

Japanese Learners' Strategy of English Sentence Processing

— On Semantic Strategy —

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0. Introduction

Form-function mapping in language varies in terms of the mediating rules and the strength of each cue. The task, therefore, of second language learners is to acquire the appropriate strategy of form-function mapping in the target language. This paper reports the result of the investigation of Japanese learners' semantic strategy in parsing English language forms towards the underlying function.

1. Background

1.1. Semantic function hierarchy

There is a universally operating semantic hierarchy in the assignment of "subject" and "object", which is called the semantic function hierarchy. This hierarchy shows the order of accessibility of the semantic function to the subject and object cases. In the following diagram, items to the left of > are understood as showing a preference to precede those on the right of > (Dik, 1980).

	Agent		Goal		Recipient		Beneficiary		Instrument		Location		Time
Subject	x	>	x	>	x	>	x	>	x	>	x	>	x
Object			x	>	x	>	x	>	x	>	x	>	x

This schema indicates that if one of the arguments of the verb is an agent, it is the most likely to be selected as subject. It becomes more and more difficult to assign the syntactic role of subject or object as the noun goes from left to right through this hierarchy.

The semantic function hierarchy is closely related to the personal hierarchy.

1st person > 2nd person > 3rd person human > higher animals > other organisms
 > inorganic matter > abstracts

(Siewierska, 1988)

This hierarchy means that human nouns possess more potential agenthood than animate nouns; likewise animate nouns are more likely to be agents than inanimate nouns.

These hierarchies reflect perceptual saliency representing the way humans experience the world. For example, as inanimate entities can't be agentive, other than in a metaphorical sense, animate nouns are the more frequent agents than inanimate nouns. Of course, the degree of restriction of these hierarchies on the subject assignment varies in the interaction of the strength of various aspects of grammar in each language.

In the following two sections, the strength of this semantic restriction on the subject case assignment both in English and in Japanese will be discussed briefly, focusing on the function of the animate noun (animacy).

1.2. Animacy in English

A large body of crosslinguistic research in the processing of simple transitive verb sentences has extracted a very specific strategy of English native speakers, which made the discoverers themselves call it “exotic”.

English is an exotic language with a word order bias that has so far failed to appear with equivalent strength in any other language.

(Bates and Macwhinney, 1987 : 172)

This means that English native speakers rely on word order cues even at the expense of semantic naturalness. If faced with the sentence “the table kicked the boy” English native speakers are most likely to choose “the table” as the subject of the sentence, relying on the SVO word order cue. However, Italian speakers, for example, tend to choose “the boy” as the subject because of the semantic naturalness that the animate noun is more likely to be an actor (following the semantic function hierarchy). The reason why English native speakers internalize such a strong syntactic strategy is that syntax determines the meaning in English. In other words, syntactic cues dominate semantic cues in determining sentence interpretation. Of course the semantic function hierarchy also works in English, but because of the stronger word order cue which mitigates the animacy effect and the non-agentive subject system developed in English, animacy as a support of a subject of a transitive verb sentence is assumed to be relatively weak in English.

1.3. Animacy in Japanese

Kuno (1978) mentions, “transitive constructions in Japanese acquire animate subjects.” and that the following example is “an extremely unnatural sentence with a distinct flavor of direct translation from English.”

Taihuu ga ie no hei o kowasita.
typhoon house's fence destroyed.
“The typhoon destroyed the house's fence.”

(Kuno, 1978 : 65)

Based on this description, we could say that animacy as a support of the sentence subject is stronger in Japanese than in English.

1.4. Sentence processing in second language

A number of studies have investigated sentence processing in second language (e. g. Gass, 1987, Harrington, 1987, Kilborn and Cooreman, 1987, McDonald, 1987). Although these studies differ in purpose, size, scope, and methodology etc., a summary of conclusions

reveals a picture of first language transfer taking place especially at the initial stage of second language processing. More concretely stated in the scope of this study, if Japanese learners internalize the semantic strategy which chooses an animate noun as the subject, they tend to carry this strategy to their second language and tend to judge an animate noun as the subject in English sentences.

Therefore, the current study begins by investigating how strong the animacy cue is for the Japanese, and then proceeds to examine how Japanese learners change in their use of the animacy cue in processing English transitive verb sentences. For this purpose the processing strategies of three different groups of Japanese learners of English with different levels of exposure to English were examined. Two other groups, one Japanese and one English native speakers, were included in the study to establish baseline data with which to compare that of the Japanese learners.

2. The study

2.1. Subjects

The subjects consisted of the following five groups;

12	Japanese native speakers	(JNS)
41	Junior high school students (2nd year)	(JHS)
45	Senior high school students (2nd year)	(SHS)
23	University students (English major seniors)	(UNS)
16	English native speakers	(ENS)

2.2. Material

Two sets of materials were prepared ; one in English for the ENS, UNS, SHS, and JHS, and the other in Japanese for the JNS. These English and Japanese versions are translation equivalents of each other.

The three word order patterns (NVN, VNN, NNV) and the three animacy contrasts (both nouns are animate : AA, the first noun is animate and second noun is inanimate : AI, the first noun inanimate and the second noun animate : IA) have been combined to make nine types of sentences (i. e. AVA, AVI, IVA, VAA, VAI, VIA, AAV, AIV, IAV). There are four sentences for each type, therefore 36 sentences altogether. The words chosen for the material were placed randomly into the respective slot of each test sentence, and the 36 sentences were randomly reordered for presentation. Those sentences in English were tape-recorded by a female native speaker so that the subjects do the task following the tape. (For examples of material, see appendix)

2.3. Procedure

The experiment was administered in a group for Japanese subjects and individually for English subjects. The task was to indicate the sentence subject by drawing a circle on one of the two nouns on the answer sheets. Special care was directed to the instruction so as not to bias subjects toward either a syntactic or semantic cue. So syntactic information (subject) and semantic information (agent) were both asked for in the instruction.

2.4. Analysis

Those data in which more than half of the answers were invalid because of missed or incomplete answers were omitted. This left the following number of data for analysis ; 12 JNS, 25 JHS, 42 SHS, 23 UNS, 16 ENS.

The number of the first nouns selected as a subject was tallied for each word order type. A $2 \times 3 \times 3$ ANOVA for the native speakers' baseline strategy and a $5 \times 3 \times 3$ ANOVA for the interlanguage processing strategy were computed. In both ANOVA, the subject group was a between-subject variable, and word order and animacy were within-subject variables.

2.5. Results and discussion

In the appendix, a table summarizes the percent choice of the first noun under each condition and a figure illustrates the first noun choice under each animacy contrast.

2.5.1. Native baseline strategy

The animacy effect was significant for JNS ($F(2, 25) = 76.57, p < .000$) but not for ENS ($F(2, 52) = 1.82, N.S.$).

As the result shows, ENS's choice of the first noun lingered around the chance level regardless of the difference in animacy condition, which indicates that they didn't react to the animacy cue (The cue that they relied on was word order, which is not explored in this paper). JNS's choice in the AA condition where there is no animacy contrast was also around the 50% chance level (47.2%). Their first noun choice, however, increased in the AI condition where the first noun was semantically biased (81.9%) and dropped in IA where the second noun was biased (9.0%). This indicates that JNS reacted to the semantic information. This result allows the author to conclude that Japanese learners internalize the semantic strategy as their starting point in L2 sentence processing.

2.5.2. Interlanguage strategy

The animacy effect reached significance for JNS, JHS, SHS, and UNS ($p < .001$ for all), but not for ENS.

The result indicates that all Japanese learners adopted a semantic strategy in their choice of English sentence subject, regardless of the level of proficiency. In NVN sentences, even the UNS who showed a near-native SVO word order strategy¹⁾ turned out to be affected by the animacy cue, i. e. their first noun choice was significantly lower in the IVA condition. Though the difference of the strength of the semantic strategy couldn't be specified among different subject groups, the advanced students seem to be more conscious of the use of the semantic strategy (This discussion can be supported by the data obtained through introspection and "subject" definition by Japanese learners, which are presented in the other paper by Yamashita in this volume.). The animacy cue didn't weaken its effect on Japanese learners at any level.

3. Conclusion

Learners' heavy reliance on the animacy cue in the subject selection seems to indicate, at least indirectly, the difficulty of acquiring the non-agentive subject in English (see also Rutherford, 1987). Although the non-agentive subject system is taught at school to some extent, how much does the teaching contribute to the learners' use of the non-agentive subject? Compared with the acquisition of the formal aspect, acquiring the target language specific semantic aspect seems much more difficult (cf. the paper by Yamashita in this volume). Heavy reliance on exercises such as pattern practice which emphasize form rather than meaning are not likely to help learners become aware of the differing strengths of semantic cues in Japanese and English. The question remains whether target language specific semantic properties, such as the non-agentive subject, is teachable or not.

NOTES

- 1) The difference of the overall first noun choice in NVN condition wasn't statistically significant between UNS and ENS. The first noun choice is 99.0% by ENS and 86.2% by UNS. However, as the table in the appendix shows, the choices under IVA condition were significantly different ; 96.9% vs. 64.1% ($p < .01$).

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APPENDIX

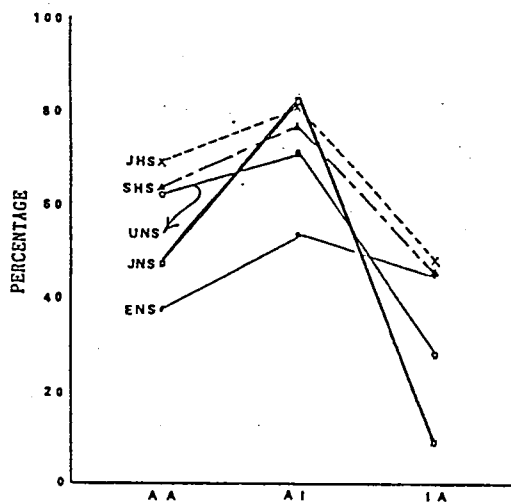
(1) Words and sample sentences

	English	Japanese
animate noun	dog, cat, monkey, fish, bird,	いぬ、ねこ、さる、 さかな、とり
inanimate noun	table, chair, map, box, book,	テーブル、いす、ちず、 はこ、ほん、
verb	like, want, hear, see,	好く、欲する、聞く、 見る、
sample sentences		
AVI:	The monkey likes the table.	さる 好く テーブル
VIA:	Wants the chair the cat.	欲する いす ねこ
AAV:	The monkey the bird sees.	さる とり 見る

(2) Percentage and consistency of first noun choice: as a function of word order and animacy

		JNS		JHS		SHS		UNS		ENS	
		%	con.	%	con.	%	con.	%	con.	%	con.
NVV	AA	52.1	2.1	74.0	24.0	83.9	33.9	97.8	47.8	100.0	50.0
	AI	79.2	29.2	86.0	36.0	85.7	35.7	96.7	46.7	100.0	50.0
	IA	10.4	39.6	57.0	7.0	60.1	10.1	64.1	14.1	96.9	46.9
VNN	AA	45.8	4.2	64.0	14.0	53.8	3.8	54.3	4.3	23.4	26.6
	AI	77.1	22.9	70.0	20.0	72.0	22.0	63.0	13.0	46.9	3.1
	IA	10.4	39.6	38.0	12.0	42.9	7.1	16.3	33.7	28.1	21.9
NNV	AA	43.8	6.2	69.0	19.0	56.0	6.0	32.6	17.4	4.7	45.3
	AI	89.6	39.6	85.0	35.0	72.6	12.6	52.2	2.2	14.1	35.9
	IA	6.3	43.7	48.0	2.0	31.0	19.0	3.3	46.7	9.4	40.6

(3)



Percent choice of first noun: subject group by animacy