

## 臨界期仮説と第2言語の統語構造理解：予備的調査

Critical Period Hypothesis and Syntactic Comprehension in Second Language :  
A Preliminary Study

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### Abstract:

This paper focuses on the issues of age and second language (L2) acquisition. It presents research results concerning the comprehension of Japanese syntax by 90 Chinese adult learners of Japanese as an L2, who were exposed to Japanese in a natural environment. There are especially two objectives in this study. The first one is to examine whether learners who start learning Japanese as an L2 after 15 years of arrival age, which is often considered as an upper limit of critical period for language learning, can over time come to fully comprehend the thematic relations assigned to the nouns. The second objective of the paper is an attempt to investigate whether there is a difficulty order of syntactic comprehension among the sentences in question by these L2 learners. The results show that not only the learners in 15-20 and 20-25, but also most of the learners whose arrival ages were 25 years old and over, still have achieved almost perfect achievements. The results also show that there is a difficulty order among the test sentences. Thus, it can be assumed from these results that at least some of the L2 grammatical items appear to be little influenced by the age factor, and could be learned with a fixed route.

### 1. Introduction

This paper focuses on the issues of age and second language (L2) acquisition. <sup>(1)</sup> It presents research results concerning the comprehension of Japanese grammatical case systems by 90 Chinese adult learners of Japanese as an L2, who were exposed to Japanese in a natural environment. There are especially two objectives in this study. The first one is to examine whether learners who start learning Japanese as an L2 after 15 years of arrival age, which is often considered as an upper limit of critical period for language learning, can over time come to fully comprehend the thematic relations assigned to the nouns. The second objective of the paper is an attempt to investigate whether there is a difficulty order of syntactic comprehension among the sentences in question by these L2 learners.

The literature of L2 acquisition has argued that several factors, such as the age at which the learner starts the L2, the length of learning, the amount of exposure to the L2, gender, motivation and affect, ability to mimic, and/or musical ability will influence the learner's L2 development (Gardner, 1985 ; Thompson, 1991). It is also commonly believed that the most important factor among these is not how long the learners stay in a target-language country, but when they start learning the L2 : The early start will bring you a rich result. (Krashen, Long & Scarcella, 1982 ; Long, 1990). This issue of critical period of language learning is related to the question of the full operation of the language acquisition faculty suggested to be innately endowed in our minds (Chomsky, 1988 ; Cook & Newson, 1995).

Some researchers claim that only child L2 learners are able to acquire the full range of language behaviors (Patkowski, 1980 ; Coppieters, 1987 ; Johnson & Newport, 1989, 1991 ; Long, 1990 ; Larsen-Freeman & Long, 1991 ; Johnson, 1992). Johnson & Newport (1989), for example, examined the achievement of grammatical knowledge of Korean and Chinese migrants to the U.S. according to the age difference at which they arrived. The results show that the learners before age 7 were able to attain a native like competence, and with the increase of age, the learners' achievement decline in linear fashion until around age 15. After age 15, the decline still continues, though the learners' performances have a wide range of variation. These studies suggest that there is a critical period for acquisition and that learners' abilities for acquiring the L2 syntax will decline with age.

Patkowski (1980) had experienced raters evaluate the written transcripts of spoken passages performed by native and nonnative speakers of English based on syntactic accuracy. He also reached a similar conclusion as Johnson & Newport (1989, 1991) that there exists a big difference in the scores of the learners before and after the age 15 of arrival time. Long (1990) also supports the "age 15 hypothesis" saying that as far as the acquisition of morphology and syntax is concerned, age 15 is a "sensitive period," whereas age-related constraints begin to set as early as 6 for phonology. Long insists on the "younger the better" hypothesis and "multiple critical periods hypothesis" originally proposed by Seliger (1978).

However, all L2 researchers do not believe this "younger the better" hypothesis. There are other researchers who claim that the data of child superiority are so ambiguous in terms of their methodologies of the data collection that it is still unclear whether only child L2 learners can attain native-like ability in every domain of L2 acquisition (Hatch, 1983 ; McLaughlin, 1987 ; Singleton, 1989, 1995 ; Bialystok & Hakuta, 1994 ; Gass & Selinker, 1994 ; Kellerman, 1995 ; Martohardjono & Flynn, 1995).

In fact, there are few experimental studies to support with confirming data that child L2 starters have actually attained a native-like ability and adult L2 starters have not, particularly in the acquisition of syntax. Bialystok & Hakuta (1994) and Kellerman (1995), for example, point out several deficiencies of the method and materials Johnson & Newport (1989, 1991) and Johnson (1992) used, and the way they interpret their data.

Kellerman (1995) claims that “it is doubtful whether Johnson & Newport (1989) or the virtual replication by Johnson (1992) really have very much to contribute to the important ‘critical period for L2 acquisition’ debate ”(p. 220). To summarize Kellerman’s claim, there might be a critical period for L2 acquisition. But before asserting the hypothesis, we must collect the acquisition data to support it objectively using suitable experimental methods and materials.

Another important question relating to the age factor is as follows. Let us imagine that adults are inferior to children in L2 acquisition. Then, are L2 adults inferior to L2 children in every domain of acquisition, or is adult inferiority only limited to some domains like the acquisition of phonology? In other words, do L2 adults stop developing their proficiencies in every aspect? In fact, as Bialystok & Hakuta (1994) and Kellerman (1995) claim, in Johnson (1992), the only significant differences between the early arrivals (3-7) and the adult arrivals (17-39) are restricted to merely three of the twelve rule types: Determiners, Plural and Subcategorization.

Although age 15 has been generally considered the “barrier” to obtain a native-like level in morphosyntactic acquisition (Long, 1990), after reanalyzing Johnson & Newport’s (1989) data, Bialystok & Hakuta (1994) and Kellerman (1995) claim that the critical period cut-off point can easily be shifted to age 20. They assert that one of the crucial reasons for “the younger the better” is the amount of exposure to formal grammar instructions: younger arrivals have more exposure than older ones at school.

The other question of “the younger the better” is related to the subjects’ real “first language.” What is the first language (L1) of the learners who arrive at a target language country before age 7? They do not behave like a native speaker, but they are really native speakers of that language (Kellerman, 1995).

In short, it has been empirically believed that child L2 learners are superior to adult L2 learners in the long-term attainment, but so far there have been surprisingly few data supporting this hypothesis. Focusing on the acquisition of Japanese case systems by adult L2 learners, the present paper will examine whether the learners past age 15 upon arrival still can comprehend the thematic role orders assigned to nouns.

A second purpose of the paper, as was mentioned earlier, is to examine the difficulty order of the comprehension of the Japanese structures in question. It is generally claimed that in the case of L2 acquisition as well as L1 acquisition, the learners acquire a knowledge of a target language following a relatively fixed acquisition route (Ellis, 1985, 1994 ; Towell & Hawkins, 1994). Thus, it is said that although there exist L1 transfer errors in the learner’s interlanguage, they do not influence to the extent which crucially changes the natural route of L2 acquisition (Ellis, 1985, 1994 ; Cook, 1991, 1993). The L2 learners are said to develop their ability of the target language grammar roughly following a fixed route with little regard to their different learning environments, age difference, and/or L1 difference. In fact, plenty of experimental studies of the L2 acquisition have shown strong similarities in the developmental routes among L2 learners with a variety of language

learning backgrounds, though, of course, they are not exactly the same (Cook, 1991, 1993). If this “natural route” hypothesis holds true, in the case that L2 learners comprehend the verb transitive structures of Japanese, the learners’ proficiency level for test sentences will show a gradual rise from time to time. Now let us examine the test sentences used in this experiment.

## 2 . Scrambled sentences in Japanese

English has a relatively rigid word order. Its canonical word order is *Subject + Verb + Object (SVO)*. Therefore, the categorical order of syntax is *Noun + Noun + Verb (NNV)*. (1)-a and (1)-b below have different meanings. In (1)-a, the agent of verb, “kicked,” is *John*, and *Mary* plays a thematic role of Theme, while in (1)-b, the thematic roles become reversed: *Mary-Agent* and *John-Theme*. In the English active sentences, the sentential subject (Agent) must always be in the left position of the verb, and the object (Theme) must always be in the right position of the verb. On the other hand, a prepositional phrase or an adverbial phrase is relatively freely moved, as seen in (1)-c.

- (1) a . John      kicked      Mary      in the classroom.  
           <agent>                      <theme>  
       b . Mary kicked John in the classroom.  
       c . In the classroom John kicked Mary.

Let us examine the Japanese language next. Japanese canonical word order is *Subject + Object + Verb (SOV)*. That is, *N1-ga N2-o V (NNV)*. Its canonical order of thematic roles is Agent-Theme, which is as same as that of English. However, Japanese allows for relatively free word order, except that the main verb is basically placed at the end of the sentence. The sentences in which some constituents are not in the canonical word order are called scrambled sentences (Bever, 1970 ; Hayashibe, 1975 ; Otsu, 1994). Consider the following examples in (2). All of them are the same meaning. Scrambled sentences are allowed in Japanese because case marker particles such as *ga* (nominative), *o* (accusative) and/or *ni* (dative) tell us the functions of the noun or the noun phrase (NP).

Let us next examine the order of thematic roles assigned to nouns in Japanese. Agent-Theme is a canonical order of the thematic role when syntactic order is canonical in (2)-a. On the other hand, the order of thematic role becomes reversed in the scrambled sentences like (2)-b even if the categorical order of syntax stays the same as the canonical one (N-N-V).

- (2) a . neko-ga      kuma-o      ketta. [A (Active)]  
           <agent>      <theme>  
           neko-nom    kuma-acc    kick-past  
           “The cat kicked the bear.”

- b. kuma-o     neko-ga     ketta. [AN (Active Noncanonical)]  
     <theme>   <agent>
- c. neko-ga     ketta,         kuma-o. [RDTh (Right-Dislocation Theme)]  
     <agent>   <theme>
- d. kuma-o     ketta,         neko-ga. [RDAg (Right-Dislocation Agent)]  
     <theme>   <agent>

Putting the four structures of active voice in order, (2)-a is a simple active sentence of verb transitive structure ([A]). Its thematic role order is Agent-Theme and categorical order of syntax is NNV. (2)-b is different from (2)-a in the order of thematic roles. It is formed Theme-Agent. This structure will be called Active Noncanonical ([AN]) from now on.

The main verb must basically be at the end of the sentence in Japanese as was mentioned earlier. However, there are exceptional cases for this restriction. (2)-c and (2)-d are examples of this exception. These sentences are called Right-Dislocation or Afterthought, in which some constituents are moved to the right of the verb. The Right-Dislocation is often observed in spoken Japanese. Both (2)-c and (2)-d have NVN in categorical order. The difference between (2)-c and (2)-d is the order of thematic roles. (2)-c has an Agent-Theme order, while (2)-d is Theme-Agent. Thus, (2)-c is Right-Dislocation Theme ([RDTh]) and (2)-d is Right-Dislocation Agent ([RDAg]).

Let us look at passive sentences. Below are the illustrations of the four variants. (3)-a is a canonical Japanese passive structure (Passive [P]). It has Theme-Agent order of thematic roles, which is a canonical order of thematic roles for the passive. The categorical order is NNV. (3)-b has also Theme-Agent order, but NVN categorical order (Right-Dislocation Agent Passive [RDAgP]). On the other hand, the thematic orders of (3)-c (Reversed Passive [RP]) and (3)-d (RD (Right-Dislocation Theme Passive [RD])) are Agent-Theme. (3)-c has NNV, while (3)-d has NVN order.

In the present study, these eight sentences ((2) a, b, c, d and (3) a, b, c, d) are an attempt to examine the extent of Japanese L2 learners' comprehension.

- (3) a. neko-ga     kuma-ni         os-are-ta [P(Passive)]  
       <theme>   <agent>  
       cat-nom   bear-by         push-pass-past  
       "The cat was pushed by the bear."
- b. neko-ga     osareta     kuma-ni [RDAgP(Right-Dislocation Agent Passive)]  
     <theme>                      <agent>
- c. kuma-ni     neko-ga     osareta [RP(Reversed Passive)]  
     <agent>   <theme>
- d. kuma-ni     osareta     neko-ga [RDThP(Right-Dislocation Theme Passive)]  
     <agent>   <theme>

Consider the present subjects' L1, Chinese. Chinese canonical word order is SVO (N-V-N). Unlike Japanese, Chinese does not allow scrambled sentences. However, while Japanese canonical order of thematic roles is Agent-Theme, that of Chinese is also Agent-Theme. There is no inflection of nouns in accordance with grammatical cases. Chinese depends upon the word order to be understood which noun is the subject of a sentence and which is the object. If the Chinese learners achieve a high comprehension of Agent-Theme structures in the present experiment, it could be said that it might be influenced by their L1 structure. A Chinese example is shown in (4).

(4)      wo        kan      shu.  
           I        read    book  
           <agent>      <theme>

\* shu kan wo.

### 3 . Acquisition of scrambled and related sentences

The issue of a learning strategy by L1 children to utilize word order for assigning thematic roles was first argued by Bever (1970). Bever (1970) claims that in order to comprehend the meaning of a sentence, young children will have a tendency to use a certain comprehension strategy other than grammatical rules. They are generally called "perception strategies." Word order strategy is one of Bever's proposed perception strategies. Language learners automatically assign the thematic role of Agent to the first noun in the sentence, and the second noun, Theme, if the sentence they hear is divided into N-V-N. If the learner follows this strategy, he can assign suitable thematic roles to the nouns in *John kicked Mary*. However, if the learner depends too much upon the strategy, he errs in assigning the incorrect thematic roles to the nouns in sentences like *Mary was kicked by John*. That is, the learner may possibly assign *Mary* Agent, and *John* Theme.

Dependence on the word order strategy in assigning the thematic roles will, therefore, lead to both correct and erroneous responses. In the case of English and French, learners make more correct responses to sentences of the form N-V-N, in which successive nouns play the role of Agent-Theme, than they do to sentences of the form N-that-N-V or N-V-by-N, in which successive nouns play the roles of Theme-Agent.

If the Chinese learners of Japanese as an L2 use the same kind of strategy in the early stage of acquisition, it is presumed that they will assign correct thematic roles to the sentences with canonical order of thematic roles, but will assign incorrect thematic roles to the non-canonical sentences. If the canonicity of thematic role order determines L2 learners' responses to interpret semantically reversible sentences at an early stage of their acquisition, the sentences which have Agent-Theme are easier to comprehend than those which have a reversed Theme-Agent order. However, since the present adult L2 learners have already acquired Chinese, it is difficult to determine which strategy, word order

strategy or L1 transfer strategy, or universal strategy, they use when they comprehend the thematic roles of Agent-Theme.

Then, let us look at syntactic comprehension by Japanese aphasics. The studies dealing with the syntactic comprehension by aphasic patients report that they also tend to assign thematic roles on the basis of word order. Hagiwara (1990) is one of the studies dealing with this issue. She claims that for the Japanese aphasic patients, what is most important is not the order of syntactic categories but the order of thematic roles. When the category orders are N-N-V, Agent-Theme case is more comprehensible than the case of Theme-Agent.

Hagiwara's (1990) results also show that Japanese aphasics tend to assign the thematic role of Theme to the immediately preverbal noun. It seems that Japanese aphasics try to preserve the integrity of the Japanese verb phrase (VP) structure, N-V. In the sentences in which the integrity of the VP breaks down, aphasics' performances tend to be worse. On the other hand, it is reported that aphasic patients whose L1 have V-N verb phrases, such as French and English, tend to assign the thematic role of Theme to the NP immediately following the verb (Caplan, Baker, & Dehault, 1985; Caplan & Futter, 1986). These results also suggest that there is a strong relationship between the verb and its object. The object is an internal argument of a verb, and the verb directly assigns the Theme theta-role to its object NP, while the subject is the external argument of a verb, and the verb indirectly assigns the Agent theta-role to it. Hagiwara assumes that this distinction between direct versus indirect theta-marking, and between external versus internal argument, influences the performance of aphasic patients' sentence comprehension.

Summarizing Hagiwara's (1990) results, several significant factors for the comprehension of Japanese verb transitive sentences of aphasic patients are raised: First of all, canonicity of thematic role order seems important. Secondly, categorical order of syntax seems not so important. Thirdly, the integrity of the VP seems important. Fourthly, active voice seems easier than passive voice. L2 learners differ physically from aphasic patients in that the former do not have brain disorder and already have a language (L1). However, it is interesting to compare the results of these groups in terms of considering the general language acquisition/loss process of human beings. The present paper will compare the findings of these cases.

## 4. Experiment

### 4.1 participants

The present study limited the subjects to Chinese learners of Japanese as an L2 in order to avoid L1 variables. Therefore, L1 Chinese speakers who first came to Japan after age 15 were conditioned to be subjects of the study. The subjects were collected according to their age of arrival and the duration of stay in Japan. There were three divisions for the age of arrival: A: 15 – 19, B: 20 – 24, and C: 25 and over. Concerning the duration of

stay in Japan, there were also three subdivisions : (1) : 6 months – 2 years, (2) : 2 years and 1 month – 4 years, (3) : 4 years and 1 month and over. Thus, there were nine groups: A (1), A (2), A (3), B (1), B (2), B (3), C (1), C (2), and C (3). See Table 1 below.

Table1. Chinese Subjects (N=90)

	(1) 0 ; 6-2; 0	(2) 2 ; 1-4 ; 0	(3) 4 ; 1-
(A) 15-19	10(1-10)	10(11-20)	10(21-30)
(B) 20-24	10(31-40)	10(41-50)	10(51-60)
(C) 25-	10(61-70)	10(71-80)	10(81-90)

notes : The above figures show the duration of stay in Japan : “0 ; 6-2 ; 0” means that the subjects stayed there from for 6 months to for 2 years. The left sided figures represent the subjects’ arrival age in Japan : “15-20” means that the subjects came to Japan when they were from 15 years old to 20 years old. “10 (1-10)” represents that the number of the subjects is 10 and subjects’ numbers are from 1 to 10.

Each group contained 10 subjects. Thus, the study involved 90 subjects altogether. Over a hundred Chinese subjects, who had already stayed in Japan more than six months, had been candidates of the experiments. However, before the main experiment began, as a preliminary test, in order to judge whether they were able to behave as the experimenters intended, two intransitive actions were demonstrated by the experimenters. The first one was an action which a rabbit was walking, and the second one was an action which a cat was running. The experimenters showed the subjects these actions using the dolls, and then asked orally in Japanese, “What is the rabbit doing?” If the subjects did not answer in a suitable way such as “(The rabbit is) walking,” they were ruled out from the experiment.

#### 4 . 2 procedure

The experimenters and the subjects met in their apartment or school. The subjects were interviewed individually. One interview took 20-25 minutes including the explanation of the experiment. This interview test was a judgment test. An experimenter first showed the two dolls, for example, a bear and a cat, on the table in front of the experimenter and a subject. Then the experimenter told a short story by using the dolls. The story is demonstrated in Table 2.

After that, the subject was asked to point out one of the two pictures presented on the table which he/she thought correct regarding what the experimenter said to him/her. There were five sets of picture cards. One set had two pictures which showed opposite thematic roles. For example, one picture displayed “the bear pushes the cat” and the other picture, “the cat pushes the bear.” The same procedure was repeated five times in a random order. The dolls used were a cat, a dog, a rabbit, a bear, a boy (Katsuo-kun) and a woman (Sazae-san). In the case when the subjects did not know the Japanese name(s) of the doll(s), the experimenters used the dolls which the subjects knew well (see also Otsu,



1994) (2).

Table2. The Example of the Interview Test

“Usagi-ga imasita.”  
rabbit-nom was (=There was a rabbit.)

“Soko-e kuma-ga kimasita.”  
there-to bear-nom came (=A bear came there.)

“Sono kuma-ga usagi-o osimasita.”  
that bear-nom rabbit-acc pushed (=The bear pushed the rabbit.)

There were five sets of stimulus sentences, which means that there were 40 question sentences (8 x 5 = 40). The grammatical structures of the question sentences in the experiment were already shown in (2) and (3) above. There were eight different sentences relating to Japanese verb transitive structures. The question sentences consisted of two different category orders (N-N-V and N-V-N), thematic role orders (Agent-Theme and Theme-Agent), voices (Active and Passive) and the VP formation (integrity of the VP and split of the VP).

The verbs the experimenters used throughout the test were *osu* (= push), *keru* (= kick), *nageru* (= throw), and *tataku* (= hit). The verb, *osu* had to be used twice because of the subjects' limited number of verbs the experimenter was able to use. When the subject encountered verbs which he or she did not understand or were unfamiliar with, they were changed to ones which the subjects knew well. As the PASS or FAIL criteria of the experiment, when the subject acted correctly 4 or 5 times out of 5, he or she was regarded as PASS.

As has been stated, the L2 literatures of the acquisition of morphology (a series of studies on grammatical morphemes) and/or syntax (negation, interrogatives, and/or relative pronoun, etc.) have proved that the L2 learners do not randomly acquire a target language grammar, but they acquire it along with a fixed route. Therefore it is predicted that in the comprehension of Japanese verb transitive structures for the beginning L2 learners, there will be a systematic order of difficulty of acquisition.

What factor(s) will determine the hierarchy of difficulty for the learners to comprehend verb transitive structures? As can be suggested from the preceding literatures in L1 and aphasics, one important factor appears to be the order of thematic roles. L1 transfer cannot be ignored. The preservation of the VP also seems important. However, the Japanese canonical VP structure is NP-V, while Chinese is V-NP. If the VP structure of the subjects' L1 influences their comprehension of Japanese, it is predicted that the V-NP structure is not very difficult. Probably it is less difficult than the ones with split VP structures.

Passive sentences seem more difficult than active sentences because the passive needs to move the elements so that the operation becomes more complex. The present L2

learners have already experienced passive voice in their L1, but they must learn what the passive structures of Japanese are. In the passive sentences, Theme-Agent is the canonical order of thematic roles. Thus L2 learners comprehend the passive sentences with L2 Theme-Agent order easier than those with Agent-Theme.

If categorical order plays an important role in the comprehension of the sentences, and L1 structure influences the L2 acquisition, N-V-N is easier than N-N-V for the present subjects. If the categorical order is not important, as seen in the aphasic patients, there will not be any accuracy difference between the two structures.

As was discussed earlier, Japanese canonical word order is SOV (N-N-V), while Chinese is SVO (N-V-N). Since Chinese does not allow scrambled sentences, there is a weak possibility for the learners to facilitate the comprehension of the scrambled sentences from L1 Chinese transfer.

To summarize, there will be a difference among the stimulus sentences in terms of the degree of comprehension. When a voice is active, like the sentences in (2), it will be predicted that (2)-a ([A]) is the easiest, (2)-c ([RDTh]) is second easiest, (2)-d ([RDAG]) follows, and (2)-b ([AN]) is the most difficult structure to comprehend. In the case of passive voice, the structures with Theme-Agent will be easier than those with Agent-Theme. Thus, (3)-a ([P]) and (3)-b ([RDAGP]) are easier than (3)-c ([RP]) and (3)-d ([RDThP]).

## 5 . Results

The results of the experiment are presented in Tables 3, 4 and 5. Let us first examine the factor of the Age of Arrival Time (AAT) in a target-language country. Group (A), (B), and (C) have the same AAT respectively. Let us consider Group (A) first. Group (A)'s AAT is from 15 to 20, and the average AAT is 17.6 years old. Although (A)1 did not gain high scores, (A)3 has attained almost perfect score. It can be said that even after learners start learning L2 after 15, they can over time acquire case relationship to a native-like level. The "age 15" hypothesis does not seem to apply to the comprehension of grammatical cases.

How about the L2 learners over 20 years old concerning the AAT. From the results of the Group B (average 22.4 years old), the learners, especially in (B)3, can still achieve a very high level as well as (A)3. The performances of the learners in Group (C) appears to be relatively worse than the other groups.

In short summary, it can be said that although it takes several years, the L2 learners after age 15, even after 20, come to comprehend the thematic orders in scrambled sentences. Table 4 classifies the results according to the average duration of stay in a target-language country ; in this case, Japan. At first glance, the longer the learners stay in Japan, the higher their achievements become. This tendency applies to all three groups.

Let us examine difficulty order according to difference of the voices. In the active voice and passive voice respectively, the difficulty order of the four sentences is the following :

Active Voice:

[A] → [RDTh] → [RDAg] → [AN]

Passive Voice:

[RDAGP] → [P] → [RDThP] → [RP]

The total results showed that the structures with Agent-Theme ([A] and [RDTh]), which is a canonical thematic order, are easier than those with Theme-Agent ([RDAG] and [AN]). On the contrary, there seems to be no significant difference between NVN ([RDTh] and [RDAG]) and NNV ([A] and [AN]). The order, Agent-Theme, plays a crucial role in the comprehension of verb transitive structures in the case of L2 Japanese adults.

The results in Table 2 confirm that active sentences are generally easier than passive sentences for the subjects to comprehend. It was also found that the sentences with the preservation of the integrity of the VP ([A], [RDTh] and [RDAG]) are easier to comprehend than those with the split VP structure ([AN]). However, N-V and V-N contrast does not seem to influence the subjects' comprehension of Japanese. When the object is separated from the verb, the sentence becomes more difficult to comprehend as is the case with aphasic patients.

The partial data in Table 5 was adapted from Hagiwara (1990).<sup>(3)</sup> It is evidenced that the comprehension of the Japanese transitive sentences by the subjects is similar to those of aphasic patients'. Some people might think that the similar difficulty orders between Hagiwara (1990) and the present study might be just a coincidence. Although a further minute examination is needed, the researcher does not think this is the case. He thinks that a common mechanism functions when the human beings lose L1 and acquire L2. It is more difficult to lose and easier to acquire structures which are more core in language.

## 6 . Conclusion

The overall framework of the comprehension process of verb transitive structures by L2 Japanese learners was clarified from this experiment. The present subjects were exposed to Japanese after they passed the age 15, which is generally believed to be a limit of critical period for language acquisition. However, not only the learners in 15-20 and 20-25, but also most of the learners whose arrival ages were 25 years old and over, still have achieved almost perfect results. The comprehension of grammatical case is a core part of language acquisition. L2 learners after puberty still can attain almost perfect understanding of the system. It can be assumed that the grammatical case system in L2 acquisition appears to be little influenced by the age factor.

Table3. Total results by the subjects' age of arrival

	AD	AA	TS	A	RDTh	RDAg	RDAgP	AN	P	RDTh P	RP
A(1)	1; 4	17.6	52	9	8	8	8	6	5	5	3
A(2)	2; 10	17.4	74	10	10	10	9	10	10	8	7
A(3)	7; 2	17.8	78	10	10	10	10	10	10	9	9
	3; 8	17.6	204	29	28	28	27	26	25	22	19
B(1)	1; 4	22.3	45	9	8	8	5	6	4	3	2
B(2)	3; 1	22.5	58	9	9	9	8	6	7	6	4
B(3)	6; 2	22.4	77	10	10	10	10	9	10	9	9
	3; 5	2.4	180	29	27	27	23	21	21	18	15
C(1)	1; 2	30.7	46	10	10	7	5	5	4	3	2
C(2)	2; 9	30.5	58	10	10	8	9	6	6	5	4
C(3)	5; 6	31.4	70	10	10	10	8	9	9	8	6
	3; 1	30.8	174	30	30	25	22	20	19	16	12
Total				85	80	72	67	65	56	46	

notes : AD=average duration of stay in Japan. AA=average age of arrival time. TS=total scores.

Table4. Total Results by Subjects' Duration of Time

	AD	AA	TS	A	RDTh	RDAg	RDAgP	AN	P	RDThP	RP
A(1)	1;4	17.6	52	9	8	8	8	6	5	5	3
B(1)	1;4	22.3	45	9	8	8	5	6	4	3	2
C(1)	1;2	30.7	46	10	10	7	5	5	4	3	2
	1;3	23.4	143	28	26	23	18	17	13	11	7
A(2)	2; 10	17.4	74	10	10	10	9	10	10	8	7
B(2)	3; 1	22.5	58	9	9	9	8	6	7	6	4
C(2)	2; 9	30.5	58	10	10	8	9	6	6	5	4
	2; 9	23.4	190	29	29	27	26	22	23	19	15
A(3)	7; 2	17.8	78	10	10	10	10	10	10	9	9
B(3)	6; 2	22.4	77	10	10	10	10	9	10	9	9
C(3)	5; 6	31.4	70	10	10	10	8	9	9	8	6
	6; 3	23.8	225	30	30	30	28	28	29	26	24

Table5. Results of Aphasic Patients

	present study total ( /90)	Hagiwara(1990) mean ( /10.0)
(1) Active (A)	87	9.0
(6) Right-Dislocation Theme (RDTh)	85	7.2
(5) Right-Dislocation Agent (RDAG)	80	7.5
(7) Right-Dislocation Agent Passive (RDAGP)	72	7.0
(2) Active Noncanonical (AN)	67	6.4
(3) Passive (P)	65	6.1
(8) Right-Dislocation Theme Passive (RDThP)	56	6.3
(4) Reversed Passive (RP)	46	6.4

notes : Hagiwara's (1990) results were adapted from p. 165. The figures obtained from her study are mean score of the test. The maximum score is 10.0. The maximum score of the present study is 90 points.

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- (1) This research is partially supported by the Grant-in-Aid for Scientific Research (C) (2) (from 1999 to 2002) (no. 11680259) from the Japanese Ministry of Education, Science, Sports and Culture.
- (2) In the 1970s, Hayashibe (1975), for example, investigated Japanese children's comprehension of transitive structures. According to Hayashibe (1975), the average age of the children who responded correctly to the scrambled sentences was relatively high (4 years and 9 months old). There were children among them who did not comprehend the scrambling after 5 years old. However, according to Otsu (1994), this is due to the experimental artifacts. He pointed out that "the scrambled NP must have been established as a discourse topic in order for the scrambled sentence to sound natural (p. 162)." Hayashibe or other studies did not present a sentence with discourse cue. A scrambled sentence needs another previous sentence that helps to establish the first NP of the stimulus sentence as the discourse topic : The scrambled sentence in isolation seems awkward.
- (3) Although Hagiwara (1990) included the pseudo-cleft sentence below, the present study excluded this sentence. This is because if one understands the thematic relations of this type of sentence, one must acquire, first of all, the structure of the pseudo-cleft

sentence, which seems to me not directly related to the comprehension of the grammatical cases themselves.

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