

PREDICTION ENHANCES STRUCTURAL PRIMING IN SECOND LANGUAGE WRITTEN PRODUCTION

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A recent study showed that predicting the upcoming structure led to greater structural priming effects (Grüter *et al.*, 2021). It remains unclear; however, what mechanisms underlie this increased priming effect. We conducted two experiments to explore this issue.

Expt 1 was a norming study in which we measured the biases of 22 English ditransitive verbs among 512 Chinese learners of English. For each verb, two different pictures (involving different thematic roles) were constructed. Each participant provided a written description of a given picture. The results showed that 16 verbs were biased towards prepositional-object (PO-biased) and 6 were biased towards double-object construction (DO-biased), indicating that Chinese learners of English have an overall bias towards PO.

In Expt 2, we investigated whether forced prediction resulted in greater structural priming and whether this tendency was modulated by the computation of prediction error. Prediction error was operationalized as the congruency between the verb bias and the prime structure it appeared in. Other things being equal, a PO-biased verb appearing in DO results in more prediction error relative to when it appears in PO. The prime verb bias was based on the results of Expt 1. We adopted a pretest-priming-posttest design, with the post-test immediately following the priming phase. Given that DO is the less preferred structure for Chinese learners, and in light of inverse preference effect, we only examined the priming of DO. We selected 16 ditransitive verbs from the 22 verbs in Expt 1. Four PO-biased verbs served as the target in the pretest and posttest. Each verb appeared twice in each phase with different pictures. Each target picture was paired with an intransitive prime. The priming phase contained four PO-biased verbs as the target, each appearing four times. For the prime verb, two sets of material were constructed. One set involved four strongly PO-biased verbs and the other set involved four DO-biased verbs. Each prime verb appeared four times, each time with a different picture. There were 78 sentence-picture pairs serving as fillers, consisting of intransitive and simple transitive events. 120 Chinese learners of English (79 females; mean age = 22.08) were randomly assigned to one of three groups. In the repetition group (N = 40), participants were instructed to read and retype Wendy's (a virtual partner) descriptions and then describe the target picture using the verb provided. In the two prediction groups (N = 80), participants first predicted Wendy's description of the prime picture, compared their prediction with Wendy's actual descriptions, and finally described the target picture. The prediction groups consisted of a congruent group (N=40; the prime structure was congruent with the verb bias) and an incongruent group (N=40; the prime structure was incongruent with the verb bias). This allowed us to explore whether the increased priming under the prediction condition was mainly due to the computation of prediction error. If the increased priming was due to prediction error, then the incongruent group should exhibit greater priming than the congruent group.

The results showed that across all three groups, there were significant increases in the use of DOs in the priming phase ($b = 5.576$, $SE = 0.506$, $p < .001$) and posttest ($b = 7.364$, $SE = 0.615$, $p < .001$) relative to the pretest, suggesting that significant immediate priming, as well as longer-term priming, occurred for all groups. The interactions between group (repetition vs. the two prediction groups) and phase were significant between the baseline and the priming phase ($b = -2.371$, $SE = 0.864$, $p = .0006$) as well as between the baseline and the posttest ($b = -4.136$, $SE = 1.085$, $p < .001$), suggesting that the two prediction groups exhibited greater priming than the repetition group. There was no difference between the congruent and incongruent groups from the baseline to the priming phase, $z = 1.565$, $SE = 0.951$, $p = .100$, or from the baseline to the posttest, $z = 1.707$, $SE = 1.198$, $p = .154$, suggesting that prediction error was not the primary cause of the enhanced priming in the prediction condition. Rather, prediction enhances priming via other mechanisms, such as increasing participants' motivation, encouraging deeper processing and/or explicit memory of the prime structure.