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Argument structure distribution of predicates in Korean agrammatic speech

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ABSTRACT
The present study focuses on the production of predicates by Korean agrammatic aphasic patients with respect to the argument structure distribution of the predicates. We analyzed narrative production data and picture/scene description data elicited from three Broca's aphasic patients in comparison with matched controls. In particular, we examined whether our subjects have the same kind of difficulties that Kegl's English agrammatic patient exhibited in the production of noncopular unaccusative constructions. The results show that our Korean aphasics do not exhibit any dramatic discrepancy from the control group in the pattern of argument structure distribution of the predicates produced. Regarding methodology, our studies reveal that the picture/scene description measures the subjects' competence more effectively than the narrative production task. We propose that the difference found between our agrammatic patients and Kegl's agrammatic subject may be due to the differences in the syntactic processes for deriving unaccusative constructions in the two languages.

This paper analyzes three Korean agrammatic patients' speech with a focus on the argument structure distribution of the predicates produced. All the patients had had a cerebrovascular accident. We used elicited narrative production data and picture- or video-elicited production data collected from the aphasics and their matched controls, and later compared the results with the findings from English aphasic research.

Kegl (1995) reported the argument structure distribution profile of verbs produced by an English-speaking agrammatic subject (FOK). The data were collected in sessions where the subject viewed videotaped movies and later re-

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counted the story to a tester. In her data analysis, Kegl focused on the percentage of argument structure types produced in each of the following categories: (1) verbs with an external argument (including transitives, ditransitives, and unergative intransitives); (2) verbs without an external argument: (2a) copular constructions and (2b) noncopular unaccusatives (including psychological verb constructions and unaccusative intransitives); and (3) uncodable verbs. Kegl's finding was that FOK's argument structure distribution profile showed a significant lack of noncopular unaccusatives: he produced none. Even after 6 months of syntactic mapping therapy designed to increase such structures, particularly passives, his percentage increased to only 3%, most of which were ambiguous between a true passive (unaccusative) and an adjectival passive interpretation (copular). Such a result contrasted sharply with that of his control, who showed an almost equal split between constructions with and without an external argument, as well as an equal division between copular and noncopular unaccusatives. FOK had access to a varied range of verb types specific to his needs. He produced the same range of constructions as his control in all remaining argument structure types.

The present study investigates, by looking at three cases, whether a comparable peculiarity is observed in argument structure distribution of predicates in Korean agrammatic production. Korean is a particularly interesting language to contrast with English because these two languages differ in a number of syntactically significant characteristics such as word order, case marking, and richness of inflectional morphology.

UNACCUSATIVITY HYPOTHESIS AND LEVELS OF SYNTACTIC REPRESENTATION

The main idea of Perlmutter's (1978) unaccusativity hypothesis is that there are two types of intransitive predicates, one commonly referred to as "unergatives" and the other as "unaccusatives." Examples of typical unergative verbs are activity verbs such as *walk, run, laugh, sleep, dance,* and *work*. Unaccusative verbs typically are "change-of-state" or "state" verbs such as *melt* (intransitive), *break* (intransitive), *fall, die, arrive*, and *exist*. The basic idea of the unaccusativity hypothesis is that the surface subject of an unaccusative predicate originates from its direct object position. In contrast, the surface subject of an unergative predicate is hypothesized to be its underlying subject.

More often, unaccusativity is defined in argument structural terms such as "external argument" and "internal argument" rather than in terms of syntactic notions such as "subject" and "object." Unaccusative predicates are defined in argument structural terms as follows: they are predicates that originally lack an *external argument* in their argument structure representation.

Figure 1 shows representations at different levels for four construction types in English, as assumed in Kegl (1995). As shown in the figure, an unaccusative verb and the passive form of a transitive verb lack an external argument. According to Burzio's (1986) generalization, verbs in unaccusative and passive constructions cannot assign accusative case to their object noun phrase (NP). To satisfy the case filter, this NP must receive case and therefore moves to a

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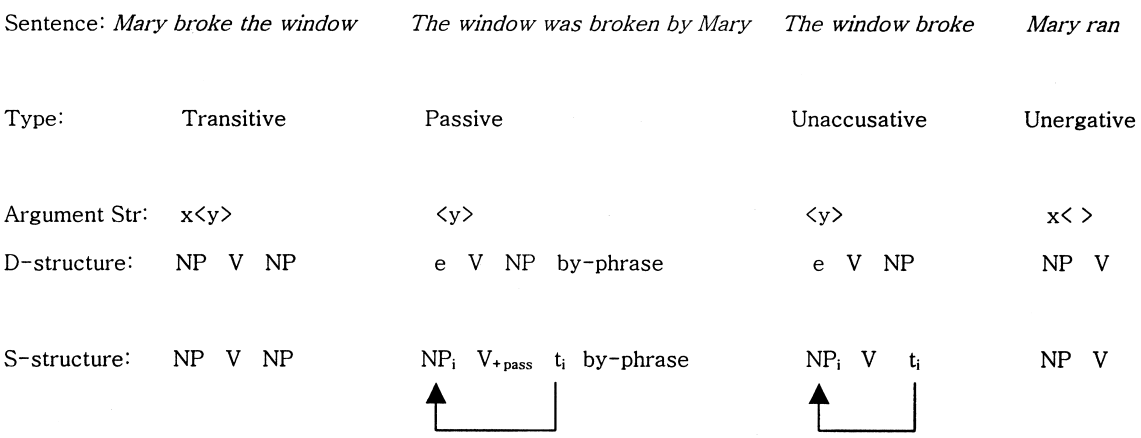


Figure 1. Sentence types in English at different levels of representation, based on Kegl's (1995) argument structure typology of verbs.

position where it can do so. Because there is no external argument occupying the subject position, this position is available and the object NP moves into it. There the NP gets assigned nominative case by inflection. In contrast, transitive verbs and unergative verbs have an external argument and thus do not require any syntactic movement between underlying and surface structures.

UNACCUSATIVITY IN KOREAN

Korean is a subject–object–verb (SOV) order language with relative freedom of word order. The verb-final constraint is strictly observed in writing and formal speech; but different orders are acceptable in colloquial speech with the exception of embedded clauses, with slightly different pragmatic effects. The grammatical roles of nominal constituents in a sentence are marked by postpositional case markers/particles. Korean is an agglutinative language: inflectional morphemes are attached to the verb root as shown in example 1 below. The inflections do not show agreement in number, gender, or person:

1. *Apeci-ka* *o-* *si-* *ess-* *upni-* *ta*
   father–Nom(inative) come–Hon(orific)–P(a)st–Formal–Dec(larative)
   Father came(Honorific)(Formal)

Predicate adjectives in Korean, unlike predicate adjectives in languages like English, do not appear under a higher copular verb. Instead, they are directly inflected for honorification, tense, aspect, formality of speech, and modality. In this respect, Korean adjectives are like adjectives in Navaho (Anderson, 1971), Mohawk (Postal, 1979), and Japanese (Kuno, 1973). Adjectives and verbs in Korean are thought to be categorically identical and differ only with respect to the feature [±stative]. The copular predicates are also inflected in exactly the same fashion as verbal and adjectival predicates.

Korean exhibits a systematic difference in the case-marking patterns of dyadic verbs. Case marking is an index of unaccusativity in Korean. The relevant case alternation patterns are illustrated in examples 3–8 below.

A typical transitive construction

2. *Yumi-ka* *chayk-ul* *ilk-nun-ta*
   Nom book–Acc read–Pres–Dec
   Yumi is reading a book.

Example 2 is a typical transitive construction: its subject NP, *Yumi*, receives nominative marking, whereas the object NP *chayk* (book) is marked as accusative. There is a class of psychological verbs (psych-verbs) that show the same case-marking pattern as typical transitive verbs:

3a. *Nay-ka umak-ul* *coh-a-ha-n-ta*
   I–Nom music–Acc be.likable–do–Pres–Dec
   I like music.

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b. *Nay-ka holangi-lul musep-e-ha-n-ta*
I–Nom tiger–Acc be.scary–do–Pres–Dec
I fear tigers.

Just as in the case of typical transitive verbs, the first NPs in example 3, which take the experiencer theta role, receive nominative marking, whereas the theme NPs are marked as accusative. This case-marking pattern of typical transitive verbs serves as the control in the test for unaccusativity in Korean. If we have an unaccusative verb in place of a transitive verb, we would not expect to see the same case-marking pattern of Nom–Acc. Fortunately, Korean has a class of psych-predicates, which take two arguments like regular transitives but manifest a case-marking pattern different from that of transitive psych-verbs such as example 3. Compare examples 3 and 4, which constitute minimal pairs:

4a. *Nay-ka(/eykey) umak-i coh-ta*
I–Nom(/Dat) music–Nom be.likable–Dec
I am fond of music.

b. *Nay-ka(/eykey) holangi-ka musep-ta*
I–Nom(/Dat) tiger–Nom be.scary–Dec
I am afraid of tigers.

In sentences like example 4, the first NP, the experiencer argument of the psych-predicate, can be marked as either nominative or dative whereas the second NP, the theme, should be marked as nominative. The significance of constructions like example 3 versus 4 is that they constitute minimal pairs that differ only with respect to the predicate suffix and the argument case-marking pattern.

One stable characteristic of regular transitive verbs in Korean is that their object NPs are marked as accusative. There has been little controversy over the assumption that accusative case in Korean is structurally assigned by a transitive verb to its sister (object) noun phrase. Sentences like those in example 4, in which no accusative case is assigned to any argument, reflect these predicates' lack of accusative case-assigning ability. It shows that the psych-predicates in example 4 are unaccusatives in Korean.

The same case-marking contrast is also found in other classes of dyadic predicates: the "bodily/mental process predicate" class and the "existential/possessive predicate" class also provide minimal pairs, as illustrated in examples 5 and 6.

Bodily/mental process predicates

5a. *Inho-ka ttam/nwunmul/phi-lul hul-li-n-ta*
Nom sweat/tear/blood–Acc flow–Caus–Pres–Dec
[Nom–Acc]

b. *Inho-ka(/eykey) ttam/nwunmul/phi-ka hulu-n-ta*
Nom(/Dat) sweat/tear/blood–Nom flow–Pres–Dec
[Nom(/Dat)–Nom]
Inho is sweating/weeping/bleeding.

6a. *Ku-ka kol/seng/hwa-lul na-y-ss-ta*
he–Nom anger-Acc occur–Caus–Pst–Dec
[Nom–Acc]

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b. *Ku-ka(/eykey) kol/seng/hwa-ka na-ss-ta*
he–Nom(/Dat) anger–Nom occur–Pst–Dec
[Nom(/Dat)–Nom]

He got angry.

7a. *Nay-ka ku mwuncey-lul ihay-ha-n-ta*
I–Nom that problem–Acc understanding–do–Pres–Dec
[Nom–Acc]

b. *Nay-ka(/eykey) ku mwuncey-ka ihay-toy-n-ta*
I–Nom(Dat) that problem–Nom understanding–become–Pres–Dec
[Nom(/Dat)–Nom]

I understand that problem.

Existential/possessive predicates

8a. *Yumi-ka ton-ul nam-ki-ess-ta*
Nom money–Acc remain–Caus–Pst–Dec
[Nom–Acc]

b. *Yumi-ka(/eykey) ton-i nam-ass-ta*
Nom(/Dat) money–Nom remain–Pst–Dec
[Nom(/Dat)–Nom]

Yumi has money left over.

These minimal pairs clearly show that certain predicates in Korean, as exemplified in parts b in examples 5–8, lack accusative case-assigning ability. Such a case-marking characteristic is a syntactic manifestation of unaccusativity in this language. The main semantic difference between the parts a and b sentences of examples 5–8 seems to be the degree of "volitional control," as manifested by the compatibility of expressions such as "on purpose" with the transitive part a pattern, but not with the unaccusative part b pattern. See Kim (1990, p. 85ff) for a discussion regarding this and for parallel phenomena in other languages.

Not all unaccusative predicates in Korean have a transitive counterpart that shares the same root as in the minimal pairs shown above, but they exhibit the typical unaccusative case-marking pattern when they take two arguments.

The following predicates in Korean constitute unaccusatives. Some of them take one argument and others take two arguments. They can roughly be grouped into the following semantic and categorical classes: psychological predicates, nonintentional perception verbs, change-of-state verbs, existential/possessive verbs, bodily/mental process verbs, spatial movement verbs, adjectival predicates, and copular verbs.

1. Psychological predicates: *kippu-* (be happy), *sulphu-* (be sad), *culkep-* (be delighted), *koylop-* (be troubled), *kulip-* (be sick for), *changphisulep-* (be ashamed of), *pukkulep-* (be ashamed of), *calangslep-* (be proud of), *musep-* (be afraid of), *pankap-* (be glad), *mitep-* (be reliable), *coh-* (be likable), *silh-* (be dislikable), and so forth.
2. Nonintentional perception verbs: *po-i-* (be visible), *tul-li-* (be audible), *nukkie-ci-* (feel), *tah-* (touch involuntary), and so forth.

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3. Change-of-state verbs: *el-* (freeze), *nok-* (melt), *kkulh-* (boil), *tha-* (burn; intransitive), *ttel-eci-* (fall off), *nem-eci-* (fall down), *ppa-ci-* (fall into, fall out), *the-ci-* (burst), *kkay-ci-* (break), *call-aci-* (cut; intransitive), *ssek-* (rot), *ppalgay-ci-* (redden), *cala-* (grow), *nulk-* (get old), *phi-* (bloom), *cwuk-* (die), *kkuthna-* (stop), and so forth.
4. Existential/possessive verbs: *iss-* (exist), *eps-* (not exist), *sayngki-* (come to exist), *nathana-* (appear), *eps-eci* (disappear), *nam-* (remain), *sal-* (live/reside), *philyoha-* (need), *pucokha-* (lack), *mocala-* (lack), and so forth.
5. Bodily/mental process verbs: *na-* (occur), *hulu-* (flow), and so forth.
6. Spatial movement verbs: *nemchi-* (flow over), *ttu-* (rise, float), *kalaanc-* (sink), *tul-* (enter), *na-o-* (come out), *kistul-* (dwell), *puth-* (attach; intransitive), *muth-* (liquid or dust, stick), *kki-* (dirt, gather), *pay-* (soak), and so forth.
7. Adjectival predicates: *khu-* (be big/tall), *cak-* (be small/short), *kil-* (be long), *ccalp-* (be short), *chakha-* (be kind-hearted), *nappu-* (be bad), *kananha-* (be poor), *yongkamha-* (be brave), *pikepha-* (be cowardly), and so forth.
8. Copular verbs: *-i-* (be), *ani-* (not be), and *toy-* (become).

With the syntactic/semantic characteristics of unaccusativity in Korean in mind, we will examine how aphasic patients and normal individuals behave with respect to argument structural differences of predicates. Specifically, we will see whether the production patterns of the patient group are influenced by the feature [±external argument] differently in comparison to the control group.

EXPERIMENT 1: NARRATIVE PRODUCTION TASK

Method

Subjects. Three Broca's aphasic patients were recruited from Samsung Medical Center and Kyunghee Oriental Medical Center in Seoul, Korea. All were monolingual speakers and suffered from left hemisphere lesions. Two certified speech–language pathologists evaluated the aphasic patients, utilizing the Korean version of the Western Aphasia Battery (K-WAB). The control group consisted of three normal subjects individually matched in gender, age, and educational level to the aphasic subjects.

The first subject (YHS), a 36-year-old ambidextrous male with 9 years of education, was a foreman at a construction site. He suffered an infarction in the left temporal lobe and left caudate nucleus. His brain MRI showed an infarction in the left caudate, left posterior insula, and left posterior striatocapsule, as well as an ischemic change in the left periventricular white matter. The initial speech–language evaluation was done 3 days postonset, and he was diagnosed as suffering a severe degree of Broca's aphasia. His Aphasia Quotient (AQ) on the K-WAB was 19.3. The experiment was carried out 1 month postonset.

The second subject (JMJ), a 51-year-old right-handed housewife with 6 years of education, also suffered a cerebral infarction. Her CT showed a subacute infarction in the left frontal lobe, and diffusion-weighted MR scans showed multifocal areas of high signal intensity in the left frontoparietotemporal lobe.

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Round high signal intensity lesions were also found in the left corona radiata and left basal ganglia. There was an associated finding of gyral swelling. The speech–language evaluation was done 3 days postonset, and her AQ on the K-WAB testing was 52.3. She was diagnosed as having Broca's aphasia of moderate severity. The experiment was carried out 5 days postonset.

The third subject (PSB), a 63-year-old right-handed male, was a former dentist and had 16 years of education. A CT taken 2 days postonset showed a left putaminal hemorrhage. Severe mass effects resulted in the effacement of sulci markings in the left frontal, temporal, and parietal regions, sparing frontal polar area. The adjacent lateral ventricle was obliterated and midline structures were deviated to the right side to a moderate degree. His AQ on the K-WAB, executed 4 years and 3 months postonset, was 59.4, and he was diagnosed as a Broca's aphasic of moderate severity. The experiment was carried out 4 years and 5 months postonset.

Table 1 summarizes the subject profiles. Controls are listed in the same order as their matched patients. All the controls are of the same age or older than their matched patients and of the same or lower educational level.

Procedure. Narrative production data were elicited by having the patients and their controls tell three well-known Korean folktales: *Hungpu wa Nolpu* (Hungpu and Nolpu), *Kaymi wa peyccangi* (The ant and the grasshopper), and *Kumtokki untokki* (The golden ax and the silver ax). To revive memory and facilitate production, subjects were given a picture-book version of each story with all the words masked. Commonly known folktales were used to control the content of the elicited narratives. This technique of using folktales is parallel to the format of Saffran, Berndt, and Schwartz (1989) to elicit a narrative, which uses the Cinderella story and accompanying redacted picture book. They suggest common fairytales or other well-known stories, TV shows, or movie plots be used to elicit the speech samples. Of these, Kegl (1995) used commercial movie clips that were viewed by subjects and then recounted in spoken English. Movie clips were not used in our experiment because it was hard to find movies with which all our subjects were reasonably familiar. As one reviewer suggested, the two different types of stimuli, one used by Kegl and the other used in this article, may have different effects in terms of the flow, amount, and naturalness of the language production collected. It seems unlikely, however, that the difference in the stimuli used may have the effect of selectively eliciting particular types of predicates over others. Moreover, the results from this experiment are complemented by the results from Experiment 2, in which we employed a different method to elicit production. The experimenter avoided interjecting comments or questions except when they were needed to facilitate continued production. All the speech produced by the subjects was recorded on an audiorecorder and later transcribed into standard Korean orthography.

Coding. The subjects' transcribed speech was segmented into narrative words and clauses in conjunction with the coding guidelines summarized in Appendix A. The coding system proposed in Saffran et al. (1989) was closely followed for the purpose of a crosslinguistic comparison. Then each predicate-containing

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Table 1. *Subject profiles*

Subjects	Age	Sex	Education Level	Etiology	Classification	Locus	K-WAB AQ
YHS	36	M	9 years	CVA (infarction)	Broca	Left temporal & left basal ganglia	19.3
YHS control	39	M	9 years		Control		
JMJ	51	F	6 years	CVA (infarction)	Broca	Left frontal lobe	52.3
JMJ control	51	F	6 years		Control		
PSB	63	M	16 years	CVA (hemorrhage)	Broca	Left putamen	59.4
PSB control	71	M	16 years		Control		

Note: CVA, cerebrovascular accident.

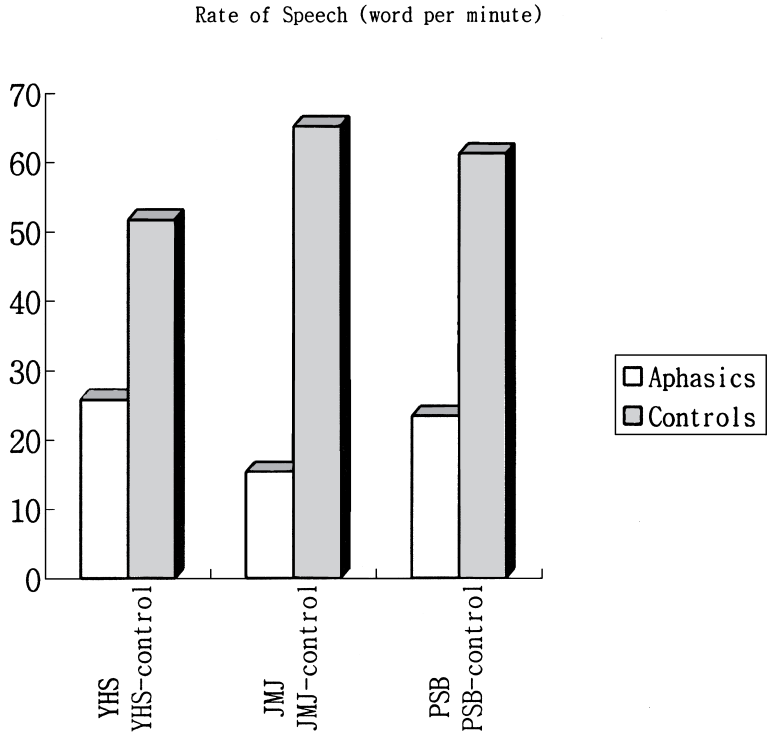


Figure 2. The rate of speech of aphasics and controls.

clause was coded according to its argument structure. Unergative intransitive verbs, transitive verbs, and causative verbs (with a lexical causative morpheme) were categorized as constructions with an external argument. In contrast, unaccusative intransitive verbs and adjectival predicates, passive verbs (with a lexical passive morpheme), and copular verbs were classified as constructions without an external argument. The rate of speech (words per minute), number of narrative words, and number of narrative clauses produced were measured for each subject.

Features of agrammatic speech

Figure 2 presents the rate of speech comparison between each patient and his or her matched control. The rate of speech was evaluated on the basis of each subject's narration of *Kumtokki untokki*, which was the third narrative in the production order. The speech rate of each aphasic was less than half of the rate of his or her matched control.

Figure 3 presents the number of narrative words and the number of clauses produced for the three stories by the three aphasics and their controls. The figure

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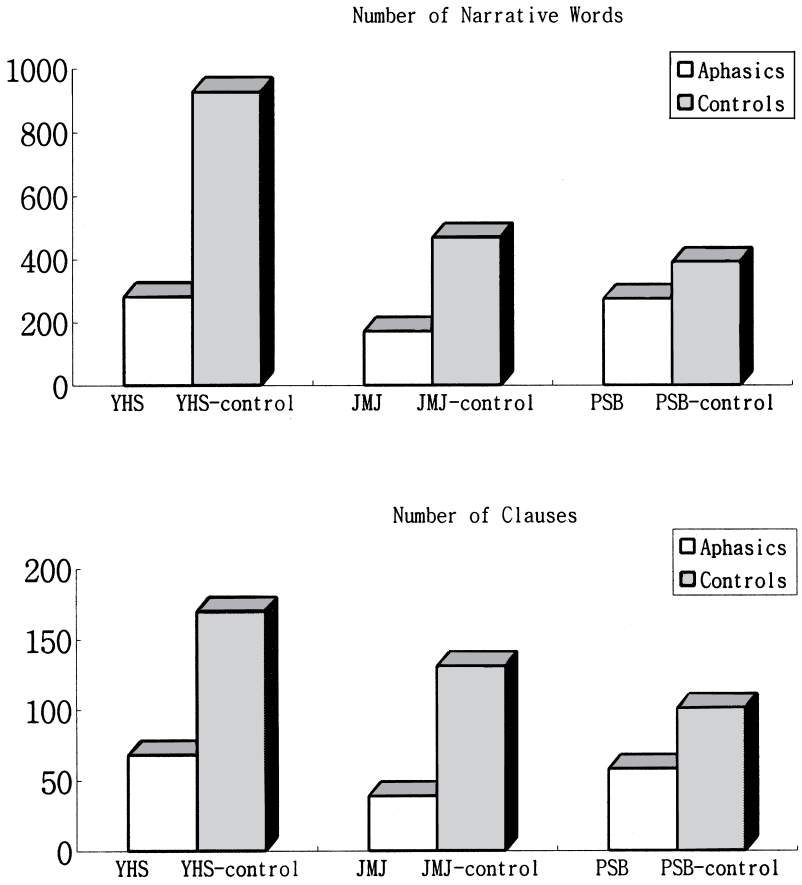


Figure 3. The number of narrative words and clauses.

shows that the number of narrative words produced by YHS was 29.2% of that produced by his control and the number of clauses was 39.4% of that produced by his control. The number of narrative words produced by JMJ was 33.4% of that produced by her control and the number of clauses was 26.9% of that of her control. The number of narrative words produced by PSB was 70.2% of that produced by his control and the number of clauses was 57.4% of that of his control. The speech of all our Broca's aphasics was slow, nonfluent, and monotonous.[1]

It has been reported in crosslinguistic research that agrammatic patients who speak inflectional and agglutinative languages such as Finnish, Polish, Serbo-Croatian, Icelandic (Menn & Obler, 1990), and Turkish (Slobin, 1991) demonstrate preservation of case marking and verbal morphology, with errors of substitution rather than errors of omission of noun suffixes. Sasanuma, Kamio, and

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Kubota (1990) reported that their two Japanese agrammatic patients demonstrated almost perfect preservation of predicate inflections and sentence-final particles, although the omission of structural case markers was notable. Grodzinsky (1984) had hypothesized that inflectional elements are preserved in agrammatism insofar as they are an obligatory part of a word.

The data from our Korean agrammatic patients show characteristics that are consistent with the earlier findings from other inflectional/agglutinative languages. Most notably, our subjects made substitution errors in case marking. In the picture/scene description task (see Experiment 2), YHS made 22 case-marking errors out of 118 case-marked utterances, JMJ made two substitution errors out of 82 case-marked utterances and nine case-marker omission errors in obligatory contexts, PSB made five substitution errors out of 95 case-marked utterances and omitted case markers in two instances. None of the controls made case-marker substitution errors. Kim (1997) investigated case-marking errors in Korean agrammatic speech using a sentence completion task. PSB also participated in Kim's experiment and made a much higher rate of case substitution errors than he did in the picture/scene description task for the present study. According to Kim, PSB made case-marker substitution errors in 34% (30/88) of the test sentences in her sentence completion task.

Our subjects provided sentence-final predicate inflections in almost all obligatory contexts but at certain times omitted the formal speech indicator *-upni-*. In the picture/scene description task, these patients used slightly fewer lexical causative morphemes compared with the control group but considerably fewer lexical passive morphemes than the control group. All in all, the features of our patients' speech such as the rate of speech, the number of narrative words and clauses produced, and case-marking and inflectional errors are typical of the characteristics of agrammatism.

Results and discussion

Table 2 presents the frequency distribution of various types of predicates produced by each subject and his or her control in the narrative production experiment.

Table 3 summarizes the same results in terms of the presence/absence of the external argument of the predicates. In coding for Table 3, transitives, causatives, and unergatives were coded as predicates with an external argument, whereas passives, middles, inchoatives, copulas, and adjectival predicates were coded as predicates that lack an external argument.

The actual predicates produced by one of the aphasics (PSB) are listed in Tables 4 and 5.

The arguments for the reduction of the proportion of noncopular unaccusatives in Kegl's English study was based on comparisons between the agrammatic data and the benchmark distribution shown by all the control subjects, which was 59% for constructions with an external argument, and a 50/50 split within the remainder between copular constructions and other unaccusatives. However, in the crosslinguistic data from American Sign Language (ASL) reported in Kegl and Poizner (1997), the argument structure distribution across

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Table 2. *Proportions of predicate types produced in the narrative production experiment*

Subjects	Unergatives (%)	Transitives (%)	Causatives (%)	Inchoatives, Passives, & Middles (%)	Adjectives (%)	Copulas (%)	Uncodable (%)	Total Predicates Coded
YHS	13.6	45.5	5.7	19.3	10.2	2.3	3.4	88
YHS control	14.8	40	4.8	21.1	13.7	5.5	0	270
JMJ	17.0	38.3	4.3	17.0	0	8.5	14.9	47
JMJ control	14.5	40.5	3.5	24.9	9.2	7.5	0	173
PSB	14.3	44.6	0.9	18.8	7.1	7.1	7.1	112
PSB control	11.8	44.4	6.9	9.7	19.4	7.6	0	144

Table 3. *Argument structure distribution of predicates produced in the narrative production experiment*

	− External Argument				
	Copular (%)	Noncopular Unaccusatives (%)	+ External Argument (%)	Uncodable (%)	Total Predicates Coded
YHS	2.3	29.5	64.8	3.4	88
YHS control	5.5	34.8	59.6	0	270
JMJ	8.5	17.0	59.5	14.9	47
JMJ control	7.5	34.1	58.4	0	173
PSB	7.1	25.9	59.8	7.1	112
PSB control	7.6	29.2	63.2	0	144

Table 4. *Verbs with external argument produced by PSB*

Verb	Meaning	Frequency	Verb	Meaning	Frequency
(Cip-ul) nao-	Leave (home)	1	*(Cip-ul) o-*	Come (home)	1
Mek-	Eat	1	*Ha-*	Do	12
Cwu-	Give	10	*Cap-*	Catch	2
Kule-	Do so	1	*Dalla-*	Give	1
Ka-	Go	5	*Kacie-o-*	Bring	2
Mul-	Hold-in-mouth	2	*Yatanchi-*	Scold	1
Yaykiha-	Talk	2	*Po-*	Try	2
Kkekk-	Break (leg)	1	*Peli-*	Throw away	1
Kam-	Wrap	1	*Ponay-*	Send	1
Sim-	Plant	1	*Calu-*	Cut	2
Tulenup-	Lie down	2	*Po-*	See	1
O-	Come (animate)	1	*Cwuk-i-*	Kill	1
Cinay-	Get along	1	*Nol-*	Play	1
Molu-	Do not know	1	*Wul-*	Cry	1
Ttel-	Shake	1	*Et-*	Get	3
Ttayli-	Hit	2	*Puthtul-*	Hold	1
Nayponay-	Send out	1			

ASL control signers was shown to be different. The relative split between constructions with and without an external argument was similar, but the split between copulars and unaccusatives was very different, with a low proportion of copular or zero verb constructions and a much larger proportion of other unaccusatives. It seems, therefore, that, as one reviewer suggests, languages have their own "argument structure distribution signature."

The benchmark distribution for Korean indeed emerges from the control group responses shown in Table 2, which is about 60% for constructions with an external argument, 7% for copulars, and 33% for noncopular unaccusatives, on average.

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Table 5. *Verbs without external argument produced by PSB*

Verb	Meaning	Frequency	Verb	Meaning	Frequency
Iss-	Exist	8	*I-*	Be	3
Eps-	Not exist	1	*Ani-*	Be not	1
Khu-	Grow	1	*Toy-*	Become	4
(Hwa-ka) na-	(Anger) occur	3	*Mac-*	Be right	1
Caykieci-	Break (intrans)	1	*Olh-*	Be correct	1
Nao-	Come out (inanimate)	1	*Chwup-*	Be cold	3
Yel-li-	Grow on a tree	1	*Nappu-*	Be bad	2
Cwuk-	Die	1	*Coh-*	Be good	1
O-	(Snow) come	2	*Sal-*	Live	2

The low proportion of copulars in Korean in comparison with English is expected because of the fact that predicate adjectives in Korean do not appear under a higher copular verb as in English but categorically behave as verbs with a [+stative] feature, directly undergoing all verbal inflections. The proportion of predicates with an external argument seems to be about the same in the two languages, whereas the proportion of noncopular unaccusatives is somewhat higher in Korean than in English (33 vs. 25%), perhaps because they include adjectival predicates (stative verbs). The benchmark argument structure distribution for Korean shows a considerably lower proportion of copulars compared with English.

With this benchmark for normal production in mind, let us turn to the results produced by our aphasic subjects. If we calculate the proportions of noncopular unaccusatives on the basis of codable responses only, YHS produced them in 30.6% of codable predicates, whereas his control produced them in 34.8% of the total (codable) predicates; JMJ produced them in 20% of codable predicates and her control in 34.1%; PSB produced them in 27.9% of codable predicates and his control in 29.2%. The overall pattern shows that the percentage of noncopular unaccusative predicates produced compared to the total number of codable predicates produced was lower in the patient group than in the control group. However, we do not see the same dramatic absence of noncopular unaccusatives as reported by Kegl (1995) for her English-speaking agrammatic patient.

Kegl reported that her agrammatic subject failed completely to produce noncopular unaccusatives in narrative production, whereas for his matched control, the percentage of noncopular unaccusative usage was about 22% of all the predicates produced. Our results contrast with Kegl's study in that the percentages of noncopular unaccusative predicates compared to total utterances produced by Korean aphasic patients do not deviate from those of the control group as dramatically as in the case of English. On the other hand, it is true that every patient in our Korean-speaking aphasic group produced a lower percentage of noncopular unaccusative predicates than his or her control.

Individual differences can also be noted within both the patient group and the control group: JMJ's proportion of noncopular unaccusatives was much lower than that of her control, as compared with other aphasics. Similarly, PSB's control

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produced a much lower proportion of noncopular, nonadjectival unaccusatives than other control subjects. Such discrepancies in the results prompted us to check the subjects' competence using a different method.[2]

The storytelling method has the advantage of controlling narrative content to a certain extent. However, we need to administer the elicitation context more tightly to "force" the subjects to produce certain target predicates with a designated argument structure. The second experiment was designed for this purpose.

EXPERIMENT 2: PICTURE/SCENE DESCRIPTION TASK

Method

Subjects. The same subjects and their controls who participated in the narrative production experiment participated in this picture/scene description task.

Procedure. The subjects were shown pictures or videotaped scenes and were asked to describe each event or activity. Each picture or scene was designed to elicit a specific target predicate. Some of the picture stimuli were selected from the sets of sequencing cards produced by Imaginart Communication Products that depicted activities, events, or social situations.[3] Others were custom designed to elicit pretargeted predicates. The content of the videotapes was created from scenarios outlined by the experimenters and was filmed by an independent film producer. Each stimulus was tested on normal individuals before the experiment in order to check their effectiveness in eliciting pretargeted predicates.

Target predicates consisted of unergative verbs, transitive verbs, causative verbs with a causative morpheme, passive verbs with a passive morpheme, middles, inchoative unaccusative verbs, and predicate adjectives. The copular verbs *i-* (be) and *ani-* (be not) were not included simply because it was hard to elicit them without a prompting question that contained *i-* (be; e.g., "What is this?"). However, two tokens of *toy-* (become) were included. All pre-targeted predicates were selected based on their frequent usage level in everyday colloquial speech. Videotaping was especially important in eliciting inchoative and middle verbs, both of which refer to events that occur without agents. The total number of target predicates was 142.

Results

Table 6 shows the proportions of various types of predicates produced by each subject and the controls in Experiment 2. Figure 4 illustrates the results in terms of the presence/absence of an external argument.

In this experiment, YHS produced noncopular unaccusative constructions in 38.4% of the codable utterances, JMJ in 39.6%, and PSB in 43.5%. In contrast, the percentage of the same constructions found in each control subject's production was 44.4, 44.4, and 45.1%, respectively, of the total (codable) utterances. These results indicate that when elicitation contexts are more narrowly defined, the patterns of argument structure distribution of the predicates that are produced

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Table 6. *Proportions of predicate types produced in the picture/scene description experiment*

Subjects	Unergatives (%)	Transitives (%)	Causatives (%)	Inchoatives, Passives, & Middles (%)	Adjectives (%)	Copulas (%)	Uncodable (%)	Total Predicates Coded
YHS	9.9	39.4	10.6	27.5	9.9	0	2.8	142
YHS control	9.2	36.7	8.5	35.9	8.5	1.4	0	142
JMJ	5.6	26.1	7.8	23.2	3.5	1.4	32.4	142
JMJ control	9.9	33.1	11.3	35.9	8.5	1.4	0	142
PSB	10.6	34.5	8.5	32.4	9.9	1.4	2.8	142
PSB control	9.9	32.4	11.3	35.2	9.9	1.4	0	142

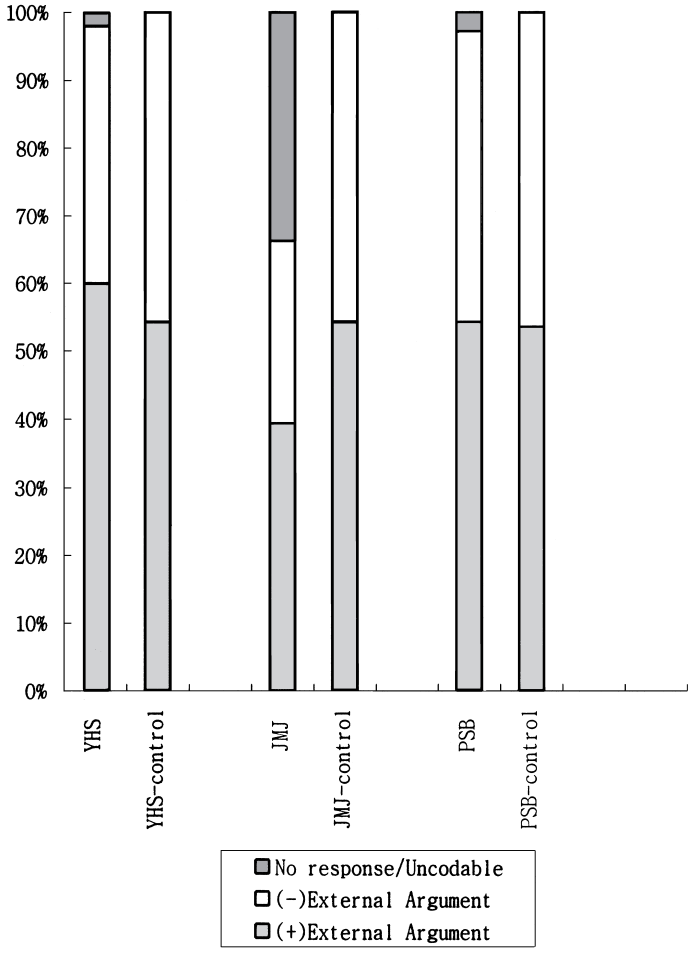


Figure 4. The argument structure distribution of predicates produced by agrammatic patients and controls in the picture/scene description experiment, based on the total number of responses.

are more consistent within the agrammatic group. They also indicate that this task provided a narrower gap in response patterns between the patient group and the control group than was shown in the free narrative production task.

In sum, the results of the second experiment confirm the findings from the previous experiment that Korean agrammatic patients do not have any particular difficulties producing constructions that lack an external argument. In other words, the frequency pattern in the production of predicates does not hinge upon the presence or absence of an external argument in any given predicate's argu-

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ment structure representation, unlike in the English case reported by Kegl. The percentages of noncopular unaccusative predicates produced compared to the total codable predicates versus the percentages of verbs with an external argument produced compared to the total codable predicates were not dramatically different between the patient group and the control group.

GENERAL DISCUSSION

None of our Korean agrammatic patients showed a significantly deviant argument structure distribution pattern in the predicates they produced. More specifically, our subjects did not seem to have any difficulty in producing noncopular unaccusative constructions. Our results contrast with the findings in Kegl (1995). Her patient failed to produce noncopular unaccusative constructions at all, whereas 22% of his control's responses were made up of these constructions. Kegl accounts for such a difference in argument structure distribution between her aphasic subject and his control by claiming that the agrammatic patient had a syntactic deficit.

English noncopular unaccusatives as a probe for a syntactic deficit

Kegl's explanation for the absence of noncopular unaccusatives in her aphasic patient's narrative production is summarized as follows. As we saw in Figure 1, an unaccusative verb and the passive form of a transitive verb lack an external argument. In the transformational grammar framework outlined in Chomsky (1981) and developed by others, verbs in unaccusative and passive constructions cannot assign accusative case to the object NP. To get case, this NP must move to a position where it can receive case. Because there is no external argument that occupies the subject position of unaccusative/passive constructions, this position is available and the object NP moves into it. There the NP gets assigned nominative case by inflection. Kegl suggests that verbs whose argument structure pattern contains an external argument are more stable and processible by agrammatic aphasic subjects because the presence of an external argument precludes the need for movement rules that displace arguments from their lexically specified positions. According to her, the processing of displaced arguments requires specific syntactic knowledge.

To be more precise, any displacement of arguments from their underlying positions that results in a tangible permutation of the arguments relative to the verb and to each other is predicted to prove problematic for agrammatic aphasics. Kegl hypothesizes that only a syntactic deficit should yield a disproportionate argument structure distribution in which the production of noncopular unaccusatives is greatly reduced: aphasics whose deficits affect other components of their grammar (e.g., a lexical accessing problem) exhibit a different profile. To test her hypothesis, Kegl analyzed the speech of a conduction aphasic with an anomic component and found that this nonagrammatic aphasic subject patterned like controls with respect to the argument structure distribution of predicates produced. Kegl concluded that this anomic patient with a lexical access deficit

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did not have a syntactic deficit and thus did not show any disproportion in argument structure distribution.

The syntax of unaccusatives in Korean

Our results show that Korean agrammatic patients produce basically the same range of constructions as the control group in all argument structure types. When we compare these results with the results from Kegl's English-speaking agrammatic patient, the crosslinguistic differences stand out. If agrammatic patients in any language have syntactic deficits and if argument structure coding is sensitive to syntactic deficits, why would Korean Broca's agrammatic patients not also show difficulties with producing unaccusative constructions?

Consideration should, of course, be given to the syntactic differences between the Korean and English languages. First, we may consider the possibility that unaccusativity has no syntactic basis or syntactic implication whatsoever in Korean. However, this hypothesis is not viable when looking at minimal pairs that are composed of dyadic unaccusative verbs and accusative-marking transitive verbs (see examples 3–8). Unaccusativity in Korean is manifested as a predicate's lack of accusative-case-assigning ability, whereas transitive verbs typically assign accusative case to their internal argument. Such a difference in case-marking ability is a typical example of a syntactic feature.

The second possibility is that even though unaccusativity has a syntactic basis in Korean, deriving unaccusative constructions may involve a different process of movement between syntactic levels of representation in comparison to English.

In the first place, it is unclear whether we should posit a syntactic movement for case-theoretic reasons between the underlying and the surface structures in a language like Korean. Some researchers (Kang, 1986; Kim, 1990) have proposed that nominative case in Korean is not structurally assigned by any element whereas accusative case is always structurally assigned. According to these researchers, there is no empirical evidence that agreement in inflection assigns nominative case in Korean, because Korean altogether lacks an agreement. Furthermore, they argue that it is unmotivated to assume that nominative case is assigned by inflection in Korean. These researchers have therefore proposed the default nominative hypothesis, which states that a nominative marker is inserted onto an NP that lacks case/case. If Korean had a default nominative strategy, no NP movement for case-theoretic reasons would be motivated.

However, there are other researchers working on case marking in Korean who have proposed that there *is* agreement in Korean and that this element in inflection assigns nominative case. Their main argument is that the subject-honorific feature in Korean is an agreement (Choe, 1988).

At this point, we do not intend to go into the debate of whether subject honorification in Korean is an agreement. For the sake of discussion, however, we will assume that nominative case is structurally assigned and that NP movement is indeed motivated in Korean for case-theoretic reasons. Then, the deep- (d-) structure object should move to the surface- (s-) structure subject position to be assigned nominative case by inflection. The NP movement in unaccusative

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constructions between d-structure and s-structure would be schematized as in example 9:

9. Unaccusative constructions in Korean at d- and s-structures:
d-structure: *e* *[raindrops] fall*
s-structure: *[raindrops]*–Nom *t fall*

It is important to note here that the movement of a d-structure object to the surface subject position in a verb-final language like Korean would not cause a permutation with respect to the predicate and it is in that sense "vacuous." This certainly contrasts with the case of English unaccusative constructions in which the displacement of the d-structure object results in a tangible permutation of the arguments relative to the predicate, as we see in the following:

10. Unaccusative constructions in English at d- and s-structures:
d-structure: *e* *fall* *[raindrops]*
s-structure: *[raindrops]* *fall* *t*

We have considered two different hypotheses about nominative case marking in Korean and their implications for the derivation of unaccusative constructions. Adopting either hypothesis would not imply a permutation of arguments relative to the predicate between different syntactic levels of representation: the default nominative hypothesis would imply no NP movement between d- and s-structures for case-theoretic reasons. In contrast, the nominative by inflection hypothesis would imply a vacuous movement between the two syntactic levels. In either circumstance, there would be no tangible permutation of noun phrases relative to the predicate. Therefore, according to Kegl's logic, we should not expect Korean agrammatics, unlike English-speaking agrammatics with a syntactic deficit, to experience difficulties with unaccusative constructions.

CONCLUSION

In this study we compared narrative production data and picture/scene description data from three Korean-speaking Broca's aphasic patients with data from matched controls. The focus of research was on the argument structure distribution of the predicates produced and, more specifically, the issue of whether Korean-speaking agrammatic patients show sensitivity to the presence/absence of an external argument of predicates in their production. The present study was inspired by previous research conducted on the same topic with English agrammatic speech (Kegl, 1995), and the results from Korean revealed remarkable differences between the Korean and English languages. Whereas Kegl's agrammatic patient could not produce noncopular unaccusatives at all, all of our Korean Broca's agrammatic patients were able to produce noncopular unaccusative constructions. Broca's aphasics exhibited basically the same argument structure distribution pattern as normal individuals in the proportions of predicate types produced.

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The results from the narrative production task were confirmed by those from the picture/scene description task. In both tasks, Korean agrammatic patients produced somewhat lower proportions of noncopular unaccusative constructions. However, both the within-group differences and the between-group differences were smaller in the picture/scene description experiment, when the production of target predicates was more specifically delineated. Such results suggest that when aphasics show a preference for a certain type of construction in narrative production, it may not necessarily indicate that they lack the capacity to produce other types of constructions. When the aphasics were prompted by highly controlled stimuli to implement specific constructions, they were able to produce results that were more consistent within the group and closer to those of the control group than in the narrative production experiment. From a methodological point of view, the picture/scene description task seems to be the more accurate method of measuring construction competence than the narrative production task. That is to say, a carefully designed set of pictures/videotaped scenes to elicit pretargeted predicates in the specific language being tested measures the subject's competence more effectively than the narrative production task. Considering that Kegl used the narrative production (storytelling) task to elicit utterances from her subjects, it seems likely that the more "forceful" methodology of picture/scene description task may have elicited some noncopular unaccusative predicates from Kegl's agrammatic patient.

Both experiments in the present study yielded the same result: three Korean-speaking Broca's agrammatic patients behave differently from at least one English-speaking agrammatic with respect to the production of unaccusatives. These Korean agrammatic aphasics, however, do not behave much differently from their controls with respect to the argument structure types of the predicates produced. We have proposed that this crosslinguistic difference in aphasic behavior is to be expected when we consider the differences in the grammar structures of the two languages and the differences in the syntactic processes of deriving unaccusative constructions. In particular, we have pointed out that Korean involves no tangible permutation of noun phrases relative to the predicate unlike English.

Needless to say, such a hypothesis needs to be substantiated in both Korean and English by a larger data base. There is always the possibility that the next patient examined would show a very unusual argument structure distribution pattern. It is also important to note a reservation we have about Kegl's (1995) findings because her English aphasic research was a single case study and we do not know how generally this phenomenon can be applied to English-speaking agrammatics as a group. Ideally, the results of the present research should be confirmed by works conducted on other SOV languages that share similar unaccusative constructions and whose grammar structures involve either no movement or only a vacuous movement of arguments.

The present study focused on a very specific aspect of Korean agrammatic speech, yet there are many other aphasia-related issues awaiting future research. The patterns of case-marker omission and substitution in aphasic speech would be a topic relevant to the present study. Although the importance of crosslinguistic comparisons in aphasia research cannot be emphasized enough, collected

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data from Korean aphasic patients has been largely unavailable. Furthermore, linguistically oriented analyses of such data have been almost completely nonexistent. This present study is a first attempt to fill this gap. It provides evidence of the importance, in crosslinguistic agrammatism research, of including languages with syntactic characteristics very different from those of English.

APPENDIX

GUIDELINES FOR CODING PRODUCTION

1. Rate of speech: The total time, including pauses in the speech sample, is counted, and the time taken by examiner's comments is subtracted. The number of complete words spoken by the patient, including recognizable paraphasia, is counted. Bound morphemes including case markers and verbal inflections are not counted as separate words. Contractions are not counted as two words. False starts that result in partial words are not counted. Utterances like *e* or *um* are excluded.
2. Count of "narrative words":
   - A. "Narrative words" are assumed to represent the propositional speech that the patient produces as part of the story. Excluded from this corpus (crossed off on the transcript) are the following:
     - i. neologisms;
     - ii. all comments that the patient makes on the narrative, or on the task, e.g., *mos ha-keyss-eyo* ((I) can't do (this)), *molla-yo* (I don't know);
     - iii. all interjections that the patient uses habitually (e.g., *e, um, mweya*, etc.);
     - iv. all materials that are subsequently repaired. Categories of repairs are as follows:
       - (1) repetitions: eliminate all but the final occurrence of a repeated word, fragment, or sentence, except where repetitions are used for emphasis;
       - (2) interruptions: count the completed clause or the more complete fragment;
       - (3) amendments: count amendment only;
       - (4) elaborations: count elaborated version only.

     After all the items listed above have been removed from the corpus (crossed off on the transcript), the remaining narrative words are counted as follows:
   - B. Lexical compounds, such as *kumun pohwa* (treasures), *chen-pel* (divine punishment), *itumhay* (next year), *cap-a-mek-* (devour), and *ki-e-oll-a-ka-* (crawl up) are scored as a single word. When in doubt as to the status of a word combination, consult a dictionary.
   - C. "Auxiliary/supporting" verbs are counted as separate words. For example, V-*a/e cwu-* (do something for someone), V-*a/e po-* (try V-ing), or V-*l swu iss-* (can V) are counted as two words.
   - D. Case markers, postpositions, and complementizers are not counted as separate words.
   - E. Set phrases such as *kulay kaciko* (thereupon), *mianhay* (I am sorry), *komap-e* (thank you), and *ani-e-yo* (it is not) are counted as one word.

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3. Count of clauses: Because Korean is a language that allows null arguments in any position, an utterance containing a verbal, adjectival, or copular predicate with or without surface arguments or adjuncts basically qualifies as a clause. Embedded sentences count as separate clauses.

Auxiliary verb constructions are not counted as biclausal but as monoclausal: for example, V-*a/e cwu*- (do something for someone), V-*a/e po*- (try V-ing), or V-*l swu iss*- (can V), V-*ko siph*- (want to V), V-*a/e peli*- (end up V-ing), V-*ko iss*- (be V-ing), V-*nun kes-i*- (it is V/ should V), V-*ya toy*- (must V), V-*a/e/noh*- (V for later use), are counted as containing one clause rather than two. Negative constructions such as V-*ci anh*- (not V) and V-*ci mos-ha*- (can't V) are also counted as a single clause.

Conjunctive clauses such as *ai-ka cip-ey ka-se ca-ss-ta* (the child went home and slept), *ai-ka pap-ul mek-ko ca-ss-ta* (the child ate the rice and slept), and *ai-ka pap-ul mek-taka cwuk-ess-ta* (the child died while eating the rice) are considered as VP conjunctions and hence counted as single clauses.

Periphrastic causative constructions such as *John-i Mary-ka/eykey/lul pap-ul mek-key hay-ss-ta* (John–Nom Mary–Nom/Dat/Acc rice–Acc eat–Comp do–Pst–Dec; John made Mary eat the rice) or "seem" constructions such as *Mary-ka o-n kes kath-ta* (Mary–Nom come–Pst Comp seem–Dec; It seems that Mary has come), as well as quotative constructions such as *Mary-ka pi-ka o-n-ta-ko hay-ss-ta* (Mary–Nom rain–Nom come–Pres–Dec–Comp do–Pst–Dec; Mary said that it was raining) are counted as being composed of two clauses.

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NOTES

1. The relatively smaller difference between PSB and his control in the production of narrative words and clauses in comparison with the other two patient–control pairs seems to be due, in part, to the low performance of his control, which, in turn, may partly be due to the relatively large age difference (8 years) between PSB and his control.
2. There are some divergences in characteristics between our patient group and Kegl's patient FOK apart from that they differ in sample size (3 vs. 1). The standardized aphasia screening used in this study is the Korean version of the Western Aphasia Battery whereas Kegl used the Boston Diagnostic Aphasia Exam (BDAE). Our Korean aphasics are typical, not borderline, cases of Broca's aphasics. Therefore, there should be no difference in classification, whatever screening method we use. In fact, one of our patients (PSB) was also administered BDAE, and he was classified as a Broca's aphasic. Lesion sites on our three Broca's aphasics vary in both location

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and extent, and Kegl's subject FOK demonstrated none of these. This is not surprising when we consider that previous results of CT scans of crosslinguistic agrammatic patients showed a wide variety of lesions (Vanier & Caplan 1990). Finally, Kegl's subject was a chronic aphasic, whereas only one (PSB) of our subjects could be considered chronic. The other two patients were tested very early (1 month and 5 days postonset, respectively). However, the basic result remains of interest: even in a fairly severe stage of recovery, our two agrammatic subjects were still producing unaccusative constructions, unlike Kegl's English-speaking patient, FOK.

3. The titles of the sequencing card sets used in this experiment were: "basic sequences," "daily living," "social situations," and "activities and events." The Imaginart Communication Products Company supplies speech, language, and learning materials for special education, speech and language pathology, occupational therapy, early childhood education, English as a second language, geriatric rehabilitation, and those with hearing impairments (Imaginart Communication Products, 307 Arizona Street, Bisbee, AZ 85603).

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