L2 Learners' Sensitivity to Illicit Extractions out of Adjuncts in English *Wh*-questions and Relative Clauses

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Abstract

This paper investigates second language (L2) learners' sensitivity to illicit extractions out of adjuncts in two different constructions (*wh*-questions and relative clauses) to advance our understanding of the role of innate principles in L2 acquisition. Assuming that extractions out of adjuncts are barred by an innate principle, formulated by Belikova and White (2009) as the revised Condition on Extraction Domains (CED), this study examines L2 learners of English (in which the revised CED operates) with two distinct mother tongues: speakers of French (in which the revised CED also operates) and speakers of Japanese (in which the revised CED is inactive). The results of an acceptability judgment task preceded by self-paced reading found that some, but not all, learners showed sensitivity to illicit extractions irrespective of their mother tongue or construction, corroborating the view that innate principles that are inactive in a learner's mother tongue are still available in L2 acquisition.

1　Introduction: Second Language Acquisition and Island Constraints

Since the 1980s, whether grammars that second language (L2) learners have are constrained by innate principles delimiting the grammar of the target language has been discussed extensively in generative-based second language acquisition (SLA) studies. The *Fundamental Difference Hypothesis* (Bley-Vroman, 1989, 1990), for instance, claims that innate principles on which the acquisition of a first language (L1) is based are no longer accessible in SLA unless the very same principles also function in a learner's L1; hence, L2 learner competence is qualitatively different from that of native speakers. By contrast, other researchers (e.g., Slabakova, 2016; White, 2003) maintain that innate principles are still available in SLA even when they are not operative in a learner's L1.

To investigate the role of innate principles, many studies explore *learnability* or *poverty-of-stimulus* situations (White, 2003). The logic behind this is that if L2 learners come to have knowledge that cannot be induced from either (a) the input they are exposed to, (b) instructions in classrooms, or (c) their prior experience in language learning (i.e., L1 acquisition), then arguably they have access to the innate principles of human language. One of the linguistic phenomena used as a diagnostic is *subjacency* (Chomsky, 1973), a principle that constrains movement in Syntax. English (non-echoic) *wh*-questions (hereafter *wh*-Qs), for example, are formed with syntactic movement, as shown in (1). In (1a)–(1c), the *wh*-expression *who* leaves its canonical position (represented as ~~who~~) and moves to the sentence-initial position. As far as the examples in (1) are concerned, movement seems unbounded; however, this is wrong.

(1) a. Who did she meet ~~who~~?
b. Who did she say that she met ~~who~~?
c. Who did he believe that she said that she met ~~who~~?

Since Ross (1967), it has been recognized that seemingly unconstrained extractions are in fact impossible when the *wh*-expressions are extracted out of certain syntactic units, called *islands*. Representative islands that are discussed among both syntacticians and L2 researchers are illustrated in (2)–(6), all of which are adapted from Belikova and White (2009, pp. 201–202). In (2b)–(6b), the parts in boxes constitute islands.

(2) *Wh*-island
a. You wondered whether this girl danced with Mark.
b. *Who did you wonder whether this girl danced with ~~who~~?
(3) Complex N(oun)P(hrase) island
a. You spread a rumor that this girl danced with Mark.
b. *Who did you spread a rumor that this girl danced with ~~who~~?
(4) Relative clause island
a. You met a girl that danced with Mark.
b. *Who did you meet a girl that danced with ~~who~~?
(5) Sentential subject island
a. That this girl danced with Mark annoyed you.
b. *Who did that this girl danced with ~~who~~ annoy you?

(6) Adjunct island

a. You met this girl after she danced with Mark.

b. *Who did you meet this girl after she danced with ~~who~~?

Since Chomsky (1973), all of these islands had been subsumed under the principle of subjacency, and it is widely accepted that all languages constructing *wh*-Qs with extraction follow this principle (see §2 for another language where subjacency operates).

However, not all languages form *wh*-Qs with syntactic movement. As we will see shortly in §2, Japanese is one example of such languages. In languages where *wh*-Qs are formed without movement, subjacency is inoperative simply because there are no syntactic environments this principle constrains.

This typological difference offers an ideal testing ground for examining the accessibility of an innate principle in SLA: it is predicted that when learners from a [– movement (*wh*-Q)] language (e.g., Japanese) acquire a [+ movement] language (e.g., English) as an L2, they are logically unable to detect the relevant principle unless they have direct access to the principle. This is because (a) *wh*-Qs included in the input they hear from native speakers of the target language are basically grammatical, (b) subjacency is likely not taught in classrooms and (c) subjacency is inoperative in their L1. Hence, whether L2 learners from a [– movement] language can distinguish grammatical and ungrammatical extractions of *wh*-expressions has been scrutinized extensively (e.g., Bley-Vroman, Felix, & Ioup, 1988; Johnson & Newport, 1991; Lakshmanan et al., 2009; Li, 1998; Martohardjono, 1993; Schachter, 1989, 1990; White & Juffs, 1998). One important finding of these studies is given in (7):

(7) L2 learners perform less accurately for *wh*-clauses and complex NPs (i.e., *weak* islands, which give rise to milder ungrammaticality for native speakers) than for relative clauses, sentential subjects, and adjuncts (i.e., *strong* islands, which produce strong ungrammaticality for native controls).

Although many studies have found (7), the very same finding is often interpreted differently. For some, L2 learners' non-uniform judgments to different islands indicate that subjacency either does not operate in L2 grammars (e.g., Johnson & Newport, 1991) or operates only "in some attenuated form" (Bley-Vroman et al., 1988, p. 27). For others, their non-uniform judgments are the reflection of their sensitivity to the different degrees of ungrammaticality that are also observed in native speakers' judgments; hence, (7) counts as evidence for the operation of subjacency in L2 grammars (e.g.,

Martohardjono, 1993).

However, recent studies on islands show that some of the islands that had been traditionally explained on par with the other islands are not necessarily based on the same mechanism; accordingly, some of the islands may not be relevant to the innate principle. Belikova and White (2009), in their review of changing perspectives on island phenomena, argue that subjacency amounts to the universal constraint that prohibits extractions out of *noncomplements* (Nunes & Uriagereka, 2000; Sabel, 2002). They formulated this constraint as a revised version of Huang's (1982/1998) *Condition on Extraction Domains* (CED), as shown in (8).

(8) Revised CED (Belikova & White, 2009, p. 211)
Wh-movement cannot take place out of a structural noncomplement.

Structural noncomplement in (8) means any element that is not selected by a head, such as V(erb) or N(oun). Subjects and adjuncts including relative clauses are representative structural noncomplements. Assuming the *Multiple Spell-out System* in Uriagereka (1999), Belikova and White (2009) claim that noncomplements are constructed in different derivational workspaces from the rest of the derivation and are later "plugged in" (Nunes & Uriagereka, 2000, p. 23) the appropriate positions. Crucially, noncomplements are transferred to the component relevant to linearization *before* they are connected with the rest of the derivation; thus, their internal structures are invisible to the rest of the structure. As a result, no element in noncomplements can be extracted at least in Syntax. This analysis implies that while relative clauses, sentential subjects, and adjuncts, all of which are strong islands, originate in the revised CED (8), *wh*-clauses and complex NPs, both of which are selected by heads, do not.[1]

Belikova and White's (2009) discussion sheds new light upon what kind of data can or cannot count as evidence for the availability of the innate principle. According to the revised CED, the extractions out of *wh*-clauses and complex NPs are not suitable for testing the L2 learners' access to the innate principle, because they have nothing to do with the innate principle (i.e., the revised CED).

In light of this, studies focusing on strong islands still seem necessary even though many existing studies have already investigated them alongside weak islands. Furthermore, although many of these studies have investigated L2 learners' sensitivity to different islands, focusing on just one extraction construction (i.e., different islands × one extraction construction), studies employing the reverse design appear to be lacking (i.e., one island × different extraction constructions). That is, little attention has been paid to how L2 learners judge the same island in different extraction constructions.

As is well known, subjacency/revised CED also constrains relative clause (RC) formations in

languages that construct RCs with syntactic movement. (9) gives examples from English, whose RC is formed with movement of either a relative pronoun as in (9a) or a phonetically null relative operator (represented as op) as in (9b). Crucially, both *which* in (9a) and op in (9b) are extracted out of the adjunct, which results in ungrammaticality. This is because adjuncts—examples of structural noncomplements—are formed in different derivational workspaces from the rest of the derivation, and therefore, elements in the adjuncts are neither visible nor extractable via relativization.

(9) a. *This is the book which John went out after having read ~~which~~.
b. *This is the book op (that) John went out after having read ~~op~~.

If L2 learners whose L1 constructs both *wh*-Qs and RCs without movement show sensitivity to the illicit extractions in both *wh*-Qs and RCs, this would corroborate the view that innate principles that do not operate in a learner's L1 are still available in SLA.

The present study reports on the results of an empirical investigation of Japanese speakers' judgments to the illicit extractions out of adjuncts in English *wh*-Qs and RCs. As we will see shortly in §2, neither *wh*-Qs nor RCs involve movement in Japanese; thus, Japanese-speaking learners of English offer an ideal testing ground. In addition, the present paper also reports on data collected from speakers of English and French, in both of which the revised CED operates, as comparison.

This paper is structured as follows: §2 introduces the properties of *wh*-Qs and RCs in French and Japanese. Then, §3 presents the methodology and the results of the present study. Finally, main findings are summarized and discussed in §4.

2 Linguistic Background

In languages where *wh*-Qs and RCs are formed with syntactic movement, extractions out of adjuncts are barred due to the revised CED (8), as we have already seen in English examples (see §1). French is another example. French, a language that also forms *wh*-Qs and RCs with syntactic movement, likewise resists extractions out of adjuncts.[2] For instance, when *le livre* 'the book' in the declarative (10a) is replaced with the corresponding *wh*-expression *quel livre* 'which book' to form a *wh*-Q, it must leave the position in which it originates and move out of the adjunct clause. However, this movement is ungrammatical, as in (10b). Likewise, relativization, which involves the movement of a (null) relative operator, is disallowed when the operator is extracted out of an adjunct, as in (10c). These examples show that the revised CED operates in French.

(10) a. Declarative

Jean est sorti [après avoir lu le livre].
John is gone.out after have read the book
'John went out after having read the book.'

b. *Wh*-Q

*Quel livre Jean est-il sorti [après avoir lu ~~quel livre~~]?
Which book John is-he gone.out after have read
'Lit.: *Which book did John go out after having read?'

c. RC

*C'est le livre [op que Jean est sorti [après avoir lu ~~op~~]?
This.is the book that John is gone.out after have read
'Lit.: *This is the book that John went out after having read?'

It is well known that Japanese is a *wh*-in-situ language, in which *wh*-expressions typically stay in their base-generated positions yet their scopes are not necessarily clause-bounded. For instance, in (11b), adapted from Richards (2008, p. 349), the *wh*-expression *dono hon* 'which book' appears in the adjunct clause on par with *sono hon* 'that book' in the declarative counterpart (11a). However, the *wh*-expression takes scope over the matrix clause, which suggests that the revised CED is inactive in Japanese *wh*-Qs.

(11) a. Declarative

John$_i$-wa [*pro*$_i$ sono hon-o yonde-kara] dekake-ta.
John-TOP that book-ACC read-after go.out-PAST[3]
'John went out after having read the book.'

b. *Wh*-Q[4]

John$_i$-wa [*pro*$_i$ dono hon-o yonde-kara] dekake-ta-no?
John-TOP which book-ACC read-after go.out-PAST-Q
'Lit.: *Which book did John go out after having read?'

c. RC

?Kore-ga John$_i$-ga [[*pro*$_i$ *ec*$_j$ yonde-kara] dekake-ta] hon$_j$-da.
This-NOM John-NOM read-after go.out-PAST book-be.PRES
'Lit.: *This is the book that John went out after having read.'

In addition to *wh*-Qs, relativization out of an adjunct island appears to be possible (e.g., Kuno, 1973; Takeda, 1999) as in (11c), although this example does not sound perfectly acceptable to some of the Japanese informants I consulted.[5] RCs like (11c) are possible because Japanese RCs are constructed without movement. Instead, in (11c), a null pronominal element (represented as *ec*) that is coreferential with the antecedent appears in the adjunct clause to form an *aboutness* or *topic-comment* relationship (Fukui & Takano, 2000; Kuno, 1973), which is functionally similar to the operator-variable relationship created with movement. In short, relativization out of the adjunct clause is possible in Japanese because of the absence of syntactic movement.

3 Present Study

3.1 Objective and Predictions

The present study investigates whether Japanese speakers can distinguish licit extractions from illicit extractions out of adjuncts in English *wh*-Qs and RCs for the purpose of gaining a better understanding of the role of innate principles in SLA. As comparison, French-speaking learners of English as well as native speakers of English are also tested.

Given the properties outlined in §2, French speakers are predicted to distinguish licit and illicit extractions for both *wh*-Qs and RCs because the relevant principle is also active in their L1. By contrast, different predictions can be made for Japanese speakers' responses. If innate principles that do not operate in their L1 are no longer available in SLA, Japanese speakers are unlikely to exhibit the target distinction in either *wh*-Qs or RCs. However, if such principles are still accessible, at least some of the Japanese speakers may be able to distinguish licit from illicit extractions.

3.2 Participants

Twenty-four native speakers of English (NSEs), 28 French-speaking learners of English (FLEs), and 45 Japanese-speaking learners of English (JLEs) initially participated in the experiment. These participants were recruited in universities in the UK or in Japan. Prior to the experiment, all participants were asked to complete a language background questionnaire that consists of questions about their bio-data (e.g., age) and their language background (e.g., language use in childhood). Based on their answers, I decided to exclude four NSEs, seven FLEs, and 13 JLEs from further analysis because these participants had substantially different language backgrounds from the other participants in the same group.[6] Table 1 gives a summary of the background for the retained participants: 20 NSEs, 21 FLEs, and 32 JLEs. Table 1 also summarizes the results of the *Quick Placement Test* (QPT: University of Cambridge Local Examinations Syndicate, 2001), which was administered to L2 learners to measure

Table 1. *Summary of Participants' Background*

Item	NSE (n = 20)			FLE (n = 21)			JLE (n = 32)		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Age	—	26.1	9.3	—	20.2	1.6	—	24.5	4.7
Sex a) Male	15	—	—	2	—	—	16	—	—
b) Female	5	—	—	19	—	—	16	—	—
OAEL[a)]	—	—	—	—	9.5	2.7	—	11.3	1.8
LEL[b)] (in Year)	—	—	—	—	10.0	2.7	—	12.3	3.5
LSEC[c)] (in Month)	—	—	—	—	7.1	4.2	—	19.0	30.2
QPT (Max. = 60)	—	—	—	—	44.0	5.9	—	43.9	5.2

Note.[a)] Onset age of English learning; [b)] Length of English learning; [c)] Length of stay in English-speaking countries

their general proficiency in English.

FLEs and JLEs differed noticeably in their backgrounds concerning English learning. Although they did not differ statistically in length of stay in English-speaking countries (U = 294.0, Z = −0.771, p = .441), JLEs started learning English significantly later than FLEs (U = 186.5, Z = −2.777, p = .005) and have been studying English significantly longer than FLEs (U = 93.0, Z = −4.469, p < .001).[7] Despite these differences, the two groups did not differ in general proficiency in English as measured with the QPT (t(51) = .092, p = .927), which indicates comparable proficiency in English between the two groups. Needless to say, each participant had a different proficiency level; hence, it was possible to divide participants into subgroups based on the standardized criteria of the QPT (e.g., Lower Intermediate, Upper Intermediate, Advanced). However, the number of participants in this study is not large enough to adopt these classifications. Thus, I did not divide participants further into narrower groups based on their proficiency in English.

3.3 Procedures

An acceptability judgment task preceded by self-paced reading was administered.[8] A laptop with DMDX Version 4 (Forster & Forster, 2003) and a gamepad as input device were used to conduct the task. Each trial begins with instructions asking participants to press the button labeled START on the gamepad (Figure 1). This screen appeared at the beginning of each trial to indicate the transition from the last trial to the next. Once participants pressed START, a number of hyphens appeared on the screen (Figure 1).

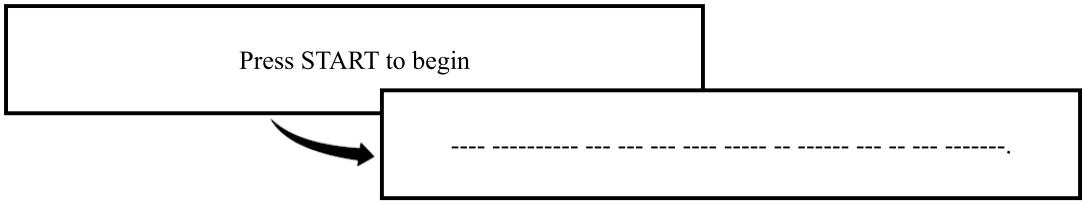

Figure 1. Before the Start of Each Trial

Participants were then told that they could read a sentence by pressing another button labeled READ on the gamepad. Participants were also told that each button-push would reveal one word at a time from left-to-right and the words they had already read would disappear from the screen when the next word appears (i.e., non-cumulative moving-window presentation: Just, Carpenter, & Woolley, 1982), as illustrated in Figure 2. Participants were asked to read each sentence until the end while paying attention to its meaning.

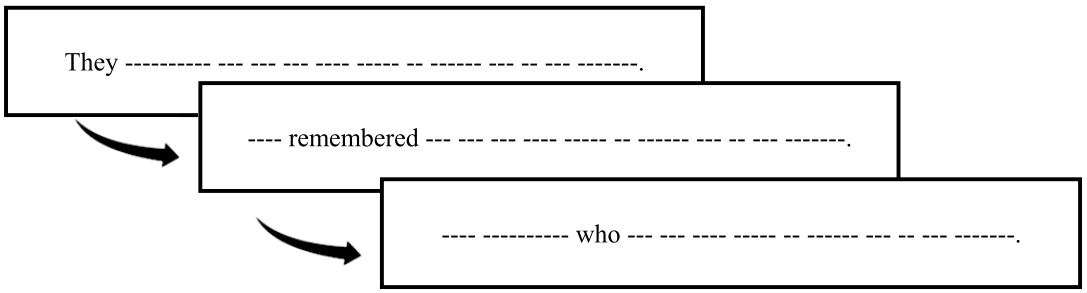

Figure 2. Non-cumulative Word-by-Word Presentation

Once participants finished reading the sentence, a question asking them to judge whether the sentence they read is acceptable appeared (Figure 3). Participants were instructed to enter their judgment as quickly as possible by pressing one of the predefined buttons on the gamepad: YES (*Acceptable*); NO (*Unacceptable*); I DON'T KNOW (*No Intuition*). Participants were instructed to use I DON'T KNOW only when they have no intuition about the acceptability of a sentence they read and accordingly have no choice but to guess the answer. To minimize erroneous button-pushes, answer keys were also displayed graphically with the question (Figure 3). Once participants finished judging the sentence or if 20 seconds had passed since the presentation of the acceptability question, the instruction for the next trial (Figure 1) automatically appeared on the screen.

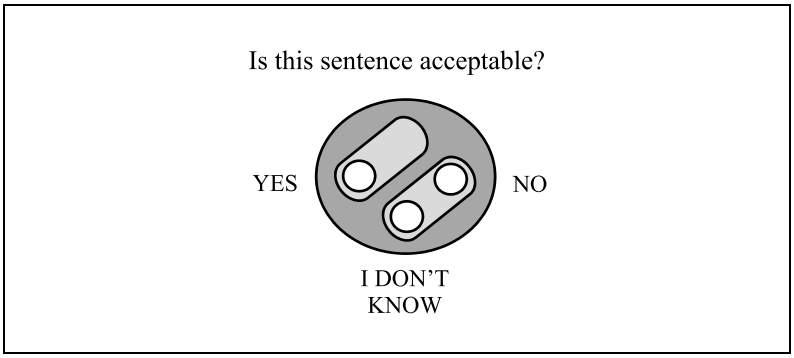

Figure 3. Acceptability Judgment Task

The test was preceded by instructions and four practice trials were presented to allow participants to familiarize themselves with the procedure. Participants were tested in a quiet room prepared by the experimenter either individually or with another participant only when both of them wished to do so. The present task (lasted less than ten minutes) was administered with other experiments (see Hokari, 2015). Upon completion of the experiments, all participants were paid £10 or ¥1,500.

3.4 Test Items

Six prepositional verbs were used as targets: *wait for*; *care for*; *vote for*; *dance with*; *agree with*; *argue with*. For each verb, two pairs of sentences were created: a pair of *wh*-Qs and a pair of RCs. (12) and (13) show the two pairs of sentences with *care for*.

(12) *Wh*-Q: *They remembered who* DP {*told them that*/**met them after*} *he* V-*ed* P PP.

a. Baseline: Licit extraction out of a clausal complement

They remembered who Tom told them that he cared for in the clinic.

b. Experimental: Illicit extraction out of an adjunct clause

*They remembered who Tom met them after he cared for in the clinic.

(13) RC: *They remember* DP *who* DP {*told them that*/**met them after*} *he* V-*ed* P PP.

a. Baseline: Licit extraction out of a clausal complement

They remember the patient who Tom told them that he cared for in the clinic.

b. Experimental: Illicit extraction out of an adjunct clause

*They remember the patient who Tom met them after he cared for in the clinic.

Each pair comprised a baseline sentence (e.g., 12a and 13a) and an experimental sentence (e.g., 12b

and 13b). Baseline sentences involved licit extractions out of clausal complements whereas experimental sentences included illicit extractions out of adjunct clauses. Items forming a pair (e.g., 13a and 13b) were identical except for the parts relevant to the extraction domains (i.e., *told them that* vs. *met them after*).

Additionally, efforts were made to reduce variables across items. First, all items were invariably tri-clausal (i.e., [C(omplementizer)P(hrase)$_1$ ... [CP$_2$ *wh* ... [CP$_3$ ... ~~*wh*~~]]]), having extractions from CP$_3$ to CP$_2$. Second, six tokens for each condition (e.g., six tokens for *wh*-Qs with licit extractions) were kept structurally constant, being constructed on the basis of the structural descriptions given in (12) and (13). Third, the length of the six tokens of each condition was exactly the same in number of words and was nearly constant in number of syllables (±1 syllable). Last, to minimize any unwanted effect of vocabulary, words used in the target sentences were chosen carefully in terms of both frequency and familiarity on the basis of the vocabulary list in Yokokawa (2006).[9]

In addition to pairs of *wh*-Qs and RCs, an additional pair of declaratives (e.g., 14a and 14b) was also constructed for each verb. These declaratives were added to check whether the test items included expressions participants were unsure about. Hence, the declaratives were made up of the same words used in the corresponding *wh*-Qs and RCs, differing from them in absence of extraction.

(14) Decl.: *They remembered that* DP {*told them that*/*met them after*} *he* V-*ed* P DP PP.

a. With a clausal complement

They remembered that Tom told them that he cared for the patient in the clinic.

b. With an adjunct clause

They remembered that Tom met them after he cared for the patient in the clinic.

The 36 test items (i.e., six verbs × three pairs of sentences) were divided into two lists such that any two items forming a minimal pair (e.g., 14a and 14b) did not appear in the same list. This means each participant read half of the tokens in each condition (i.e., three tokens). Eighteen test items in each list (12 grammatical and six ungrammatical sentences) were mixed with eight distractors, all of which were ungrammatical due to properties other than the target one (e.g., **We forgot the machine which that Carol said that she designed last year*). The resulting 26 sentences included in each list (i.e., 18 test items + eight distractors) were pseudo-randomized to reduce ordering effects. Specifically, 26 sentences in each list were first divided by hand into blocks, in which no two items of the same condition as well as no two items with the same verb (e.g., *care for*) were included (Cowart, 1997). Then, the software automatically randomized items within the blocks as well as blocks themselves, thereby

generating a different item order for each participant.

3.5 Data Screening

Before analyzing the data, I decided to exclude another FLE participant from further analysis because this participant repeatedly chose I DON'T KNOW for some of the conditions. For the remaining participants (i.e., 20 NSEs, 20 FLEs, and 32 JLEs), trials with null responses or responses of I DON'T KNOW were excluded from analysis. Due to this screening, 5.6% (20/360), 4.2% (15/360), and 1.6% (9/576) of the data were eliminated for NSEs, FLEs and JLEs, respectively. Then, for the retained responses, the mean acceptance rate was calculated for each condition and submitted to statistical analysis. As the interest lies in whether each group distinguishes licit and illicit extractions rather than whether NSEs' and L2 learners' judgments differ quantitatively, statistical comparisons were made *within* groups per construction (e.g., Hawkins, 2012; Slabakova, 2016).[10]

3.6 Results

3.6.1 Group Results

First, to check whether the test items included words/expressions participants were unsure about, the acceptance rates for the two types of grammatical declaratives (e.g., 14a and 14b) were first computed: declaratives with a clausal complement (hereafter Comp) and declaratives with an adjunct clause (hereafter Adjunct). Figure 4 gives the results.

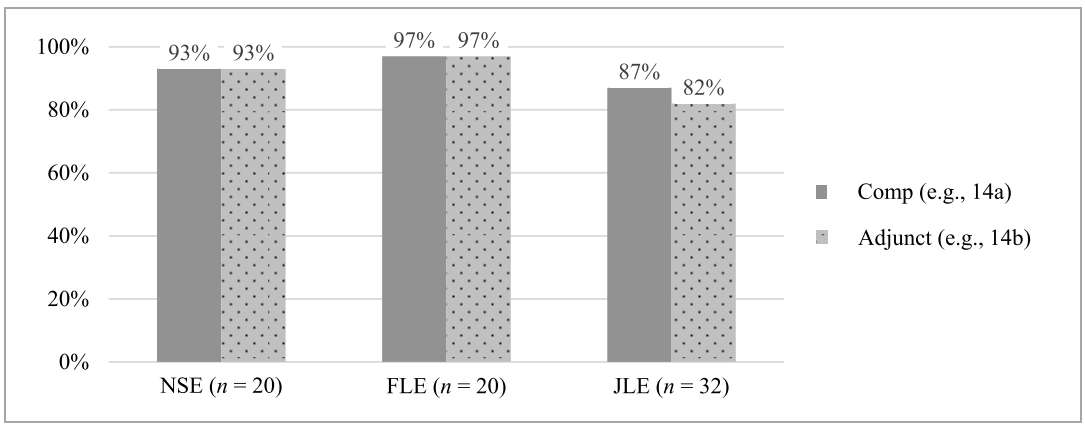

Figure 4. Mean Acceptance Rates for Declaratives

The mean acceptance rates for both types of declaratives were high for all groups. NSEs and FLEs accepted both types of declaratives almost without exception. Although JLEs' judgments were

less categorical than NSEs' and FLEs', their acceptance rates were still high for both types. The Wilcoxon matched-pairs signed-ranks tests (two-tailed) showed that the acceptance rates for the two types of declaratives were statistically indistinguishable for all groups (Z = −0.14, p = .891 for NSE; Z = 0.00, p = 1.000 for FLE; Z = −0.90, p = .370 for JLE). These results indicate that words/expressions participants were unsure about were unlikely to have been included. Thus, no further item screening was conducted for the corresponding *wh*-Qs and RCs.

Figure 5 presents the mean acceptance rates for the two types of *wh*-Qs (e.g., 12a and 12b). NSEs' mean acceptance rate for licit extractions seems somewhat lower than we might expect. This is not necessarily surprising because, as reported in L1 processing studies (e.g., Gibson, 1998), online processing of long-distance extractions is not particularly easy for native controls, even when the extractions are grammatical. Notwithstanding the difficulty accepting licit extractions, NSEs' mean acceptance rate for licit extractions was significantly higher than that for illicit extractions (Z = −3.49, p < .001), which suggests that two types of extractions were distinguished in their grammars.

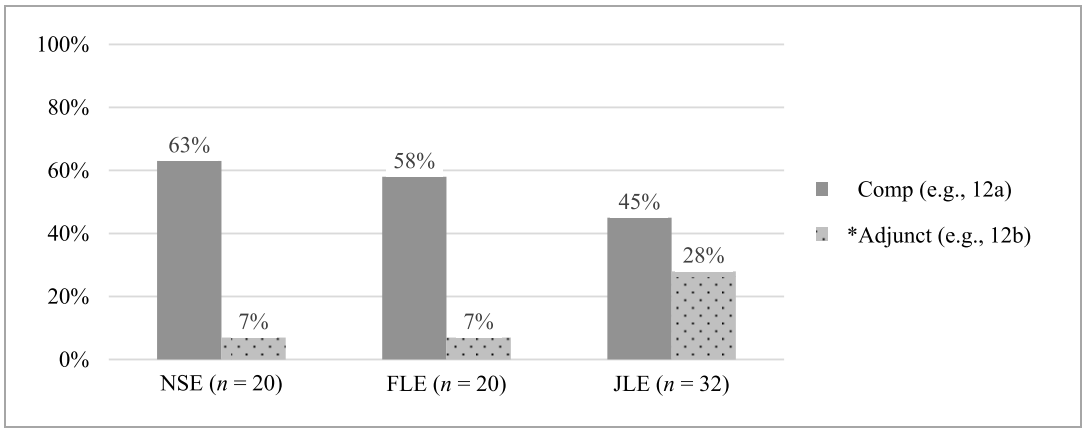

Figure 5. Mean Acceptance Rates for *Wh*-Qs

FLEs' acceptance rate for licit extractions was approximately as high as NSEs', and it was significantly higher than that for illicit extractions (Z = −3.55, p < .001). This again indicates that the two types of extractions were distinguished in FLEs' grammars as well.

Unlike NSEs and FLEs, however, interpreting JLEs' judgments is less straightforward. JLEs' acceptance rate for licit extractions was lower than NSEs' and FLEs'; conversely, their acceptance rate for illicit extractions was much higher than the other groups' rates. As JLEs' acceptance rate for licit extractions was at around chance level, it is possible that JLEs had not yet acquired long-distance movement due to effects of their L1. This claim would be too strong to be accepted, however. This is

because JLEs' acceptance rates for the two types of *wh*-Qs were indeed significantly different (Z = −2.28, p = .022). As the revised CED is inoperative in Japanese *wh*-Qs, and accordingly, the Japanese equivalents to the two types of *wh*-Qs are both grammatical (see §2), it is difficult to explain this distinction without assuming involvement of syntactic movement. Moreover, it is possible that while some of the JLEs were sensitive to the relevant distinction, other participants' judgments might conceal their sensitivity. This possibility will be explored in §3.6.2.

Finally, to examine whether L2 learners are sensitive to the illicit relativization out of adjuncts, the acceptance rates for the two types of RCs (e.g., 13a and 13b) are summarized in Figure 6. Again, NSEs did not always accept licit extractions. However, NSEs' acceptance rate for licit extractions was distinguished significantly from that for illicit extractions (Z = −3.89, p < .001). Likewise, both FLEs and JLEs made a statistically significant distinction between licit and illicit extractions (Z = −2.94, p = .003 for FLEs; Z = −3.69, p < .001 for JLEs).

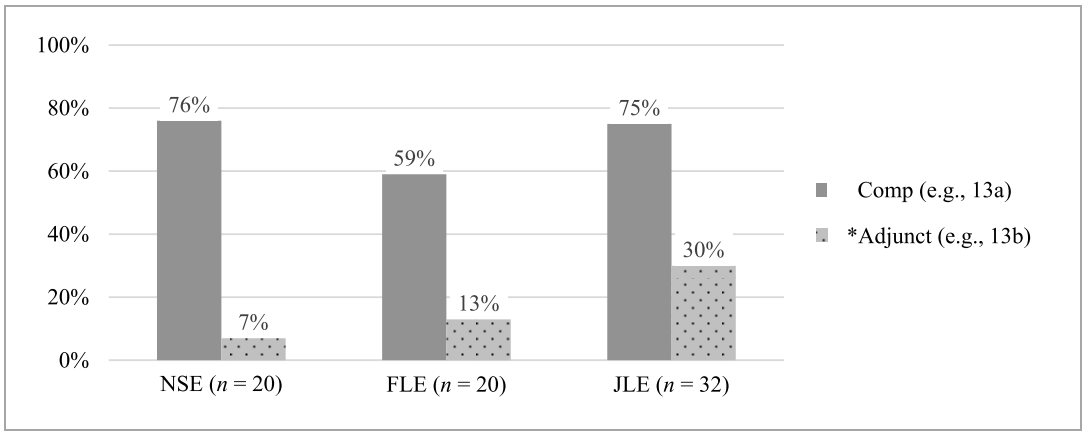

Figure 6. Mean Acceptance Rates for RCs

To summarize, despite the difficulty accepting licit extractions that even NSEs had, all groups distinguished licit and illicit extractions for both *wh*-Qs and RCs.

3.6.2 Individual Results

Group results tell us the tendencies that participants with similar backgrounds exhibit. However, they often conceal important properties in individual grammars (e.g., Hawkins et al., 2006). Hence, to confirm whether group results reflect individual grammars, individual response patterns were scrutinized in depth.

In Table 2, participants are categorized into four groups depending on: (i) whether they

consistently accepted *wh*-Qs with licit extractions (e.g., 12a); and (ii) whether they consistently rejected *wh*-Qs with illicit extractions (e.g., 12b). A 67% consistency criterion (i.e., 2/3) was adopted here to categorize participants. When participant's acceptance of *wh*-Qs with licit extractions meets/exceeds this criterion, s/he was considered to have consistently accepted them; otherwise, s/he was considered to have failed to accept them. Likewise, when participant's rejection of *wh*-Qs with illicit extractions meets/exceeds the 67% criterion, s/he was considered to have consistently rejected them; otherwise, s/he was considered to have failed to reject them. In Table 2, (i) the top left cell represents participants who consistently accepted licit extractions and consistently rejected illicit extractions; (ii) the bottom left cell shows participants who consistently accepted licit extractions but failed to reject illicit extractions; (iii) the top right cell indicates participants who failed to accept licit extractions but succeeded in rejecting illicit extractions; and (iv) the bottom right cell includes participants who neither accepted licit extractions nor rejected illicit extractions. In Table 2, the target response pattern is shaded. As the number of participants differed among groups, the proportion of participants belonging to each category is also added to parentheses.

Table 2. *Participant Distribution by Response Patterns for the Two Types of* Wh-*Qs*

a. NSE (*n* = 20)

Comp / *Adjunct	Accepted	Failed to accept
Rejected	13 (65%)	7 (35%)
Failed to reject	0 (0%)	0 (0%)

b. FLE (*n* = 20)

Comp / *Adjunct	Accepted	Failed to accept
Rejected	9 (45%)	10 (50%)
Failed to reject	1 (5%)	0 (0%)

c. JLE (*n* = 32)

Comp / *Adjunct	Accepted	Failed to accept
Rejected	9 (28%)	15 (47%)
Failed to reject	4 (13%)	4 (13%)

As Table 2 shows, 65% of NSEs (*n* = 13) responded as expected, accepting licit extractions and rejecting illicit extractions. Although 35% of NSEs (*n* = 7) did not accept licit extractions, none of the NSEs failed to reject illicit extractions. By contrast, only 45% of FLEs (*n* = 9) and 28% of JLEs (*n* = 9) responded in a target-like manner, which means that L2 learners—in particular, JLEs—had difficulty making the target distinction. However, the remaining participants were not distributed randomly. Indeed, L2 learners who failed to respond in a target-like way were largely limited to those who failed to accept licit extractions but correctly rejected illicit extractions (i.e., 10 FLEs and 15 JLEs in the top right cells). Importantly, not so many L2 learners failed to reject illicit extractions (i.e., 5% of FLEs (*n* = 1) and 26% of JLEs (*n* = 4 + 4 = 8)).

Given the properties in learners' L1, JLEs' responses are particularly interesting. As we have seen in §2, the revised CED is inoperative in Japanese *wh*-Qs; hence, JLEs are likely to accept both types of *wh*-Qs. However, only 13% of JLEs (i.e., four JLEs in the bottom left cell) accepted both types of *wh*-Qs. This means that the judgments by the majority of JLEs are not based on their L1.

Next, to examine how individuals responded to the two types of RCs, participants were again divided into four groups in accordance with their response consistency for the two types of RCs (e.g., 13a and 13b), just as in the case of *wh*-Qs (i.e., the 67% consistency criteria). The results are given in Table 3.

Table 3. *Participant Distribution by Response Patterns for the Two Types of RCs*

a. NSE (n = 20)

Comp / *Adjunct	Accepted	Failed to accept
Rejected	15 (75%)	4 (20%)
Failed to reject	1 (5%)	0 (0%)

b. FLE (n = 20)

Comp / *Adjunct	Accepted	Failed to accept
Rejected	11 (55%)	7 (35%)
Failed to reject	1 (5%)	1 (5%)

c. JLE (n = 32)

Comp / *Adjunct	Accepted	Failed to accept
Rejected	17 (53%)	5 (16%)
Failed to reject	7 (22%)	3 (9%)

Again, not all NSEs responded as expected, with only 75% of them (n = 15) accepting licit extractions while rejecting illicit extractions. Except for one NSE in the bottom left cell, the rest of the NSEs (i.e., four NSEs in the top right cell) rejected illicit extractions but did not accept licit extractions. These results are basically the same as what was found for *wh*-Qs.

By contrast, only around half of L2 learners responded in a target-like fashion. For FLEs, 55% of them (n = 11) could distinguish licit and illicit extractions. Although two FLEs failed to reject illicit extractions (i.e., FLEs in the bottom cells), the majority of FLEs who did not respond in a target-like way were those who failed to accept licit extractions but rejected illicit extractions (i.e., 35% of FLEs (n = 7) in the top right cell). In other words, nearly all FLEs (55% + 35% = 90%) succeeded in rejecting illicit extractions even though some of them failed to accept licit extractions.

JLEs' response patterns to RCs are slightly different from their responses to *wh*-Qs given in Table 2. JLEs who could distinguish licit and illicit extractions (i.e., JLEs in the top left cell) almost doubled (17 for RCs vs. nine for *wh*-Qs). At the same time, however, JLEs who responded as expected based on L1 properties (i.e., JLEs in the bottom left cell) also increased (i.e., seven for RCs vs. four for *wh*-Qs). In other words, although a non-negligible number of JLEs still seem confined to their L1, around

half of them had already departed from their L1 and had acquired the ability to distinguish licit and illicit extractions, despite the relevant constraint being inactive in their L1.

A question arising here is whether L2 learners' judgments for *wh*-Qs and RCs are related. To explore this, the results in Table 2 and Table 3 are combined in Table 4, where (i) the top left cell represents participants who succeeded in distinguishing licit and illicit extractions for both *wh*-Qs and RCs; (ii) the bottom left cell shows participants who succeeded in distinguishing licit and illicit extractions only for *wh*-Qs; (iii) the top right cell indicates participants who succeeded in distinguishing licit and illicit extractions only for RCs; and (iv) the bottom right cell includes participants who failed to distinguish licit and illicit extractions in either construction. Again, shaded cells indicate the target response pattern.

Table 4. *Participants Distribution by Response Patterns for* Wh-*Qs and RCs*

a. NSE (n = 20)

Wh-Q / RC	Succeeded	Failed
Succeeded	11 (55%)	4 (20%)
Failed	2 (10%)	3 (15%)

b. FLE (n = 20)

Wh-Q / RC	Succeeded	Failed
Succeeded	4 (20%)	6 (30%)
Failed	5 (25%)	5 (25%)

c. JLE (n = 32)

Wh-Q / RC	Succeeded	Failed
Succeeded	6 (19%)	11 (34%)
Failed	3 (9%)	12 (38%)

As can be seen in Table 4, not all NSEs responded as expected, arguably due to difficulty judging sentences presented in a word-by-word fashion. Despite this limitation, the majority of NSEs (55%, n = 11) succeeded in distinguishing licit and illicit extractions for both *wh*-Qs and RCs. On the other hand, fewer FLEs and JLEs managed to distinguish licit and illicit extractions for both constructions. However, the results given in Table 4 are intriguing in three respects.

First, there indeed exist JLEs who could distinguish licit from illicit extractions out of adjuncts for both *wh*-Qs and RCs, albeit a limited number (19%, n = 6). That is, it is possible that JLEs acquire the ability to distinguish licit and illicit extractions irrespective of constructions. Second, the majority of JLEs did not respond as expected based on the properties of Japanese. That is, the majority of JLEs distinguished licit and illicit extractions in either *wh*-Qs, RCs, or both (9% + 34% + 19% = 62%, n = 20), which indicates that their grammars are not confined to their L1. Third, the proportion of JLEs who succeeded in distinguishing licit and illicit extractions for both constructions (i.e., 19%) is similar to that of FLEs (i.e., 20%). This may imply that learners' L1 plays no role, or a limited role, in acquiring

the ability to respond in a target-like way in different syntactic constructions.

4　Discussion and Conclusion

The present study investigated Japanese and French speakers' sensitivity to the adjunct island, with two different extraction constructions (i.e., *wh*-Qs and RCs) used as targets. Main findings of the present study are summarized in (15).

(15)　a. Although not all NSEs responded as expected (particularly for licit extractions), the majority of NSEs distinguished licit from illicit extractions out of adjuncts for both *wh*-Qs and RCs.
　　b. There existed FLEs and JLEs who succeeded in distinguishing licit and illicit extractions for both *wh*-Qs and RCs even if their numbers are limited.
　　c. The majority of JLEs did not respond as predicted from their L1.

To begin with, (15a) shows that the task in the present study is not particularly easy, even for NSEs. As described in §3.3, each acceptability judgment was preceded by stimuli presented through a non-cumulative word-by-word self-paced reading procedure. Furthermore, the test items in the present study were structurally complex, invariably consisting of three clauses (see §3.4). Hence, it can be said that judging structurally complicated extractions under a high processing load is demanding even for NSEs.[11]

Given this limitation, it is not surprising that L2 learners performed less accurately than NSEs, as L2 learners' processing resources are more limited than native controls' (e.g., Clahsen & Felser, 2006; Sorace & Filiaci, 2006). Despite this, however, it was indeed possible for L2 learners to exhibit the target distinction irrespective of construction (i.e., *wh*-Qs vs. RCs) or L1 (French vs. Japanese), as summarized in (15b). This finding corroborates the view that innate principles that do not operate in a learner's L1 are still available in SLA.

In addition to learners displaying the target distinction, it is important to pay attention to L2 learners who failed to do so, although further studies will be indispensable to elucidate their grammars. In light of this, the finding (15c) is particularly intriguing. Given the properties of Japanese *wh*-Qs and RCs outlined in §2, JLEs are likely to accept both licit and illicit constructions. However, as shown in Table 2 (for *wh*-Qs) and Table 3 (for RCs), the number/proportion of such participants was limited (i.e., 13% for *wh*-Qs and 22% for RCs). That is, grammars that many JLEs had were not confined to their L1 grammars. Instead, they appear to have constructed (probably tentative) grammars that are neither target-like nor L1-based. Although whether or not such grammars are still within the range of

possible languages is an important topic to pursue, further studies are needed to elucidate more fully what specific properties such grammars have.

In relation to this, different judgments between *wh*-Qs and RCs may be worth noting: both FLEs and JLEs judged RCs more accurately than *wh*-Qs. Given that this tendency was also observed for NSEs' responses, it is possible that items for *wh*-Qs might include some unwanted factors that affect participants' judgments. It may be equally possible, however, that the relevant principle does not constrain L2 extraction constructions in an across-the-board fashion. Hence, a closer inspection of the difference between *wh*-Qs and RCs is also needed in future studies.

The present study had other limitations as well. To begin with, the results of the present study should be corroborated with an offline judgment task without self-paced reading because it was found that an acceptability judgment task preceded by self-paced reading is not particularly easy for native controls. On top of that, how L2 learners process licit and illicit extractions and how judgments and processing are (not) related are worth investigating (e.g., Lakshmanan et al., 2009; White & Juffs, 1998). It may be possible that L2 learners who fail to reject illicit extractions nevertheless process them in the same way as NSEs. Unfortunately, due to space limitations, this issue has to be left open for future studies although the present study was designed to explore this. Despite a number of limitations, it can be concluded that the present study lends credence to the view that L2 learners can access an innate principle that does not operate in their L1.

Acknowledgments

Part of the data is also presented in Hokari (2015). Special thanks go to Takayuki Akimoto and Takayuki Kimura for their valuable comments. I also thank John Matthews for his comments on the English. All shortcomings are of course mine.

Notes

1 Belikova and White (2009) conjecture that *wh*-islands, extraction out of which is acceptable in some languages (e.g., Italian), should be attributed to availability of multiple intermediate landing sites, and complex NP islands, whose acceptability is subject to individual variation (e.g., Martohardjono, 1993), might be attributed to a mixed status of the complement of N (i.e., the complement of N has the properties of an adjunct as well as a complement).

2 French also allows (non-echoic) *wh*-in-situ (e.g., *Jean a acheté quoi?* 'What has John bought?': Cheng & Rooryck, 2000, p. 4). Crucially, *wh*-in-situ is possible only for root *wh*-Qs.

3 Abbreviations used in Japanese examples are as follows: ACC = accusative; NOM = nominative; PAST = past tense; PRES = present tense; Q = question; TOP = topic.

4 The *wh*-expression can also be extracted out of the adjunct island via so-called *scrambling*, as in (i)

(i) Dono hon-o John$_i$-wa [*pro*$_i$ ~~dono hon-o~~ yonde-kara] dekake-ta-no?
Which book-ACC John-TOP which book-ACC read-after go.out-PAST-Q
'Lit.: *Which book did John go out after having read?'

Under Belikova and White's (2009) model, it is not clear how scrambling out of adjunct islands as in (i) can be accounted for. There are two possibilities. One is an invisible large-scale pied-piping of the entire adjunct island along the lines of Nishigauchi (1999). The other possibility is that scrambling is a post-syntactic operation (e.g., Sauerland & Elbourne, 2002). Due to space limitations, I do not discuss these two possibilities in depth, assuming simply that (at least long-distance) scrambling takes place outside Syntax.

Another potential problem with Belikova and White's (2009) account is preposition stranding as in (ii). The prepositional phrase headed by *in* is syntactically an adjunct; thus, it should resist extraction out of it, contrary to fact.

(ii) The world which we are living [in ~~which~~] is changing. (Radford, 2009, p. 236).

Radford, Felser, and Boxell (2012) argue that what undergoes movement is the whole prepositional phrase, and the preposition and its complement can be spelled out in different positions, as shown in (iii).

(iii) The world [~~in~~ which] we are living [in ~~which~~] is changing.

If this analysis is on the right track, preposition stranding is not necessarily problematic for Belikova and White's (2009) revised CED.

5 Although I do not know the reason why (11c) does not sound perfect, it is likely to be the factors other than Syntax, such as animacy or information structure. I would like to thank Takayuki Akimoto for pointing out these possibilities. In relation to this, Richards (1997) claims that the gap inside the adjunct island is limited to the subject position, referring to Hasegawa (1984/1985). The examples and the judgments below are from Richards (1997, (6)).

(iv) a. Subject RC
[[*ec*$_i$ party-ni ki-ta-node] Taro-ga kaettesimat-ta] hito$_i$
party-to come-PAST-because Taro-NOM go.home-PAST person
'Speaking of that person, Taro went home because (s/he) came to the party.'

b. Object RC

*[[Hanako-ga *ec*$_i$ party-ni syôtaisi-ta-node] Taro-ga kaettesimat-ta] hito$_i$
Hanako-NOM party-to invite-PAST-because Taro-NOM go.home-PAST person
'Speaking of that person, Taro went home because Hanako invited (him/her).'

However, four Japanese informants I consulted (two syntacticians, one psycholinguist, and one non-linguist) all judged (ivb) perfectly acceptable. This means that relativization out of adjuncts is possible irrespective of positions although other factors may affect its acceptability, as my informants' judgments to (ivb) and (11c) suggest.

6 Participants that were excluded based on the questionnaire include NSEs who speak non-standard variants of English (e.g., Singaporean English) and L2 learners who grew up in a multilingual family or who started learning English before the age of six.

7 Unless otherwise stated, parametric tests (e.g., *t*-test) were used only when the normality of data is confirmed with an independent test (e.g., the Shapiro-Wilk Test).

8 A self-paced reading paradigm is usually used to investigate sentence processing, rather than to investigate learners' judgments. Despite this, the present study employed this method because this study is part of a larger study to explore both representations and processing. Due to space limitations, however, this paper focuses on learners' judgments.

9 Yokokawa (2006) investigated Japanese speakers' familiarity with 2,999 high frequent English words in the British National Corpus by asking 810 Japanese university/college students to rate them with a seven-point scale (lowest familiarity = 1.0; highest familiarity = 7.0; M = 4.8, SD = 1.2). Except for function words (e.g., *the*) and proper names (e.g., *Sam*), all (content) words used in the present experiment were limited to the ones whose familiarity value is greater than or equal to 4.0.

10 In Hokari (2015), 18 additional participants (two NSEs, four FLEs, and 12 JLEs) were screened out based on their responses in other experiments. This was because, unlike the present study, the interest in Hokari (2015) lay in the relationship between preposition omission errors known as *null prepositions* (Klein, 1993) and representations of *wh*-Qs and RCs in learner grammars.

11 Since all test items are presented in the same way irrespective of grammaticality, one may wonder why NSEs could reject illicit extractions without much difficulty. In a sense, rejecting ungrammatical sentences should be easier than accepting grammatical sentences at least for native speakers. This is because grammatical knowledge internalized in their grammars is sufficient to rule out the ungrammatical sentences whereas to accept grammatical sentences, they also have to take meanings and contextual information into consideration. This difference is likely to be the reason why unexpected responses by NSEs were largely limited to licit extractions.

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