L2 Input, language aptitude, and acquisition of L2 grammar

Siwon Park
Yasuko Ito
Megumi Sugita

ABSTRACT

This paper reports the preliminary findings of a study on the acquisition of the Subjacency condition and the *wanna* contraction by Japanese learners of English. Fourteen Japanese learners of English with exceptionally high English proficiency as the experimental group and eight native speakers as the control group participated in this study. A series of grammaticality judgment experiments were conducted to test the participants' knowledge of the target constructions, and their performance was compared between the two groups. In addition, Japanese learners' language learning aptitude was examined using PLAB, and their scores were analyzed together with their performance on the judgment tasks. Their performance variables were then checked against their language learning backgrounds. The preliminary analyses of the data revealed that there was a meaningful, positive correlation between learners' academic background and their knowledge of the Subjacency condition. Furthermore, there were two exceptional Japanese learners who appeared to possess the correct knowledge of the Subjacency condition, the level of which is equivalent to that of the native speakers'. The study concludes by considering what may have contributed to these exceptional learners' acquisition of the Subjacency condition in light of their language aptitude.

INTRODUCTION

Sensitive period in L2 acquisition

A critical period has been one of frequently discussed topics in language acquisition research. While the term, "critical period", is often used in discussion of first language (L1) acquisition, "sensitive period" is preferred by some researchers in second language (L2) acquisition. A sensitive period can be defined as a stage where a second language learner could experience a serious acquisition deficit possibly due to biological constraints after puberty.

The central argument about a sensitive period in L2 acquisition concerns the mechanisms responsible for the age-specific constraints. Early research in this topic was mainly about social and affective aspects (Schumann, 1975) or the universal properties of languages (Chomsky, 1981). More recently, researchers posit biologically-based neurological processes such as lateralization of the brain (Long, 1990), while others indicate learners' growing cognitive abilities which interfere with acquisition (Newport, 1990). Still others point to linguistic characteristics of learners' L1 and L2 that are responsible for a sensitive period (Slavoff & Johnson, 1995).

Although different researchers propose different factors as responsible for a sensitive period, it is apparent that in both L1 and L2 learning, child learners invariably are more successful than adult learners in acquiring the target language. Whatever mechanism is responsible for language acquisition, it is somehow different between children and adults. Hence, a general agreement has been that the age of onset has an impact to some extent on the ultimate attainment in second language acquisition (Hyltenstam & Abrahamsson, 2003). According to Long (1993), there is "considerable evidence that the age at which learners are initially

exposed to a language (age of onset, or AO) is a robust predictor of their long-term success in that language, particularly as to whether or not they can obtain native-like abilities in an L2" (p. 197).

Many studies have investigated how the age of onset affects L2 acquisition. Patkowski (1980) examined 67 immigrants with their syntactic proficiency in L2 English who had various age of onset (AO) and length of residence (LoR). He found AO negatively correlated with syntactic proficiency; learners with an AO of less than 15 performed significantly better than those arriving after 15 years of age. Johnson and Newport (1991) have also found that there seems to be a more rapid drop-off ability to use the putative universally available principle of Subjacency in one's second language, if the initial immersion is after 14 years old. Similarly, Sorace (1993) claims there were substantial differences between the near-native speakers and the native control group, thereby setting the terminus for auxiliary choice at less than 18 years of age.

Language aptitude and SLA

While the primary concern of the studies about sensitive periods in L2 acquisition has been regarding the successful representation of the target grammar in learners' minds, language aptitude has also been a learner characteristic frequently discussed together with the acquisition of L2 grammar. Language learning aptitude refers to the "ability to succeed in learning a foreign language given adequate instruction and/or experience" (Ross, Sasaki, & Yoshinaga, 1998; 268).

When individual differences are found in L2 acquisition, one needs to further examine what (learner characteristic(s)) may be responsible for such a variability among L2 learners that enables some learners to acquire the target grammar while

not others. Conversely, no matter how talented an L2 learner may be, a native-like acquisition of L2 must not be possible once we acknowledge the existence of a critical period. This is the reason why language learning aptitude has frequently been considered as the learner characteristic that leads L2 learners to the successful acquisition of the target language.

Among the studies concerning the relationship between language aptitude and L2 acquisition, DeKeyser (2000) examined the relationship with 57 Hungarian learners of English using their grammaticality judgments on a replication of Johnson and Newport's (1989) study. He assessed his learners' aptitude using the Modern Language Aptitude Test (Carroll & Sapon, 1959). His results of the grammaticality judgment test were similar to Johnson and Newport's, which showed a negative correlation between proficiency and AO. The results of the aptitude test, although not as clear-cut, support Bley-Vroman's (1988) Fundamental Difference Hypothesis, which states, loosely, that for adults to acquire native-like proficiency, they need to rely on a mechanism that is different than that of the child learners'; in this case above average analytical abilities.

Harley and Hart (1997) compared the relationship between aptitude (memory and analytical ability) and various L2 proficiency measures in their study of Canadian French immersion students. They reported that early immersion students' L2 achievements correlated with their memory measures, while the successful late immersion students tended to rely on their analytical abilities. In a subsequent study looking at French immersion learning in a natural environment, Harley and Hart (2002) obtained similar results, although not as consistent as in the previous study. However, they did find that "age of initial intensive exposure is a factor affecting students' L2 learning orientation, whether

inside or outside the L2 classroom environment" (p. 326); thereby, supporting the notion of a sensitive period.

Target constructions

Two syntactic constructions were selected for this study, namely Subjacency and *wanna* contraction. The acquisition of these two constructions was investigated by Park and Goldner (2005) with Korean native speakers speaking English as a second language, who were divided into two groups, pre-puberty and post-puberty. Their findings indicated that there were clear differences between the pre-puberty and the post-puberty groups as well as the native control group in their performance of grammaticality judgment tasks with Subjacency and *wanna*. Yet, no meaningful differences were observable between the pre-puberty and the native control groups in their performance on the same grammar constructions.

The current study aims to explore the acquisition of the Subjacency condition and the *wanna* contraction by learners of English speaking Japanese as their first language and the following exemplify the two constructions:

Consider the following sentences:

1. The Subjacency condition:

(1a) [CP Whoi did [IP she say [CP that [IP John saw ti]]]]?

(1b) *[CP Whoi [IP does she believe [NP my statement [CP ti that [IP John saw ti]]]]]?

2. The *wanna* contraction:

(2a) Who do they wanna spread the rumor about?

(2b) *Who do they wanna spread the rumor?

As for the Subjacency condition, since CP and IP are bounding nodes in English, a sentence like (1b), in which '*who*' moves over two bounding nodes, will result being ungrammatical, although still leaving (1a) grammatical. However, since Japanese does not utilize such a condition due to the lack of '*wh*-movement', late Japanese learners of English are expected to often demonstrate inconsistent judgment with respect to the grammaticality of the sentences such as (1a) and (1b).

Such lack of '*wh*-movement' in their first language will also make acquiring the rules for *wanna* construction difficult for Japanese learners of English. The contraction of *want to* to *wanna* is constrained by what is known as the empty category principle. The principle indicates that in *wh*-questions, when the *wh*-word is moved to the beginning of the sentence, a trace (*t*) is left in the original position, as in the example sentences in (2a) and (2b). Consequently, *want to* in (2b) cannot be contracted due to the trace that stays between them. In (2a), however, since the trace lies at the end of the sentence, contraction is not constrained.

With the two target constructions introduced earlier, the present study attempts to examine the argument of sensitive period(s). In partial replication of Park and Goldner's (2005) study, we decided to invite only Japanese learners of English to our study with exceptionally high proficiency and also with as much exposure to the target language as possible in a formal as well as informal learning environment.

Purpose of the study

The purpose of the study is to examine whether L2 learners can acquire a native-like intuition for two English constructions, the Subjacency condition and the *wanna* contraction, which do not apply in their L1 and are not prevalent in the

L2 input. We hypothesize that in contrast to the native control group, the L2 experimental group, even after extensive formal experience in the learning of English and attaining an advanced level of proficiency, will still demonstrate incorrect or imperfect competence of Subjacency knowledge due to maturational constraints.

In addition to the grammatical acquisition, the participants' language aptitude is considered to examine if there are any meaningful relations between the acquisition of the target constructions and the level of language aptitude. Demonstration of a weak or no relationship between the two factors will at least partially support the idea that the two seemingly difficult linguistic constructions are not acquirable by L2 learners even of a high language aptitude.

METHOD

Participants

Fourteen Japanese learners of English as the experimental group and eight native speakers of English as the control group participated in this study. The Japanese participants varied in their age, length of residence (LoR) in (an) English speaking countries, English proficiency measured by TOEIC, and academic backgrounds. Their average age was 29, and two of them were male and the rest female. Their average LoR was 4.79 years ranging from no experience of living abroad to 12 years of residence in English speaking countries. Their average TOEIC score was 907.73, indicating that the participants' English proficiency in this study are exceptionally high. At the same time, their academic background considerably varied ranging from college students to MA holders.

In addition to the Japanese participants, eight native speakers of English

participated in this study. They served as a native control group to provide the evaluative criteria against the performance by Japanese learners for each grammaticality judgment test, i.e., how close their grammaticality judgment is to that of those English native speakers'. Four of them were Americans, three were British, and one was a Canadian.

Instruments and data collection

As explained earlier, two English constructions were used for the research purpose: Subjacency condition and *wanna* contraction. First, the items included in the two judgment tests were piloted, and ones evaluated by native speakers ambiguous for their grammaticality were all excluded from the final version of the task instruments. The final versions included 60 items for the grammaticality of the Subjacency condition – 30 reading and 30 listening items – and 30 items for the *wanna* contraction presented aurally (see Park and Goldner, 2005, for the full descriptions of the judgment instruments). The two constructions were presented to the participants in written as well as spoken modes in order to control for a possible bias due to the mode of presentation.

In addition to the grammaticality measures, a language aptitude test was conducted to measure each participant's level of foreign language aptitude so that the aptitude variable could be examined in relation to the grammaticality measures. In this study, the Pimsleur Language Aptitude Battery (PLAB) was used, which has been known dependable as a foreign language aptitude test for adult L2 learners. The battery is structured into six parts, but for the research purpose, only the last four parts were given to the participants, and their scores were analyzed in relation to other research variables. Table 1 below gives a quick reference to each part of the test regarding what aspect of language

aptitude it is supposed to assess.

Table 1 Parts of PLAB and their descriptions

Part	Description
Part 3:	Vocabulary: working knowledge in English
Part 4:	Language analysis: ability to reason logically in terms of a foreign language
Part 5:	Sound discrimination: ability to learn new phonetic distinctions and to recognize them in different contexts
Part 6:	Sound – Symbol association: an association of sounds with their written symbols

For data collection, the following forms and tasks were presented to the participants one after another.

- Consent form
- A survey for the participants' background
- A language aptitude test (PLAB)
- A written grammaticality judgment task
- A listening grammaticality judgment task
- (A follow-up interview, if necessary)

Once participants sign the consent form and complete the background survey form, each person was asked to respond to a series of the research instruments, beginning with a language aptitude test (PLAB). The listening judgment test was conducted using a CD recording, and when it was done, an interview followed if it was necessary to obtain more information about the participants' background. The collected data were later entered into EXCEL and were analyzed to address the research purpose.

RESULTS

Preliminary analyses

Table 2 reports the descriptive statistics of the judgment tests as well as their reliabilities.

Table 2 Descriptive statistics

Tests	*N*	*k*	Mean	Mode	Median	*SD*	Range	*R*
L/C grammaticality	22	64	48.47	54	51	10.04	28 - 64	.95
wanna	22	34	27.79	32	28	5.30	18 - 34	
L/C-Subjacency	22	30	20.68	21	21	5.51	13 - 30	
Written-Subjacency	22	30	23.05	23	23	4.44	16 - 30	.93

Note: L/C = listening

Since the knowledge of the *wanna* contraction could not be properly assessed in the written mode, only the L/C part was employed in the experiment. Although the *wanna* data were slightly negatively distributed, other judgment tests produced centered distributions. The reliability coefficients of the listening and written grammaticality judgment tests resulted desirably high, indicating that the test instruments used in this study were reliable to assess the participants' knowledge of the two target constructions.

Group comparisons

Table 3 below presents the means and standard deviations (DV) of the two groups of the native control and the Japanese learners across the two target constructions in the L/C test. The performance outcomes produced by the two groups were statistically different of the two tests; for *Subjacency*, $t(20) = 5.467$, $p < .001$ and for *wanna*, $t(20) = 3.971$, $p < .001$.

Table 3 Descriptive statistics for the group means of the L/C test

Tests	Group	Mean	*SD*
wanna	Native	55.50	4.31
	Japanese learners	39.86	7.36
L/C-Subjacency	Native	33.00	0.93
	Japanese learners	25.93	4.94

Correlations

Following the group mean comparisons, correlations were examined across the variables of judgment scores, language aptitude test scores (i.e., PLAB Part scores), and the Japanese learners' backgrounds, and the results are reported in Table 4. There were several notable correlation coefficients found between LoR and PLAB Part 3 ($r = .541$, $p < .05$), Subjacency and academic background ($r = .694$, $p < .05$), and the two grammaticality judgment tests ($r = .605$, $p < .05$).

Table 4 Correlation coefficients across language aptitude, learner backgrounds, and the judgment tasks

	1	2	3	4	5	6	7
1. PLAB Part 3	1.00	-	-	-	-	-	-
2. PLAB Part 4	.359	1.00	-	-	-	-	-
3. PLAB Part 5	-.140	.740*	1.00	-	-	-	-
4. PLAB Part 6	.207	.534*	.610*	1.00	-	-	-
5. Academic bg	.140	.156	-.161	-.082	1.00	-	-
6. LoR	**.541***	.022	-.166	.026	.153	1.00	-
7. Subjacency	.110	.433	.205	.260	**.694***	.121	1.00
8. *wanna*	-.105	.414	.372	.266	.322	.025	**.605***

* significant at the 0.05 level

While the significant correlation coefficients between Subjacency and *wanna* and PLAB Part 3 and LoR were rather predictable findings, the relatively high correlation coefficient between academic background and Subjacency was never expected.

Exceptional learners

As there was a significant correlation found between Subjacency and the academic background variable, a closer look was given at the learners' individual background factors, their performance outcomes on the grammaticality judgment tests, and the language aptitude test, PLAB.

Two Japanese participants exhibited exceptionally high performance on the grammaticality of the two target constructions, especially of Subjacency, which is equivalent to that of the natives'. Below provides information regarding these two learners' academic and language learning backgrounds.

- Both possess extremely high English proficiency (IELTS 7.5 and TOEFL over 650, paper-based)
- Both are MA holders; one in Applied Linguistics (& French) and the other in Communication (& ESL)
- Both teach English at a college

Interestingly, as shown in Table 5 below, both of the learners performed exceptionally well on the language aptitude test, especially demonstrating a nearly perfect ability of sound discrimination measured by Part 5 of PLAB.

Table 5 **Scores by two exceptional learners on grammaticality judgment tasks and PLAB Parts**

	Subjacency	*wanna*	PLAB Part 3	PLAB Part 4	PLAB Part 5	PLAB Part 6
Learner 1	51	27	11	14	**29**	24
Learner 2	49	32	9	14	**30**	22

DISCUSSIONS AND CONCLUSIONS

A series of analyses were performed to address the research purposes in this study. First, the mean scores of the native control and the Japanese L2 groups were compared on the grammaticality judgment tests. On both Subjacency and *wanna* constructions, the L2 group's performance was significantly lower than that of the native control group indicating that the L2 learners (as a group) do not possess the correct grammar of the two constructions even though their English proficiency is exceptionally high.

Correlations were also checked between the variables of judgment scores, language aptitude test scores (i.e., PLAB Part scores), and the learners' backgrounds, and the results are shown in Table 4. Among the correlation coefficients that resulted with statistical significance, the one between academic background and Subjacency required attention. That is, what really matters in the acquisition of the two constructions examined in this study could be how intensively and laboriously (represented as the academic background) an L2 learner studies English rather than how long (LoR) or how early (i.e., AO). Such a finding clearly falsifies our prediction and compels us to modify our assumption regarding the learnability of the Subjacency and the *wanna* constructions. In

addition, this finding calls for a more thorough and theoretical speculation as to the status of the two constructions in the UG account as well as a reconsideration of the research instrument and the performance data produced by the learners.

In a partial attempt to understand the findings from the correlational analyses, a closer look at the individual participants was given to the data. It revealed that at least two learners performed exceptionally well on the judgment tests, i.e., their performance fell within the acceptable limits of the native control. Among other things, as found through the correlational analyses, these two learners were the ones who have studied English for the academic purposes and have continued to use it especially as college English teachers. Hence, there is a strong possibility that they have paid continuous and sometimes intensive attention to the grammatical aspects of English and such an endeavor, whether conscious or unconscious, may have helped them acquire the two target constructions examined in this study.

Before concluding the study, however, we would like to acknowledge that all our findings must be considered tentative. Our preliminary findings require much more sophisticated speculations in light of recent accounts on the status of '*wh*-movement' especially under the framework of Minimalism (Belikova & White, 2009). In addition, there is a strong need for an examination of the Japanese syntax in relation to the status of the Subjacency condition (Watanabe, 2001) and reconsideration of the transferability of the knowledge from L1 to L2, which may invalidate the assumption that the Subjacency condition is not utilized in L1, i.e., Japanese, in the acquisition of L2, English. Moreover, future research will require further theoretical examinations and speculations of L2 learners' performance on individual items to assess different grammatical aspects of

wh-movement presented in the test instruments of this study.

REFERENCES

Belikova, A., & White, L. (2009). Evidence for the fundamental difference hypothesis or not? Island constraints revisited. *SSLA, 31*, 199-223.

Bley-Vroman, R. (1988). Confounded age: Linguistic and cognitive factors in age differences for second language acquisition. In D. Birdsong (Ed.), *Second language acquisition and the Critical Period Hypothesis* (pp. 19-30). Mahwah, NJ: Erlbaum.

Carrol, J. B., & Sapon, S. M. (1959). *Modern Language Aptitude Test (MLAT)*. San Antonio: Psychological Corporation.

Chomsky, N. (1981). *Lectures on government and binding*. Dordrecht: Foris.

DeKeyser, R. M. (2000). The robustness of critical period effects in second language acquisition. *Studies in Second Language Acquisition, 22*, 499-533.

Harley, B., & Hart, D. (1997). Language aptitude and second language proficiency in classroom learners of different starting ages. *Studies in Second Language Acquisition, 19*, 379-400.

Harley, B., & Hart, D. (2002). Age, aptitude, and second language learning on a bilingual exchange. In P. Robinson (Ed.), *Individual differences and instructed language learning.* Philadelphia: John Benjamins.

Hyltenstam, K., & Abrahamsson, N. (2003). Maturational constraints in SLA. In C. J. Doughty and M. H. Long (Eds.), *The handbook of second language acquisition* (pp. 539-588). Malden, MA: Blackwell Publishing.

Johnson, J. S., & Newport, E. L. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology, 21*, 60-99.

Johnson, J. S., & Newport, E. L. (1991). Critical period effects on universal properties of language: The status of subjacency in the acquisition of a

second language. *Cognition, 39*, 215-258.

Long, M. H. (1990). Maturational constraints on language development. *Studies in Second Language Acquisition, 12*, 251-285.

Long, M. H. (1993). Second language acquisition as a function of age: substantive findings and methodological issues. In K. Hyltenstam and A.Viberg (Eds.), *Progression and regression in language* (pp. 196-221). Cambridge: Cambridge University Press.

Newport, E. L. (1990). Maturational constraints on language learning. *Cognitive Science, 14,* 11-28.

Park, S., & Goldner, D. K. (2005). A sensitive period for the acquisition of English syntax by Korean learners of English. *Korean Journal of Applied Linguistics, 21*(1), 37-67.

Patkowski, M. S. (1980). The sensitive period for the acquisition of syntax in a second language. *Language Learning, 30*(2), 449-472.

Ross, S., Sasaki, M., & Yoshinaga, N. (1998). Compensatory factors in post-critical period SLA. A paper presented in SLRF 98. University of Hawai`i at Manoa.

Sorace, A. (1993). Incomplete vs. divergent representations of unaccusativity in non-native grammars of Italian. *Second Language Research, 9*, 22-47.

Schumann, J. H. (1975). Affective factors and the problem of age in second language acquisition. *Language Learning, 25*, 209-35.

Slavoff, G. R., & Johnson, J. S. (1995). The effects of age on the rate of learning a second Language. *Studies in Second Language Acquisition, 17*, 1-16.

Watanabe, A. (2001). Wh-in-situ languages. In M. Baltin and C. Collins (Eds.), *The handbook of contemporary syntactic theory.* Oxford: Blackwell Publishers.