Predicting a dispreferred structural alternative as a result of syntactic priming in comprehension

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The phenomenon that prior experience to a particular syntactic structure facilitates subsequent processing of the structure, i.e., syntactic priming, has been observed in numerous comprehension studies with structurally ambiguous (so-called garden-path) sentences [3,7,8]. It is however still unclear whether priming only helps integrating disambiguating information where processing difficulty typically occurs and facilitating structural reanalysis or it also affects comprehenders’ expectation about an upcoming structure while the sentence is still ambiguous. Although previous comprehension priming studies suggest that listeners do make a structural prediction [1,5], it remains to be seen whether such a prediction can occur in processing garden-path sentences by influencing the preference between a dominant analysis and the dispreferred (but eventually correct) analysis.

The current study examined an effect of priming on prediction with temporally ambiguous sentences in Japanese such as (1) and (2). In Japanese, relative clauses neither take an overt complimentizer nor involve any marking on the verb. Thus, a relative clause (RC) sentence (2) is identical to a main clause (MC) sentence (1) up to the first verb (i.e., *yondeiru*, ‘reading’). Readers typically experience processing difficulty on encountering the MC object (i.e., *bijinesuman* ‘businessman’ in (2)), indicating that they initially adopt the MC interpretation [4]. Using this structure, we investigated whether syntactic priming can guide syntactic analysis before any disambiguating word is encountered (*toki* ‘when’ in (1) and *bijinesuman*, ‘businessman’ in (2)). We used visual world eye-tracking paradigm combined with a syntactic priming method. Participants first read a prime sentence, which was either the MC or RC structure. They next saw a visual scene and at the same time listened to a target sentence, which was also either the MC or RC structure. The visual scene always depicted three corresponding objects and one distractor (e.g., an old man, newspaper, a businessman, and a little girl). Importantly, the distractor is a plausible continuation with the MC interpretation but is implausible with the RC interpretation (i.e., newspaper for a little girl). This way, prediction of the RC structure was measured by the preference of looks to the RC head entity over the distractor. To investigate lexical dependence of a priming effect, we conducted experiments using the same verb between prime and target (Experiment 1) and using different verbs (Experiment 2).

The results from Experiment 1 revealed a clear priming effect; following a RC prime, participants looked more at the RC head entity (*bijinesuman* ‘businessman’) more than following a MC prime. Importantly, the effect was observed before the point of disambiguation and thus occurred anticipatorily, demonstrating that participants predicted the dispreferred RC analysis while the structure is still ambiguous. Furthermore, Experiment 2 also showed a similar priming effect although the effect was smaller in size and was not significant as anticipatory. This is important as many comprehension studies, except few studies [5,6,9], failed to observe an effect without repetition of the verb [1,2,7,8]. This finding implies that the representation of the RC structure in Japanese is, at least partly, lexically independent. The results together showed that an immediately preceding experience can lead to prediction of a dispreferred structural alternative in processing garden-path sentences.
Examples
1. Roujin-ga shinbun-wo yondeiru toki, bijinesuman-ni hanashikaketa. (Main clause structure)
   Old man-NOM newspaper-ACC reading when, businessman-ACC talked to
   ‘When the old man was reading the newspaper, he talked to the businessman.’

2. Roujin-ga shinbun-wo yondeiru bijinesuman-ni hanashikaketa. (Relative clause structure)
   Old man-NOM [newspaper-ACC reading] businessman-ACC talked to
   ‘The old man talked to the businessman who was reading the newspaper.’

References: