Processing Japanese relative clauses with local assignment of clause boundaries
Barış Kahraman, Hajime Ono & Hiromu Sakai

Since neither pronouns nor complementizers overtly mark relative clauses (RCs) in Japanese, clause types are temporarily ambiguous and reanalysis is often required (Hirose & Inoue, 1998). Yet, Ishizuka (2005) argues that subject relative clauses (SRC) are easier to predict than object relative clauses (ORC), since the sentence-initial accusative NP indicates a possibly missing nominative NP. Ishizuka et al. (2006) pointed out that the lack of predictability could be responsible for the processing difficulty of ORC, and showed that ORC was read faster than SRC when context is supplied, making prediction equally possible for both SRC and ORC. However, it is still unclear whether ORC is indeed less predictable than SRC without any context, and whether predictability is responsible for the processing difficulty of RCs. To answer these questions, we utilized a processing constraint (1), local assignment of clause boundaries (LACB), proposed by Miyamoto (2002). Miyamoto showed that the presence two consecutive accusative NPs provided syntactic cues for RCs and reduced processing difficulty of RCs. We can thus compare the processing difficulty of SRC and ORC when RCs are syntactically predicted by LACB.

In Experiment 1, we investigated whether the prediction of SRC/ORC changes in two different syntactic environments. In the LACB[+] conditions (2c)-(2d), the third NP signals the beginning of an embedded clause and possibly of an upcoming RC, while there is no such syntactic cue in the LACB[-] conditions in (2a)-(2b). Participants were asked to complete sentence fragments like (2), presented only until region 4. Results showed that, (i) SRC and ORC were equally produced in LACB[-] conditions (both more than 85%; \( \chi^2(1) = 0.08, \text{ns} \)), (ii) ORC was more likely to be produced in LACB[+] conditions (SRC 30%, ORC 47%; \( \chi^2(1) = 10.45, p<.01 \)). Assuming that the production of RCs would reflect their predictability, this result showed that, in LACB[-] conditions ORC and SRC were equally predicted, whereas SRC was less predicted than ORC in LACB[+] conditions. This result suggested that ORC may be easier to process than SRC in LACB[+] conditions, whereas no difference may be found in LACB[-] conditions.

In Experiment 2, we compared the reading times by a self-paced reading experiment, as in (2). In LACB[-] conditions, a slowdown in region 6 was observed in the ORC condition (spill-over region) \( F_1(1,43) = 7.91, p<.01 \); \( F_2(1,23) = 8.42, p<.01 \). In LACB[+] conditions, the head-noun of SRC was processed significantly slower than that of ORC \( F_1(1,43) = 4.32, p<.05 \); \( F_2(1,23) = 3.75, p<.1 \).

This study shows that in LACB[+] conditions, ORC was easier to process than SRC as expected. Moreover, in LACB[-] conditions, ORC and SRC were equally produced, but SRC was still processed easily than ORC. Taken together, these results suggest two possibilities: (I) Production data do not in fact reflect the prediction for RCs in the online experiment. Due to this, predictability is still responsible for the results of this study. (II) Production does reflect the prediction, but another factor such as depth of embedding must also be taken into consideration (O’Grady, 1997), since SRC was processed easily than ORC in LACB[-] condition. Decision between (I) and (II) is left for future research.

(1) Local assignment of clause boundaries (LACB): “Assign the left boundary of a new clause at the point where it is first clear that this new clause is necessary for the interpretation of the sentence” (Miyamoto, 2002).

(2) Conditions: (a): LACB[-]SRC; (b): LACB[-]ORC; (c): [LACB+]SRC; (d): LACB[+]ORC

Region: 1 2 3 4 5 6 7 8
(a) NP_1^gen / NP_2^loc / NP_3^acc / V_1past / NP_4^dat / NP_5^nomi / NP_6^acc2 / V_2past
(b) NP_1^gen / NP_2^loc / NP_3^nomi / V_1past / NP_4^dat / NP_5^nomi / NP_6^acc2 / V_2past
(c) NP_5^nomi / NP_6^acc1 / NP_3^acc2 / V_1past / NP_4^dat / NP_1^gen / NP_2^loc / V_2past
(d) NP_3^nomi / NP_6^acc1 / NP_3^nomi / V_1past / NP_4^dat / NP_1^gen / NP_2^loc / V_2past

Example of (c)
Shusaisha-ga zasshikisha-o shikisha-o hihanshita kashu-ni shinai-no hoteru-de hikiawaseta.
Organizer-nom journalist-acc conductor-acc criticized singer-dat city-gen hotel-loc introduced
The organizer introduced the singer who criticized the conductor at the city hotel.