongly than weak islands. They make a distinction, therefore they must have *wh*-movement. This claim was also supported by Shimizu (1994) with native Japanese speakers. More recent studies by Li (1998) and White and Juffs (1998) also argue that there are L2 learners who do have access to UG and can acquire *wh*-operator movement.

However, the problems most of the above-mentioned studies have are as follows: (i) participants were selected impressionistically as advanced L2 learners without any validated assessment (except Hawkins and Chan's (1997) study). We need to utilise reliable and

validated tests to properly assess L2 learners' proficiency levels; (ii) they investigated only *wh*-question formation rather than relative clause formation (except Hawkins and Chan's (1997) study). It is necessary to distinguish violations of locality of movement in English which involve the movement of the relative operator from violations which involve the movement of the question *wh*-word/phrase. Given that Japanese does not have relative operators, but clearly has *wh*-operators like *nani* 'what' and *naze* 'why', it is important to test native Japanese speakers' awareness of each of these in English independently. We also need to distinguish the nature of the island from which the operator has been extracted: relative clause, adjunct, sentential subject, *wh*-island and complex NP.

This study, therefore, investigates the extent to which advanced Japanese L2 learners are sensitive to Subjacency violations in English to see if they can acquire feature-driven movement, considering the nature of the operator (*wh*-Q or relative) and the island from which it has been extracted (relative clause, adjunct, sentential subject, *wh*-island and complex NP) and using reliable proficiency tests.

Thus, the research questions addressed in this study are the following:

(5) Can advanced Japanese L2 speakers acquire the surface morphological properties of *wh*-questions and relative clauses in English?
(6) Can advanced Japanese L2 speakers acquire feature-driven movement in English (i.e., are they sensitive to Subjacency violations)?
(7) Is there any difference in their sensitivity to Subjacency between *wh*-operators and relative operators?

4. Method

4.1. Participants

Participants in this experiment were 8 native Japanese speakers, who lived in Japan or the UK and 11 native speakers of English randomly selected as a control group. All the native Japanese speakers were selected on the basis of their performances on an independent measure of proficiency: the Oxford Placement Test (OPT) (Allan, 1992). This is a test involving a multiple-choice auditory discrimination component and two multiple-choice decision components dealing with a variety of lexical, morphological and syntactic properties of English (each with 100 items, hence the maximum total possible score is 200). Participants who scored between 170 and 184 overall were selected for the study. This band covers a range of proficiency described as 'advanced proficient user'. The age that the participants started learning English was above 10, and the age range was 26 to 47 at the time of the experiment. Hence, participants' backgrounds varied with the quantity and quality of exposure to English that they had (in classrooms and natural environments). Details of the number of participants, the average age, and the average scores on the OPT are summarised in Table 1.

Table 1 Participant details

			Oxford Placement Test		
Group	*n*	Age	Range	Mean	SD
Advanced	8	29.46	170 - 184	175.500	4.301
Native controls	11	26.27	-	-	-

4.2. Test instruments

The first test instrument was a written grammaticality judgement task with 71 items. The participants were asked to read sentences and rate the grammaticality of them on the 5-point scale indicated. The sentences fell into the following 3 groups:

(8) The sentences which involve grammatical relative clauses with *wh*-operator (8 items), complementiser *that* (5 items) and null operator or complementiser (4 items), and ungrammatical ones with *who(m) that* or *which that* (5 items) and resumptive pronoun (5 items):

The boy who(m) I kicked yesterday broke the window.	(-2 -1 0 +1 +2)
The picture that you are looking at was painted by Picasso.	(-2 -1 0 +1 +2)
The friend they lent money to bought a very big house.	(-2 -1 0 +1 +2)
*The woman who that is singing on the stage is my wife.	(-2 -1 0 +1 +2)
*The classmate that you don't like him is very unkind.	(-2 -1 0 +1 +2)

(9) The sentences which display grammatical *wh*-questions (8 items) and ungrammatical ones with no subject-auxiliary inversion (8 items):

What did your girlfriend want to talk about?	(-2 -1 0 +1 +2)
*Whose house Sandy's father is going to build?	(-2 -1 0 +1 +2)

(10) The sentences which violate Subjacency conditions in the following 5 construction types with relative clauses (2 items) and *wh*-questions (2 items), and grammatical declarative sentences from which the operators are extracted (2 items):

(a) Extraction from a relative clause

a. The police caught the man who stole the bicycle.	(-2 -1 0 +1 +2)
b. *This is the bicycle which the police caught the man who stole.	(-2 -1 0 +1 +2)

(b) Extraction from a sentential subject

a. A picture of the ghost frightened the children.	(-2 -1 0 +1 +2)
b. *This is the ghost which a picture of frightened the children.	(-2 -1 0 +1 +2)

(c) Extraction from an adjunct

a. The earthquake occurred while you were talking with Tom. (-2 -1 0 +1 +2)

b. *Who did the earthquake occur while you were talking with? (-2 -1 0 +1 +2)

(d) Extraction from a complex NP (DP)

a. Tom believed the claim that Ann stole the car. (-2 -1 0 +1 +2)

b. *What did Tom believe the claim that Ann stole? (-2 -1 0 +1 +2)

(e) Extraction from an embedded question (i.e., *wh*-island)

a. Peter knows where Tom bought the CD. (-2 -1 0 +1 +2)

b. *This is the CD which Peter knows where Tom bought. (-2 -1 0 +1 +2)

The participants were asked to judge the grammaticality of each sentence by circling one of the numbers on the scale. They were told that +2 meant that the sentence was 'completely grammatical', -2 that it was 'completely ungrammatical', and -1, 0 and +1 were gradations between the extremes to be used if they thought the sentence was more or less grammatical. Detailed instructions were given on the use of the scale prior to testing, and there were initial practice items for information before the test began. They had just ten seconds to judge each sentence.

Individuals' scores for each sentence were summed and the means calculated. Comparisons were made between advanced Japanese L2 learner and native speaker responses for each item, and between relative clauses and *wh*-questions, using a one-way analysis of variance (ANOVA).

The second test instrument was a written grammaticality judgement task with Japanese equivalents of sentences violating Subjacency conditions in English. For example:

(a) Extraction from a relative clause in Japanese

Kimi-wa	[dare-o	egai-ta	hon]-o	yomi	masi-ta	ka
you-Top	who-Acc	described	book-Acc	read	Hon-Past	Q

Lit. "*Who did you read the book that described?"

(Nishigauchi, 1999)

(b) Extraction from a sentential subject in Japanese

Kore-wa	[[Bill-ga	syussekishita	koto]-ga	
ryousin-ni	syokku-o	ataeta]]	kaigou	desu.
this	[[Bill-Nom	attended]	that]-Nom	
parents-Dat	shock-Acc	gave]	meeting	is

Lit. "*This is the meeting which for Bill to attend shocked his parents."

This test was given to a different group of native speakers of Japanese ($n=40$, average age=19.50). The procedures of this test were the same as the English version of the grammaticality judgement test.

The purpose of this test was to examine the potential effects of the participants' L1. The reason for using this kind of test is that when we analyse data, we need to consider which of the sentences in English we are using to test native Japanese speakers are actually grammatical in Japanese, and which of them are ungrammatical in Japanese. If it turns out that some of these distinctions they make in English between grammatical and ungrammatical (and/or weak and strong islands) actually are also reflected in Japanese even though Japanese does not have *wh*-movement, this tells us in fact that we cannot use this kind of evidence to decide whether native Japanese speakers can acquire *wh*-movement or not (L1 influence). Therefore, we need to decide which types of sentence constructions violating Subjacency in English are grammatical or ungrammatical in Japanese.

5. Results and Discussion

Overall results of relative clauses are presented in Tables 2 and 3. Table 2 compares mean scores for advanced Japanese learners of English and native speakers of English in judging the grammatical relative clauses with *wh*-operator, complementiser *that* and null operator or complementiser. Table 3 compares mean scores for both groups in judging the ungrammatical relative clauses with *who(m) that* or *which that* (doubly-filled comp) and resumptive pronouns. In the grammatical cases, participants' ratings should approach +2, and in the ungrammatical cases their ratings should approach -2. Significant differences between Japanese and native speakers' responses on the basis of one-way ANOVAs are indicated by an asterisk. These observations can also be applied to other tables. The results show that there are no significant differences in mean scores between advanced group and natives in all the grammatical and ungrammatical relative clauses.

Table 2 Rating of grammatical relative clauses

	Wh-operator		*That*		Null	
Group	Mean	SD	Mean	SD	Mean	SD
Advanced	1.594	0.904	0.950	1.648	0.656	1.715
Native controls	1.500	0.823	1.491	0.750	1.318	1.073

Table 3 Rating of ungrammatical relative clauses

	Who(m) that or *which that*		Resumptive pronouns	
Group	Mean	SD	Mean	SD
Advanced	-0.800	1.506	-1.550	1.037
Native controls	-1.291	1.083	-1.364	1.043

Overall results of *wh*-questions are given in Table 4, which compares mean scores for advanced group and natives in judging the grammatical and ungrammatical *wh*-questions.

There are no significant differences in mean scores between these two groups, both in the grammatical and ungrammatical cases (without subject-auxiliary inversion).

Table 4 Ratings of grammatical and ungrammatical (no subject-auxiliary inversion) *wh*-questions

	Grammatical		No subject-auxiliary inversion	
Group	Mean	SD	Mean	SD
Advanced	1.328	1.310	-1.047	1.214
Native controls	1.546	1.060	-1.466	1.005

Results of Subjacency violations rated by advanced group and natives are presented in Table 5 to 9. These tables crucially show that there are no significant differences in mean scores between the advanced group and the native control group in grammatical and ungrammatical (both relative and *wh*-question) cases, with the exception of *wh*-movement out of an embedded question (*wh*-island) in relative clauses.

Table 5 Ratings of *Wh*-movement out of a relative clause in English

	Grammatical		Ungrammatical			
			Relative clause		*Wh*-question	
Group	Mean	SD	Mean	SD	Mean	SD
Advanced	1.184	1.415	-1.375	0.719	-1.375	0.619
Native controls	1.454	0.903	-1.773	0.429	-1.955	0.213

Table 6 Ratings of *Wh*-movement out of a sentential subject (subject island) in English

	Grammatical		Ungrammatical			
			Relative clause		*Wh*-question	
Group	Mean	SD	Mean	SD	Mean	SD
Advanced	1.125	1.360	-1.313	0.873	-1.375	0.719
Native controls	0.714	1.146	-0.909	1.265	-1.273	1.032

Table 7 Ratings of *Wh*-movement out of an adjunct island in English

	Grammatical		Ungrammatical			
			Relative clause		*Wh*-question	
Group	Mean	SD	Mean	SD	Mean	SD
Advanced	1.313	1.401	-0.063	1.482	-1.063	1.182
Native controls	1.091	1.192	-0.591	1.623	-1.955	0.213

Table 8 Ratings of *Wh*-movement out of a complex NP in English

	Grammatical		Ungrammatical			
			Relative clause		*Wh*-question	
Group	Mean	SD	Mean	SD	Mean	SD
Advanced	1.250	1.342	-0.438	1.504	-1.188	1.223
Native controls	1.727	0.551	-1.636	0.727	-1.682	0.568

Table 9 Ratings of *Wh*-movement out of an embedded question (*wh*-island) in English

	Grammatical		Ungrammatical			
			Relative clause		*Wh*-question	
Group	Mean	SD	Mean	SD	Mean	SD
Advanced	1.313	1.353	0.375*	1.360	-0.800	1.320
Native controls	1.727	0.767	-1.591	0.734	-1.955	0.213

Note:* = significantly different from native controls ($p < .05$)

Table 10 shows the results of judging equivalent sentences of Japanese which violate Subjacency conditions in English (including grammatical sentences). All the sentences, except *wh*-movement out of a sentential subject in relative clauses, are not judged as ungrammatical, although the grammaticality of relative clause cases is not so high, or marginal.

Table 10 Ratings of Japanese equivalents of Subjacency violations in English

	Grammatical		Japanese equivalents of sentences violating Subjacency (ungrammatical in English)			
			Relative clause		*Wh*-question	
Type	Mean	SD	Mean	SD	Mean	SD
Relative clause	1.938	0.244	0.313	1.523	1.488	0.955
Sentential Subject	1.450	0.913	-0.025	1.607	1.238	0.958
Adjunct Island	1.875	0.432	0.488	1.484	1.338	1.113
Complex NP	1.938	0.244	0.225	1.387	0.438	1.367
Embedded Q	1.938	0.368	0.938	1.118	0.525	1.542

The results suggest the following. First, Japanese learners of English who have reached the advanced proficiency level perform within the range of native speakers in rating the surface morphological properties of relative clauses and *wh*-questions (Tables 2, 3 and 4).

Second, in the case of sentences violating Subjacency conditions in English, advanced Japanese learners perform within the range of native English speakers, with the exception

of a relative clause with *wh*-movement out of an embedded question (*wh*-island). No significant difference is found in advanced learners' performance between relative clauses and *wh*-questions in all the construction types (Table 5 to 9).

Third, native speakers of Japanese treat Japanese equivalents of sentences which violate Subjacency conditions in English *wh*-questions as definitely grammatical, although the ratings of complex NP and embedded question are not so high. However, relative clause cases are not highly treated as grammatical in the constructions except the embedded question, but at least they are not judged as completely ungrammatical (Table 10).

It seems, then, that on the basis of their judgements of the grammaticality and ungrammaticality of sentences involving long-distance operator movement 'advanced' Japanese learners of English have acquired feature-driven movement. They still have problems, however, judging the ungrammaticality of one type of extraction: extraction of a relative clause operator from an embedded question. How might we account for this? Our claim will be that judgements of ungrammaticality are a reflection of the role that syntactic features like [wh] or [R] play in relation to semantic interpretation: they have the effect of 'blocking' the free application of semantic rules. Where such a blocking effect is absent in the L1 it may continue to be absent in the L2. But this is not always the case. In order to make the claim clear, we need to sketch out our assumptions about the interpretation for relative clauses.

In this study, we assume that in Logical Form (LF), semantic operations are invariant cross-linguistically (Chomsky, 1998; Takeda, 1999). Where languages vary is in how semantic operations are associated with features of lexical items manipulated by the syntax: essentially the features of functional categories. An idea about the nature of this association can be found in the work of Chierchia (1998), who suggests that syntactically-related features have the effect of constraining the free application of semantic operations. This idea has been extended by Takeda (1999: 103) as the 'Generalised Blocking Principle'.

(11) Generalised Blocking Principle (GBP): If a language has a certain functional category in its lexicon, the free application of the semantic operation that has the same function as that syntactic category is blocked in that language.

Technical details aside, what the GBP suggests is that the important difference between English and Japanese in calculating the meaning of the relative clauses lies in the application of a certain semantic operation. This application in English always requires a relative pronoun or a relative operator as a prerequisite. On the other hand, this semantic operation seems to be applied in a less restricted manner in Japanese. In contrast to English, Japanese lacks a syntactic category [+R] C, which is supposed to license a relative operator that would induce the semantic operation. Due to the absence of the syntactic relative operator, the GBP applies to yield no effect on the availability of the semantic operation in Japanese, and as a consequence, the application of the semantic

operation is allowed in a fairly free manner in Japanese. Takeda (1999) also mentioned that the lack of island effects accords with this view.

Concerning a relationship between morphological variation and interpretation, Takeda (1999) suggests that the morphological properties appear to have a function of making certain semantic operations visible. We all have these operations, but languages vary in whether or not they actually make these things visible. And by visibility, what she says is that they localise those operations. Hence, this blocks the free or long distance operation of the semantic operations. Therefore, we can interpret relative clauses freely in Japanese, and we do not need to worry about whether there is an island intervening or not.

Takeda (1999) suggests that some language does not have particular syntactic properties and a semantic operation automatically takes them over, allowing us to use it to construct correct relative clauses. In the absence of a relative operator, it has properties which lead to a wider range of relative clause interpretations. But syntactic operations stop using a semantic operation. In English, if a child learns that there is a syntactic signal for relative clauses, syntax takes over the domain of interpretation of relative clauses. If the child recognises there is a syntactic device, he or she will interpret sentences in terms of this space in the domains of relative clauses because syntactic operation is present. For the Japanese child, he or she does not encounter anything like this. Consequently, in fact, a semantic operation will automatically come into play at some point.

The findings of this study clearly show that advanced Japanese L2 learners can acquire *wh*-movement in English in their mental grammars. In particular, there is no problem for them to acquire *wh*-movement in *wh*-question formation because they have features [wh] and [Q], although their qualities are different from those involved in English. In the case of relative clauses, they have trouble with sentences containing *wh*-movement from embedded questions which violate Subjacency conditions (mean score is 0.375). Even advanced L2 learners failed to reject them. Following the idea proposed by Takeda (1999), a possible explanation is that Japanese equivalents of sentences violating Subjacency in English were judged as relatively grammatical (mean score is 0.938), and then, this L1 influence blocked the acquisition of a relevant feature [+R] involved in C. As a result, the GBP was violated, and they applied the semantic operation in order to interpret the sentences in English.

Alternatively, if we assume that relative clauses have the syntactic status of 'adjunct' (in contrast to indirect questions which are argumental), can we say that the one case where our participants do not behave like native speakers is when a relative operator is extracted from a *wh*-argument? If so, our participants recognise ungrammaticality when a relative operator is extracted from an adjunct, but not an embedded question. At any rate, the explanation does need more thought on this issue.

6. Conclusion

In this study, we provided evidence which indicated that native Japanese speakers can acquire feature-driven *wh*-movement in English questions and relative clauses. This is counterexample to the 'failed functional features hypothesis' proposed by Hawkins (1998; 2000) and Hawkins and Chan (1997).

Of course, we do not deny the common observation that persistent selective difficulty lies in the acquisition of *wh*-movement in English by adult L2 speakers whose L1 does not have *wh*-movement. However, to claim that this area of grammar always fossilises and is subject to a critical period may be too strong, at least, in the light of the results in this study.

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