Rethinking relative clause processing in Japanese: New evidence with causatives

There are two major hypotheses that aim at explaining the processing difficulties of relative clauses associated with gapped positions. Structural Distance Hypothesis (SDH: Hawkins, 1999; O’Grady, 1997) explained processing load differences in terms of its structural depth (the number of intervening nodes), and Linear Distance Hypothesis (LDH: Gibson, 1998, 2000) utilizes linear distance (the number of intervening constituents). Until now, many researchers working on Japanese have reported results supporting SDH (Ishizuka, 2005; Miyamoto & Nakamura, 2003; Ueno & Garnsey, 2007).

However, Miyamoto & Nakamura (2003) pointed out a potential confounding factor in the tested materials that the position wherein gap-insertion occurs is different in subject and object relative clauses (SRC and ORC, respectively). In SRC (1a), the absence of a nominative subject is noticed as soon as an accusative NP appears. In ORC (1b), on the other hand, the absence of an object stays unnoticed until a verb appears. Another factor which might have impact on relative clause processing is case-markers. Inoue (1976), among others, argued that grammaticality of relative clauses is determined by the case-hierarchy. Although the relationship between grammaticality and processing difficulty is not always straightforward, the case-hierarchy captures, at least partially, general pattern found in results of previous studies—ga-marked NPs are easier to process than o-marked NPs, o-marked NPs than ni-marked NPs, and so on. In the current study (self-paced reading), we controlled the potential confounding factor and examined SDH, LDH, and the generalization based on case-hierarchy (GCH) using Japanese causative relative clauses.

In Experiment 1, we examined which hypothesis better accounts for the processing load of causative relative clauses that have an RC gap either in causee (NP-ni) or accusative-marked direct object (NP-o). What is crucial about those sentences is that the potential gap remains unnoticed until a causative verb is encountered. Since the causee (NP-ni) of causative relative clauses is relativized, the parser does not realize its absence until the verb appears (2a). Similarly, when an accusative object is relativized, the parser does not realize its absence until a verb appears (2b). The reading time for the relative head in (2a) is reliably longer than that in (2b) \((F_{1,17}=8.95, p<.01; F_{2,19}=4.38, p<.05)\), which supports LDH and GCH.

In Experiment 2, we tested whether it is case marker or linear distance that determines the processing load. We used verbs that take a dative object (NP-o) since those verbs use o to mark a causee. The case-marking pattern is thus reversed, but the linear distance is unchanged (3). At the relative head, the reading time for (3b) is reliably longer than that for (3a) \((F_{1,33}=4.99, p<.05; F_{2,17}=7.10, p<.05)\), which supports GCH.

Overall, neither SDH nor LDH can explain these results. GCH, on the other hand, effectively captures those results although why and how it influences processing remains unanswered. The reason why GCH is so effective might be founded on the salience of morphological case, the strict head-finality, or other syntactic features of Japanese. We should wait for further research on to answer these questions.

(1a) SRC: sensee-o mita gakusee-wa … “the student who __ saw the teacher”

(1b) ORC: sensee-ga mita gakusee-wa … “the student who the teacher saw __”

(2a) katyoo-ga hisyo-o kyooiku-sase-ta syain-wa …

(2b) katyoo-ga hisyo-ni kyooiku-sase-ta syain-wa …

(3a) butyoo-ga kakarityoo-ni dookoo-sase-ta sinnyusyain-wa …

(3b) butyoo-ga kakarityoo-o dookoo-sase-ta sinnyusyain-wa …