Priming ditransitives in L2 Mandarin: Error-driven learning affects production but not real-time predictive processing

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Using a visual world structural priming (VWSP) paradigm, Arai et al. (2007) and Thothathiri & Snedeker (2008a, 2008b) found that reading a double object (DO) or prepositional (PO) dative can lead to subsequent prediction of the same dative construction in real-time comprehension among adult and child native speakers of English. Chen et al. (2022) replicated these findings with native Mandarin speakers; additionally, an inverse frequency effect indicated that priming effects were stronger after DO primes with PO-biased verbs (the unexpected combinations) than with DO-biased verbs. Şafak & Hopp (under review) extended the inquiry to L1 German L2 English learners and replicated the construction-level priming effects and inverse frequency effects. These studies support error-driven learning (EDL) accounts for the dative alternation (e.g., Chang et al., 2006; Goldberg, 2019), which suggest that language users predict based on dative verb bias and adjust their linguistic knowledge after encounters of prediction error. None of these VWSP studies, however, included baseline or post-priming phases assessing real-time verb-based prediction in the absence of immediate priming. It thus remains unclear whether these immediate comprehension priming effects translate into longer-term adaptation, as would be expected under EDL accounts. In the present study, we use a pretest-priming-posttest design to address whether structural priming can lead L1 and L2 Mandarin speakers to adapt (1) their predictions in real-time comprehension, and (2) their production of dative constructions.

Method L1 (N=65) and intermediate-to-advanced proficiency L2 (N=64, $M_{LEXTALE\_CH}$ = 61.3/90, range=39-78, SD=10.1) participants completed a VWSP task where they took turns reading aloud sentences (prime trials) and listening to sentences while looking at visual scenes (target trials) containing three entities (agent, theme, goal, for experimental trials; Fig.1). In the priming phase (but not in baseline and posttest), all primes were DO sentences. The experimental target sentences were DO or PO paired with PO-biased verbs. No lexical boost was utilized. Participants also completed written picture description tasks eliciting ditransitives one day before and after the VWSP task to assess longer-term priming.

Results We used LMER models to examine the likelihood of participants looking at the theme vs. goal (log-ratio) during two ambiguous time windows (CR1=verb; CR2=perfective + numeral + classifier; Fig.1). We interpret changes from CR1 to CR2 as evidence of prediction based on verb information. Neither L1ers nor L2ers showed evidence of prediction based on verb bias at any phase of the task, nor did their looking patterns change from baseline to posttest (Fig.2). However, logistic regression models of the production data indicated both groups produced more DO datives one day after priming (b=1.88, p<.001, Fig.3), and L1ers' increase (b=2.07, p<.001) was significantly larger than L2ers' (b=1.97, p=.003).

Unlike previous VWSP studies (but see also Chen & Hartsuiker, 2023), we observed no immediate priming effects in real-time comprehension, nor longer-term adaptation of real-time prediction. Nevertheless, the priming treatment led to adaptation in production from pre- to post-test. Notably, the same pattern of change was observed in L1 and L2 speakers. Implications for priming as a learning mechanism in L1 and L2 will be discussed.

Fig.1. *Illustration of experimental item (PRF=perfective marker; CL=general classifier)*

	CR1		CR2						
Nanren	song	le		yi	ge	daxuesheng	yi	ge	shafa.
Man	give	PRF		one	CL	college student	one	CL	sofa

"The man gave a college student a sofa.

Note. Both CRs are fully ambiguous.

Fig.2. *Proportion looks for **PO-biased** verbs under **DO priming** by condition in VWSP*

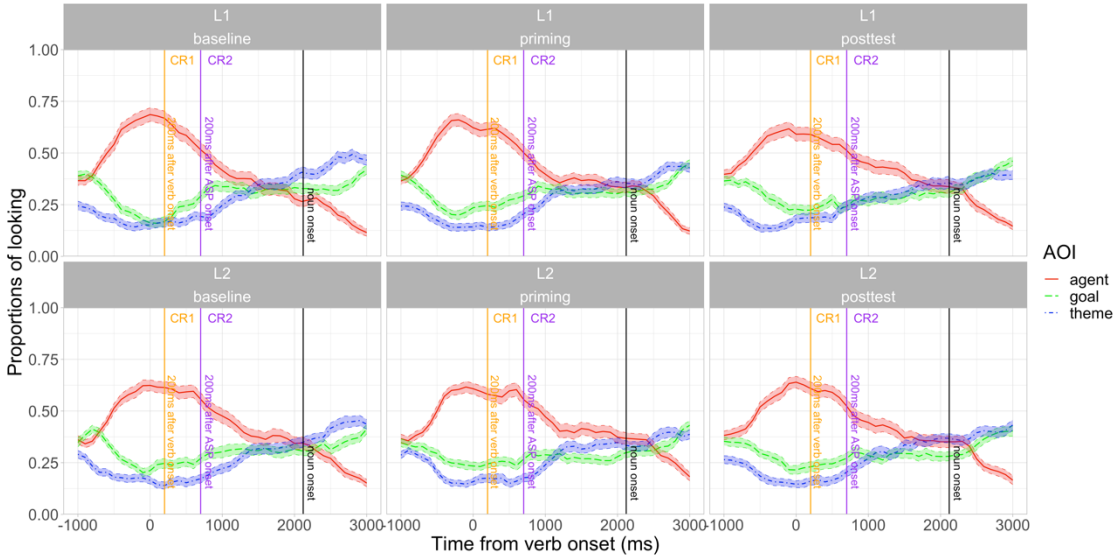
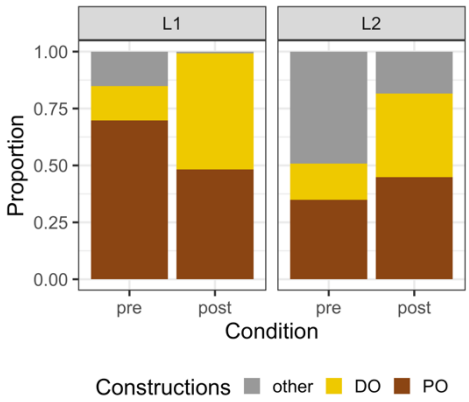


Fig.3. *Productions with **PO-biased** verbs pre- vs. post-DO-priming*



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