## ERP Effects of Scrambled/'Floating' Numeral Classifiers in Korean

This study examines the effects of scrambling either a subject or object associated with 'floating' numeral classifiers (FNCs) in Korean by using the event-related potentials (ERP) paradigm.

The experimental materials consisted of 360 sets of 6 items, which vary in terms of three factors such as (i) the grammatical role ((S)ubject vs. (O)bject) that FNCs associate with, (ii) the type of Case/particle marker on FNCs (Case-less vs. (N)om/(A)cc Case-marked vs. (F)ocus-particle-marked), and (iii) the application/non-application of subject or object scrambling, as schematically represented below.

i) S-related Case-less FNC: [park-in **dog-Nom** bread-Acc **2-FNC** ate] I heard.
ii) S-related N-marked FNC: [park-in **dog-Nom** bread-Acc **2-FNC-Nom** ate] I heard.
iii) S-related F-marked FNC: [park-in **dog-Nom** bread-Acc **2-FNC-Foc** ate] I heard.
iv) O-related Case-less FNC: [park-in **bread-Acc** dog-Nom **3-FNC** ate] I heard.
v) O-related A-marked FNC: [park-in **bread-Acc** dog-Nom **3-FNC-Acc** ate] I heard.
vi) O-related F-marked FNC: [park-in **bread-Acc** dog-Nom **3-FNC-Foc** ate] I heard.

Using the materials, we investigated the following three questions.

First, is there a difference between effects of in-situ and scrambling options on FNCs? Second, is there a contrast between the in-situ and scrambled objects? Third, is there a distinction between the subjects in object-scrambling and object-in-situ sentences?

We found that, first, the Case-less FNCs in sentences involving subject or object scrambling elicited P600 in comparison to the corresponding ones in sentences without such scrambling, whereas the Case-marked FNCs in the former case were ERP-wise not significantly different from the corresponding ones in the latter case. By contrast, the F(ocus-particle)-marked FNCs in sentences involving scrambling elicited P600 for subject or N400 for object in comparison to the corresponding ones in sentences without scrambling. We attribute the P600 effects here to a second-pass, revised integration process that now attempts to correctly link the Case-less/F-marked

FNC to the relatively more 'distant' scrambled subject or object associated with it.

Second, the scrambled objects induced reduced N400 effects relative to the in-situ ones. This result is unexpected, given that the canonical word order in Korean is SOV, predicting that scrambled objects will incur more processing loads. But one crucial feature of Korean is that this language allows *pro* drop or null subject argument for subjects. Thus, the object-initial sentences were not perceived by the Korean users as marked/exceptional in terms of word order.

Third, the subjects after the scrambled objects were not differentiated from the ones before them in terms of ERP responses. Note that the former involve object scrambling, while the latter do not. Since the subjects do not involve scrambling in either type of sentences, no difference between them is an expected result.

Overall, we take all the three results above to render neuroelectrophysiological evidence that our mind actively detects scrambling or permutation of word order in the course of sentence-processing FNC-associated scrambled subjects or objects.