

Is subject-gap preference universal?

An experimental study of cleft constructions in Japanese

Masataka Yano^{1,2}, Yuki Tateyama¹, Tsutomu Sakamoto¹

¹Kyushu University, ²Japan Society for the Promotion of Science

masayano@kyudai.jp

Numerous studies of sentence processing have examined the functions of the mechanism for associating long-distance words during on-line processing. In particular, relative clauses and cleft constructions have attracted a considerable amount of attention because the diversity of structural differences among languages allows researchers to explore the language-universal and language-specific aspects of sentence comprehension. For example, previous studies on English relative and cleft constructions have found that subject-gap constructions are easier to process than object-gap ones (i.e. subject-gap preference, Gordon et al., 2001; King & Just, 1991; King & Kutas, 1995).

	Subject-gap	Object-gap
I met the reporter _i that	<gap _i > attacked the senator	the senator attacked <gap _i >
It was the reporter _i that	<gap _i > attacked the senator	the senator attacked <gap _i >

In Japanese, similar subject-gap preference was observed in relative clauses (Miyamoto & Nakamura, 2003; Ueno & Garnsey, 2008). This consistent subject preference has been best accounted by Structural Distance Hypothesis (O'Grady, 1997). This hypothesis predicts that, in all languages, subject-gap constructions are easier to process than object-gap ones because hierarchically higher 'subjects' are nearer to the gap position than lower 'objects'.

Contrary to the results of these studies, Kahraman et al. (2011a) reported the object-gap preference in Japanese cleft constructions. Thus, this result may disconfirm the Structural Distance Hypothesis. However, this result could have been affected by temporal structural ambiguities of cleft constructions (Kahraman et al., 2011b). To address this issue of ambiguity, we provided stimuli sentences with contexts that minimize temporal structural ambiguities followed by cleft constructions in (1). The aim of this experiment was to examine whether object-gap constructions are preferred even when an appropriate context is provided to eliminate ambiguity effects.

We used an event-related potential component termed as the P600 to selectively track the process that establishes a syntactic dependency (Kaan et al., 2000; Phillips et al., 2005; Ueno & Garnsey, 2008). The results have demonstrated that, of the two types of cleft constructions, object-gap constructions (OCs) elicited larger P600 effects compared to subject-gap constructions (SCs), which indicated OCs are more difficult to process (i.e. subject-gap preference).

Our results are well aligned with previous studies that reported the consistent subject preference in Japanese relative clauses and other languages. Therefore, Structural Distance Hypothesis can be sustainable in explaining the processing of long-distance dependencies.

(1) Context:

1. A picture shows that there are two persons (Ms. Takeuchi and Ms. Konishi).

2. kono futari-no uchi

This two-GEN among
'among the two persons'

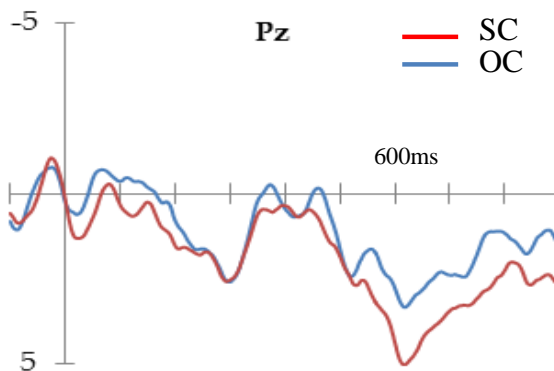
Experimental sentences:

a. Subject cleft constructions (SC):

Kyonen	<gap _i >	Ichiro-o	<u>kaihoushita-nowa</u>	Takeuchi-san_i-da.
Last year		Ichiro-ACC	nursed-C-TOP	Takeuchi-Ms.-COP
'It is Ms. Takeuchi who <gap> nursed Ichiro last year.'				

b. Object cleft constructions (OC):

Kyonen	Ichiro-ga	<gap _i >	<u>kaihoushita-nowa</u>	Takeuchi-san_i-da.
Last year	Ichiro-NOM		nursed-C-TOP	Takeuchi-Ms.-COP
'It is Ms. Takeuchi whom Ichiro nursed <gap> last year.'				



The grand-average ERPs for SC and OC at the embedded verb

The X-axis represents the time course from -100 to 900 ms, and each hash mark represents 100 ms. The Y-axis represents the voltage from -5 μV to 5 μV. Negativity is plotted upward.

References

- Gordon, P. C., Hendrick, R., & Johnson, M. (2001) Memory interference during language processing. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 27(6), 1411-1423.
- Kaan, E., Harris, A., Gibson, E. & Holcomb, P. (2000) The P600 as an index of syntactic integration difficulty. *Language and Cognitive Processes*, 15(2), 159-201.
- Kahraman, B., Sato, A. Ono, H., & Sakai, H. (2011a) Incremental processing of gap-filler dependencies: Evidence from the processing of subject and object clefts in Japanese. *The Proceeding of the Twelfth Tokyo Conference on Psycholinguistics*, 113-147.
- Kahraman, B., Sato, A. Ono, H., & Sakai, H. (2011b) Why object clefts are easier to process than subject clefts in Japanese: Frequency or expectation?. *Technical report of IECIE*, 111, 67-72.
- King, J. W., & Just, M. A. (1991) Individual differences in syntactic processing: the role of working memory. *Journal of memory and language*, 30(5), 580-602.
- King, J. W., & Kutas, M. (1995) Who did what to when?: Using word- and clause-level ERPs to monitor working memory usage in reading. *Journal of Cognitive Neuroscience*, 7(3), 376-395.
- Miyamoto, E. T., & Nakamura, M. (2003) Subject/object asymmetries in the processing of relative clauses in Japanese. In G. Garding and M. Tsujimura (eds.), *Proceedings of 22nd West Coast Conference on Formal Linguistic*, 342-355. Somerville, MA: Cascadilla Press.
- O'Grady, W. (1997) *Syntactic development*. Chicago, University of Chicago Press.
- Phillips, C., Kazanina, N., & Abda, S. H. (2005) ERP effects of the processing of syntactic long-distance dependencies. *Cognitive Brain Research*, 22(3), 407-428.
- Ueno, M., & Garnsey, S. M. (2008) An ERP study of the processing of subject and object relative clauses in Japanese. *Language and Cognitive Processes*, 23(5), 646-688.