

Differential patterns of noun-verb naming and the verb argument complexity in persons with aphasia and normal elderly adults

Abstract

The purpose of the study was to investigate 1) whether persons with aphasia (PWA) showed differential patterns between noun and verb naming tasks compared to normal elderly individuals (NEI) and 2) whether the two groups showed differential effects of verb argument complexity on a Korean-verb naming task. Results revealed that PWA showed differentially greater difficulties in verbs than nouns compared to NEI. PWA presented worse performance on unaccusative and 3-place verbs than unergative verbs. However, these patterns were not observed in NEA. Dissociated patterns of verb argument complexity were discussed with respect to Korean-specific verb argument structures.

Introduction

Several studies have reported that persons with aphasia showed greater difficulties in naming verbs than nouns, and most of evidence focused on a certain group of aphasia, especially diagnosed as Broca's aphasia with agrammatism (Berndt et al., 1997; Miceli et al., 1988; Miceli et al., 1984; Thompson et al., 1995b; Zingeser & Berndt, 1990). Among many approaches to examining the nature of verb production deficits, some researchers focused on the lexical-syntactic properties of verbs, especially examining the number of arguments associated with the verb. Thompson and colleagues reported that verbs with more arguments were difficult to produce than those with fewer arguments (Kim & Thompson, 2000; Thompson et al., 1995a, 1997).

A more recent work by Thompson (2003) examined two types of intransitive verbs (unaccusative vs. unergative) in persons with aphasia. Unaccusative verbs were considered more complex than unergative verbs, given that the movement was involved in assigning the theme for the unaccusative verbs. Consistently with the hypothesis, Thompson found that persons with agrammatic Broca's aphasia showed greater difficulties in producing unaccusative than unergative verbs. Unlike English, the movement hypothesis is controversial in Korean syntactic structures. Korean is a verb-final language (Subject-Object-Verb), and the word-order is relatively free. There are two contrasting hypotheses with respect to the movement theory in Korean. One is "Default Nominative Hypothesis" (Kang, 1986; Kim, 1990), which assumed that movement does not emerge in Korean syntactic structures, whereas "Norminative-by-inflection Hypothesis" (Han, 1987) suggested that movement occurs in Korean. Kim (1998) analyzed connected speech samples from Korean-speaking individuals with Broca's aphasia and reported that Korean Broca's aphasics did not show differentially greater difficulties in unaccusative verbs than unergative verbs unlike English-speaking individuals with Broca's aphasia. Kim (1998) accounted for these findings based on the crosslinguistic differences between Korean and English syntactic structures. However, Kim (1998) analyzed connected speech samples obtained from a picture description tasks, and therefore it is not sure whether these findings can be replicated in the confrontation naming task.

The purposes of the current study were 1) to investigate whether persons with aphasia (PWA) showed differential patterns between noun and verb naming tasks compared to normal elderly individuals (NEI) and 2) examine whether the two groups showed differential effects of verb argument complexity on a Korean-verb naming task.

Methods

Fifteen PWA (mean of age=44.67, SD=13.173 and mean of education=13.40, SD=2.923) and 15 NEI (mean of age=44.53, SD=13.384 and mean of education=14.80, SD=2.336) participated in the study. The NEI group showed normal range of performance on the Korean Mini-Mental State Examination (K-MMSE) (Kang, Na, & Hahn, 1997). All individuals with aphasia suffered a single, left hemisphere stroke. The diagnosis of aphasia was based on administration of the Korean version of Western Aphasia Battery (Kim, & Na, 2001). Aphasia quotients(AQs) derived from the K-WAB ranged from 46.6 to 85, and the mean AQ was 67.113 (SD=12.40). Mean of months post onset ranged from 7 to 42 (Mean=22.4, SD=12.38). Demographic information of PWA was provided in **Table 1**. All participants were right-handed and native speakers of Korean. Participants- and Spouse(or caregivers)-reports indicated that they had no history of prior neurological disease, psychiatric disorder, and developmental speech/language disorders.

For naming tasks, 36 nouns and 36 verbs were selected based on the Yonsei Corpus of lexical frequency in Korean vocabulary (Seo, 1998). Verbs were classified into the four types (one-place unergative, one-place unaccusative, two-place, and three-place verbs) with 9 items for each type. Nouns consisted of 18 animate and 18 inanimate items. Frequency of verbs and nouns was matched. Stimuli for the noun naming task were presented on black-and-white line drawing pictures. All of items for verb production were demonstrated in a computer screen on an animation consisting of eight frames in a black-and-white drawing.

Results

In order to examine whether PWA showed differential patterns between the nouns and verbs compared to the NEI group, a two-way mixed ANOVA was performed with group as a between-subject factor and word-class as a within-subject factor. A main effect for the group was significant, $F(1, 28)=66.119, p<.0001$, with PWA showing lower accuracy than NEI, and the main effect for the word-class was significant, $F(1, 28)=5.077, p<.05$, with lower accuracy in the verbs than nouns. The two-way interaction was significant, $F(1, 28)=8.711, p<.01$, indicating that PWA showed differentially greater difficulties in the verbs than nouns compared to the NEI group. Accuracy of the nouns and verbs was illustrated in **Figure 1** for both groups.

A two-way mixed ANOVA was performed with group as a between-subject factor and verb-type as a within-subject factor. A main effect for the group was significant, $F(1, 28)=65.141, p<.0001$, with PWA presenting lower accuracy than NEI, and the main effect for the verb-type was also significant, $F(3, 84)=4.92, p<.005$. Post-hoc analyses using Bonferroni correction revealed that one-place unergative verb generated significantly higher accuracy than the 3-place verbs ($p<.05$). The two-way interaction was significant, $F(3, 84)=8.603, p<.0001$. As post-hoc analyses for the significant interaction, two separate

one-way repeated ANOVA were performed for each group. In the PWA group, there were significant differences among the verb-types, $F(3, 42)=6.659, p<.005$. Bonferroni pairwise comparisons revealed that one-place unergative verbs generated higher accuracy than one-place unaccusative verbs ($p<.05$) and three-place verbs ($p<.01$). In the NEI group, there were significant differences among the verb-types, $F(3, 42)=6.659, p<.005$. Bonferroni pairwise comparisons revealed that one-place unaccusative verbs generated higher accuracy than one-place unergative ($p<.05$) and three-place verbs ($p<.005$). Accuracy of each verb-type was presented in **Figure 2** for both groups.

Discussion

The current results revealed that PWA showed differentially greater difficulties in naming verbs than nouns compared to the normal aging group, and the results were consistent with previous findings (Berndt et al., 1997; Miceli et al., 1988; Miceli et al., 1984; Thompson et al., 1995b; Zingeser & Berndt, 1990). PWA also showed greater difficulties in three-place verbs than one-place verbs, and furthermore Korean-speaking individuals with aphasia showed lower accuracy in unaccusative verbs than unergative verbs. These results were consistent with the findings of English-speaking individuals with aphasia (Thompson, 2003), but not with the previous findings from Kim (1998), who reported that there were not significant differences between unaccusative and unergative verbs in Korean participants with Broca's aphasia. Dissociated patterns between unergative and unaccusative verbs may be better accounted for by the "Norminative-by-inflection Hypothesis" (Han, 1987) than the "Default Nominative Hypothesis" (Kang, 1986; Kim, 1990). More studies need to be conducted to investigate the nature of verb production deficits in Korean individuals with aphasia.

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Table 1. Descriptive information of individuals with aphasia

ID	Gender	age	Edu(yrs.)	MPO	AQ(K-WAB)	Aphasia Type
101	2	38	12	42	70.5	Conduction
103	1	43	6	36	64.6	Broca
102	1	39	16	36	60.7	Broca
104	1	58	16	34	84.3	Anomic
111	1	51	16	33	46.6	Anomic
107	1	69	12	31	48.4	Wernicke
112	1	40	16	31	51.8	Anomic
115	2	28	16	16	60.8	Wernicke
106	1	58	12	14	79.2	Broca
109	2	53	12	14	71.4	Anomic
108	2	46	16	12	66.2	Wernicke
114	1	41	12	12	78.6	TCSA
110	1	22	11	10	25	Conduction
113	1	27	16	8	85	Global
105	1	57	12	7	61.3	Wernicke
Mean		44.67	13.40	22.40	63.63	
SD		13.17	2.92	12.38	16.13	

Note: MPO=Months Post Onset; AQ=Aphasia Quotient; K-WAB=Korean version of Western Aphasia Battery(Kim & Na, 2001); TCSA=Transcortical sensory aphasia

Figure 1. Accuracy of noun and verb naming tasks for normal elderly adults and persons with aphasia

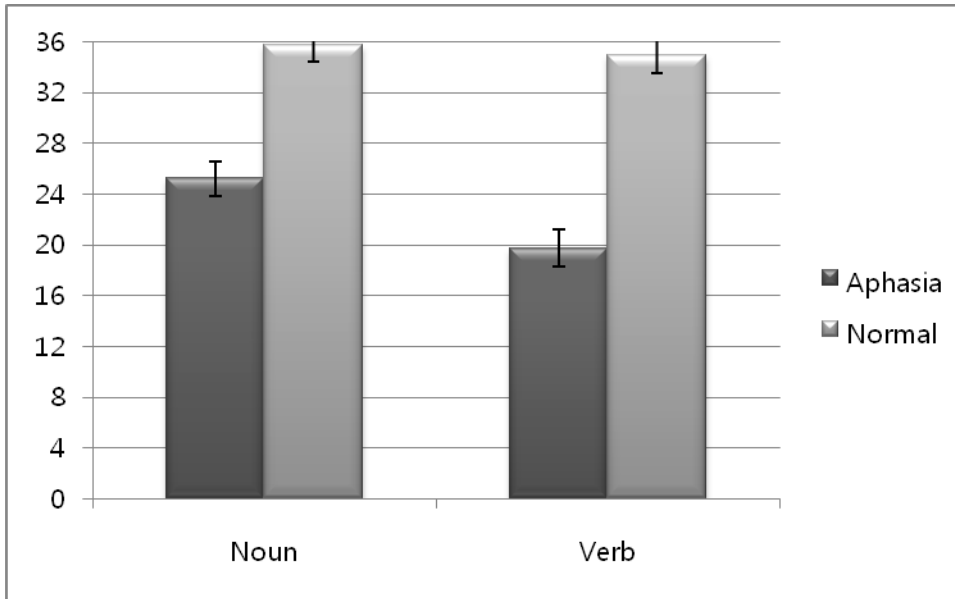


Figure 2. Accuracy on a Korean-verb naming task for each verb type in normal elderly adults and persons with aphasia

