

The persistence of the initial misanalysis without pragmatic inference: Evidence from Japanese relative clause structure

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Past research showed that readers often preserve an initially adopted analysis after reanalyzing the sentence structure [1,2]. It is suggested that this is due to incomplete structural reanalysis, viz., failure to fully abandon the initial misanalysis. Previous studies, however, used structures with which the initial and correct analyses are not completely mutually exclusive. For example, even with a reflexive verb sentence *While Anna dressed the baby spit up on the bed*, people can make a pragmatic inference that the baby spit up while being dressed by Anna although such inference is not syntactically licensed. We tested Japanese relative clause sentences such as (1), with which readers typically adopt a main clause analysis initially and later reanalyze as a relative clause at the head noun (*joyuu*, 'actress'). Crucially, the correct interpretation following reanalysis with these sentences makes an interpretation for the initial analysis pragmatically incompatible, i.e., (1a) cannot indicate that the baby spilled the milk after reanalysis occurs. Two self-paced and one eye-tracking reading experiments examined the preservation of the initial analysis with this structure and the factors that contribute to the phenomenon.

In the first two experiments, we manipulated semantic bias of the second noun (underlined in (1,2)) as main clause bias (a), neutral (b), and relative clause bias (c) and relative clause length (short (1) or long (2)). We found that semantic bias affected both the accuracy of comprehension questions on the initial analysis and the reading time at the head noun (i.e., disambiguating region) only when the relative clause was long; Participants answered incorrectly more and spent longer at this region with (2a) than (2c) (the difference between (2b) and (2c) was marginal). The results suggest that with main clause bias nouns, participants committed more to the initial analysis and experienced greater cost for reanalysis, which resulted in persistence of initial analysis interpretation.

In the third experiment, we crossed semantic bias ((a) or (c)) with relative clause length ((1) or (2)) and investigated how the above results are underlain by online processing in natural reading. The analysis on first-pass reading times at the spill-over region (*jitto*, 'fixedly') showed an interaction of the two factors, showing that participants spent less in (2a) than in (2c) but longer in (1c) than (1a). Importantly, (2a) was accompanied by the highest regression-out rate at this region (0.42), suggesting that participants made regressive eye-movements immediately due to excessive processing difficulty. Consistently, the analysis on second-pass reading times showed the main effect of semantic bias (longer in (a) than in (c)) and that of relative clause length (longer in (2) than in (1)) across the regions from the second noun to the spill-over region. There was also an interaction at the first verb region, demonstrating that the effect of semantic bias was larger when the relative clause was long than when it was short. Our results taken together demonstrated that the initial analysis could persist even without pragmatic inferences and also revealed the link between the degree to which readers commit to the initial analysis and the likelihood for failing to abandon the analysis.

Example Sentences

(1a, b, c) Main clause bias / neutral / relative clause bias with short relative clause
Akachan-ga (miruku / nomimono / champagne)-o koboshita joyuu-o jitto mitusmeta.
 Baby-NOM [milk / drink / champagne-ACC spilled] actress-ACC fixedly stared at
 'The baby stared fixedly at the actress who spilled the milk / drink / champagne.'

(2a, b, c) Main clause bias / neutral / relative clause bias with long relative clause
Akachan-ga (miruku / nomimono / champagne)-o table-de hadeni koboshita joyuu-o jitto itusmeta.
 'The baby stared fixedly at the actress who spilled the (milk / drink / champagne) wildly on the table.'

References

- [1] Christianson, K., Hollingworth, A., Halliwell, J., & Ferreira, F. (2001). Thematic roles assigned along the garden path linger. *Cognitive Psychology*, 42, 368–407.
- [2] Van Gompel, R.P.G., Pickering M.J., Pearson, J., & Jacob, G. (2006). The activation of inappropriate analyses in garden-path sentences: Evidence from structural priming. *Journal of Memory and Language*, 55, 335-362.