A Study of Morphological Errors in Aphasic Language

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ABSTRACT

How do aphasics deal with the inflectional marking occurring in agglutinative languages like Korean? Korean speech repetition, comprehension and production were studied in 3 Broca's aphasic speakers of Korean. As experimental materials, 100 easy sentences were chosen in 1st grade Korean elementary school textbooks about reading writing and listening, and two pictures were made from each sentence. This study examines the use of three kinds of inflectional markings--past tense, nominative case, and accusative case. The analysis focuses on whether each inflectional marking was performed well or not in tasks such as repetition, comprehension and production. In addition, morphological errors concerned with each inflectional marking were analyzed in view of markedness. In general, the aphasic subjects showed a clear preservation of the morphological aspects of their native language. So the view of Broca's aphasics as agrammatical could not be strongly supported. It can be suggested that nominative case and accusative case are marked elements in Korean.

1. INTRODUCTION

Like Japanese, Hungarian, Turkish, and Mongolian, Korean is an agglutinating inflectional language. B. H. Kim (1992: 241) says, "an agglutinative language is one in which words composing sentences do not change their word forms and the grammatical relation of each word is represented by the auxiliary word or the suffix combined with a word or a stem. Altaic languages are representative agglutinative languages." In such languages, postpositions are used rather than prepositions. Postpositions are particles that follow nouns in a sentence to indicate the roles of these nouns, such as the actor and the acted upon. Taylor & Taylor (1990: 14-5) shows one example: In the Japanese sentence ("John gives Mary a book"), the postpositions are in uppercase. *John-WA Mary-NI hon-O yaru /*

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hon-O John-WA Mary-NI yaru. In such cases, the noun is preceded by demonstratives, numerals, possessives, adjectives and relative clauses.

Agrammatism -- the impaired ability to produce and process "grammatical morphemes" (Taylor & Taylor 1990: 439) -- is often found in Broca's aphasia. Agrammatic patients typically use one- to three-word noun phrases or verb phrases to express themselves. Their speech is notably lacking in small grammatical words such as prepositions, auxiliary verbs, and articles (Goodglass 1993:6). Agrammatic speech is also primarily characterized by the omission of grammatical morphemes (e. g., "__ wife __ here") and paragrammatic speech by the misselection of grammatical morphemes (e. g., "my wife *are* here") (Hofstede & Kolk 1994).

A recent study about the morphological aspects of an agglutinative language shows a good retention of basic noun and verb inflections in Broca's and Wernicke's aphasic speakers of Turkish (Slobin 1991). Another study about the use of inflectional markings in Broca's and Wernicke's aphasic speakers of Hungarian indicate a group of individuals whose grammatical abilities are damaged and noisy, but still largely functional (MacWhinney & Osman-Sagi 1991). These studies implicate much about the use of morphological markings in aphasic speakers of Korean, one of the agglutinative languages such as Turkish, Hungarian, Mongolian and so on.

So this study aims to reveal whether the three kinds of inflectional markings or morphemes--past tense, nominative case, and accusative case--are performed well or not. Then we will be able to decide how much we can support the view of Broca's aphasics as agrammatic. In this study, the author will also investigate whether the inflectional markings are marked or unmarked in view of markedness.[1]

2. METHODS

Subjects. The subjects were 3 Broca's aphasics, studied at Kosin University's Gospel Hospital. All were monolingual Korean speakers. They were diagnosed as subjects with Broca's Aphasia by a doctor in the Department of Neurology in the hospital. Each subject

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1. There have been several kinds of markedness theory. In this paper the author used Jakobson's implicational universals. Cairns (1986: 19) argued that "implicational universals have traditionally been assumed to be the most reliable index of what is and what is not marked." According to Hyman (1975: 15), "implicational universals have been discussed by Jakobson (1941) and Greenberg (1966a). In an implicational universal, X implies Y but Y does not imply X. ..... the consonant /t/ implies the consonant /d/, but /d/ does not imply /t/. There are, however, many languages which have /t/ but do not have /d/(for example, Finnish, Korean, Southern Paiute."

was individually   tested in a special room at the hospital 3 times during 4 months, February through May, 1996. Table 1 shows the data on the subjects' sex, age, aphasic onset and etiology.

Table 1. Description Data for 3 subjects

Subjects	Sex	Age	Onset	Etiology
B1 (K., B.H.)	Male	63	6/13/94	Cerebral Infarction
B2 (J., B.R.)	Female	75	2/12/96	Cerebral Infarction
B3 (K., K.S.)	Male	56	5/08/95	Cerebral Infarction

Materials and Procedure. Patients were given a battery of tests, including repetition tasks, comprehension tasks, and production tasks. The experimental materials consisted of 100 easy sentences and 200 pictures. The sentences were chosen in 1st grade Korean elementary school textbooks that dealt with reading and writing Korean, and listening to Korean. Two pictures were made from each sentence. The 100 sentences centered on either a past tense morpheme (았/at/, 었/ət/) or one of two postpositions (a nominative case -- 이 /i/, 가/ka/, 은/in/, 는/nin/-- or an accusative case --을/il/, 를/lil/). Forty sentences out of the 100 included a past tense morpheme, 30 sentences a nominative case morpheme, and 30 sentences an accusative case morpheme. The three subjects performed the three kinds of task in order. The tasks were as follows: First, the repetition task, which lets the patients repeat each sentence spoken by the experimenter. Secondly, the comprehension task, which presents two pictures from each sentence to the subjects, in order to confirm whether they can choose the right picture for each sentence spoken by the experimenter. Thirdly, production task, which consists of the written sentences with a blank in each. The experimenter just showed each subject experimental cards on which one sentence was written with one blank (e. g., 어머니께서 방바닥__ 닦으십니다. 'A mother wipes the floor of a room.'; an accusative case is missing.)   Subjects should fill in the blank with a past tense, an accusative case, or a nominative case marking or morpheme. Except in the comprehension tasks, all responses were tape-recorded and transcribed by an assistant. The transcription was used in identifying the accuracy of the experimenter's evaluation that the experimenter had made concerning the subjects' responses..

3. RESULTS

Tables 2-4 show the percentages of morphological inflectional marking errors in the tasks. The tables also show that the subjects performed each task 3 times.

Table 2. Percentages of inflectional marking errors in the repetition task

Subjects	Past tense			Nominative case			Accusative case		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
B1	30	17.5	17.5	30	10	6.7	46.7	25	30
B2	50	10	15	33.3	0	3.3	46.7	6.7	6.7
B3		Unable			Unable			Unable	

Table 2 shows that, except for B3 who was unable to repeat sentences, the ability to repeat sentences generally became better as time went on for B1 and B2. . The mean percentages of error in each subject were as follows: B1--past tense (21.7); nominative case (15.6); accusative case (33.9); B2--past tense (25); nominative case (12.2); accusative case (20); B3--unable to repeat. Therefore, on average, the nominative marking errors occurred the least among three kinds of markings in B1 and B2. Most importantly, all the mean percentages were below 34%. For example, B2 usually omitted certain phonemes from the required morphemes.

Table 3. Percentages of inflectional marking errors in the comprehension task

Subjects	Past tense			Nominative case			Accusative case		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
B1	27.5	25	20	10	16.7	23.3	26.6	16.7	13.3
B2	12.5	8.8	25	23.3	23.3	13.3	20	16.7	23.3
B3	25	15	Unable	43.3	23.3	Unable	26.6	43.3	Unable

In Table 3, the frequency of each type of error changed in various ways, according to the subject, the test period, or the experimental material. The mean percentages of error in each subject were: B1--past tense (24.2); nominative case (16.7); accusative case (18.9); B2--past tense (15.4); nominative case (20); accusative case (20); B3 was unable to respond to the task on the third test, so it was impossible to assess the subjects comprehension ability objectively, compared to other subjects. Therefore, there was very little difference in the percentages among the three kinds of markings in B1 and B2. And most importantly, all the mean percentages were below 25% in both B1 and B2.

Table 4. Percentages of inflectional marking errors in the production task

Subjects	Past tense			Nominative case			Accusative case		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
B1	12.5	7.5	15	23.3	8.3	10	30	16.7	0
B2	?*	21.3	?	?	31.7	?	?	13.3	?
B3	Unable			Unable			Unable		

* ? means that the experimenter could not test the subject due to his or her physical condition.

Similar to Table 3, Table 4 does not show a clear direction of marking errors. However, it is common that, except with B3, the subjects' rates of error were below 32%.

4. DISCUSSION

From the results mentioned above, some characteristics were found. First, the percentages of inflectional marking errors were below 34% and did not differ much in the three kinds of tasks. This fact may imply that the subjects have a comparatively intact morphological knowledge. Secondly, in repetition tasks, subjects B1 and B2 showed the least number of errors in nominative case markings (see Tables 2 and 5). This may be due to the fact that Korean word order is SOV, so nominative case is first heard and remembered in the brain. In the test materials, all sentences were statements and followed the word order SOV, so the following marking order occurred: nominative case, accusative case, and past tense. Therefore, it is suggested that the ability to remember the initial part of a sentence was an important factor in the repetition task of aphasic subjects. Meanwhile, thirdly, the little difference in percentages among three inflectional marking errors in comprehension and production tasks suggests that the subjects did not get this effect from the word order as compared to that of the repetition task. In other words, they just needed to catch the whole concept of each sentence in comprehension tasks, and to insert the one case marking in the underlined part of every sentence in production tasks.

In the following section, error types and their distribution were dealt with only in the repetition task and the production task, not in the comprehension task.

Error types. On the basis of B1's and B2's marking errors, the distribution of the errors were shown in Table 5.

Table 5. The number of inflectional marking errors in B1 and B2

Subject	Repetition task			Production task		
	Past tense	Nom. case	Accus. case	Past tense	Nom, case	Accus. case
B1(210)*	22	6	16	21	13	14
B2(210)	39	13	18	11	9	4
Total(420)	61	19	34	32	22	18

* The number in parenthesis means the total number of sentences performed by each subject in two kinds of tasks. That is, each subject had to respond to 70 sentences three times (70x3=210); e. g., the number of errors may be counted twice, in relation to past tense, since an error (계셨습니다 -> 계십니다(be + past -> be)) shows two kinds of error types, that is, omission and tense change.

The errors in Table 5 were classified into several types according to their characteristics. Tables 6 and 7 indicate the distribution of inflectional marking errors according to type. The number of error types in each marking is as follows: past tense (7), nominative case (5), and accusative case (4). 'Case' error is a kind of a substitution error. For example, a nominative case was replaced by an accusative case (이/i/ -> 을/ɨl/; 방이 깨끗해집니다. -> 방을 깨끗해집니다.)

Table 6. Percentages of past tense errors in B1 and B2

Task types	Consonant Substitution	Vowel Substitution	Omission	Addition	Tense Change	Unable*	Others
Repetition	3.3	27.9	34.5	6.5	6.5	21.3	0
Production	6.3	15.6	37.5	12.5	15.6	9.4	3.1

* 'Unable' means that subjects could not repeat or produce related inflectional markings.

Table 7. Percentages of nominative case and accusative case errors in B1 and B2

Task types	Nominative case					Accusative case			
	Omission	Case	Unable	Addition	Others	Omission	Case	Unable	Others
Repetition	5.3	0	84.2	0	10.5	5.9	17.6	64.7	11.8
Production	31.9	50	4.5	4.5	9.1	22.2	72.2	0	5.6

In Table 6, concerning past tense errors, 'omission' takes the largest percentages of errors, in both repetition and production tasks. But the characteristics of omission in

repetition tasks are different from those in production tasks. The former generally includes the omission of honorific ending(시/si/) of a word (for example, 주셨습니다 -> 주었습니다). The latter generally includes real omission of the past tense, so a past tense sentence resulted in a present tense sentence (for example, 말하였습니다 -> 말합니다). This phenomenon shows some difficulty in representing past tense voluntarily.

In Table 7, 'omission' also takes the second largest percentages of errors in production tasks, in relation to both nominative and accusative case errors. These phenomena are evidence of a typical part of Broca's aphasic speech characteristics.

In repetition tasks, 'unable' errors are the majority of both nominative and accusative case errors (nominative-84.2%; accusative-64.7%)(See Table 8). In production tasks, 'case' errors hold more than 50% in the two kinds of case errors (nominative-50%; accusative-72.2%)(See Table 9). This type of error occurred when a subject substituted a nominative case for an accusative case, and vice versa. The reason why those errors occurred so frequently still needs to be answered.

Table 8. Percentages of inflectional marking errors in the repetition task

Task types	Past tense		Nominative case			Accusative case	
	Omission	Substitution	Unable	Others	Case	Unable	Case
B1 and B2	34.5	31.2	84.2	10.5	0	64.7	17.6

Table 9. Percentages of inflectional marking errors in the production task

Task types	Past tense		Nominative case		Accusative case	
	Omission	Substitution	Case	Omission	Case	Omission
B1 and B2	37.5	21.9	50	31.9	72.2	22.2

The subjects' linguistic abilities were revealed better in production tasks than in repetition tasks, because the subjects spoke a sentence on his or her own in the production tasks. So it is required to analyze Table 9 more concretely. There are two points to refer to in Table 9. First, omission errors occurred more frequently compared to other types of errors. But this phenomenon does not influence the evaluation of those errors, because their percentages are not too high. Secondly, the rates of 'case' errors[2] were very high, that is,

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2. A case error means here that the case of a word changes from one case to another one. e. g. 매미가 -> 매미를 (nom. -> accus.), 위를 -> 위에 (accus. -> locative), 수미를 -> 수미가 (accus. -> nom.), etc.

more than 50%. This fact suggests that the two kinds of markings -- nominative case and accusative case -- are likely to be dealt with less importantly in sentence relation in Korean. Because there should not have been many errors related with three kinds of markings, if those markings had been important and carried essential information in Korean sentence relation and, in other words, been acquired earlier in language acquisition. Therefore, the high rates of case errors implies that nominative and accusative case markings are marked elements.

According to H. B. Kim (1992: 33), on the basis of 'implicational universal' by Jakobson, the following hypothesis can be made: "the sound change in the errors of aphasic language follows the reverse order of sound acquisition in child language......Therefore, in aphasic errors, there are tendencies that a marked member (of a word or a sentence) is lost earlier than an unmarked one." So those three kinds of markings may be called marked ones. For example, according to Jarema & Kehayia (1992: 548), "Bates et al. noted that while the omission of articles is extremely common in English, in the two richly inflected languages, Italian and German, article omissions were hardly found." Bates et al. (1987: 30) indicates that "patients struggle to provide the article, in keeping with a lifetime habit of furnishing this important piece of information" In the Bates et al. study, it is implied that articles carry essential information. In other words, articles are unmarked particles in Italian and German.

5. CONCLUSIONS

This study shows that 3 Korean Broca's aphasics have comparatively intact morphological aspects of their native language. This is evidenced by the low percentages of inflectional marking errors--for past tense, nominative case, and accusative case--in three kinds of tasks: repetition (<34%), comprehension (<25%), and production (<32%). Broca's aphasic speech has been regarded as agrammatic speech. Agrammatic speech is characterized primarily by the omission or wrong usage of grammatical morphemes. This fact was also found in this paper (See Tables 6 and 7). Overall, Korean aphasics tend to respond to the tasks with appropriate verbs and nouns, and with a high retention of inflectional markings. These kinds of phenomena have been found in other studies such as Bates et al. (1987) and Menn & Obler (1990). The former study reports relative preservation of inflected articles in Italian and German aphasics. But in production tasks, there are many 'case' errors related with the nominative case and the accusative case (See Table 9).

In conclusion, this study presents the position that the view of Broca's aphasics as agrammatic cannot be strongly supported. It also demonstrates that nominative cases and accusative cases are marked elements in Korean, in view of 'implicational universals' in markedness theory. However, more aphasics' data should be examined in order to argue this position more strongly.

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