

## Syntactic priming of verb copying constructions in (non-)native Chinese speakers

Yaning Yan (Renmin University of China) & Jun Lyu (University of Southern California)

yaningyan@ruc.edu

**Introduction** This study investigates the syntactic priming effect and the lexical boost effect in the verb-copying construction with a V-NP-V-Adverbial structure in Chinese (e.g., '*drive car drive 3 hrs*'). A unique property of this construction is that the V-NP encodes the *background* or presupposed information while the adverbial expresses the *foreground* or new information (Xiang'97; Yang'99; Nie'01; Sun'05). Prior work suggests that exposure to a certain syntactic structure leads to a tendency to reuse the same structure later (i.e., syntactic priming) and that additional repetition of the lexical item leads to even stronger priming effect (i.e., lexical boost effect) (e.g., Pickering & Branigan'98). But few studies have probed how information structure (i.e., old vs. new information) modulates the lexical boost effect. Specifically, we query whether repetition of verbs (old info) and adverbials (new info) will lead to similar lexical boost effects. Additionally, we look at whether L2-Chinese learners (Egyptian Arabic natives) whose L1 does not have verb copying constructions will show syntactic priming and lexical boost effects.

**Methods** Two priming experiments are reported. For each trial, participants saw a picture and read aloud the prime sentence above it before judging whether or not the sentence is a correct description of the picture. After the prime item, participants were asked to produce a target sentence given a target picture and an adverbial above the picture (see (1-2)). In **Exp.1** ( $N_{L1}=25$ ;  $N_{L2}=25$ ), factors *Prime Type* (Control/V-copy/Repetition) and *Group* (L1/L2) were crossed in a factorial design. The "control" primes (non-verb-copying sentences) were used as baselines. The "V-copy" prime is a verb-copying prime without lexical repetition. The verb of the "repetition" prime is shared between the prime and the to-be-produced target (this lexical overlap can be deduced from target pictures; alternative verbs for describing the target picture hardly available). **Exp.2** ( $N_{L1}=25$ ;  $N_{L2}=25$ ) follows the same design, but the "repetition" prime now involves repetition of the adverbial (adverbials typed above pictures).

Each experiment included 24 primes equally distributed by prime type and 8 filler primes. Only grammatical productions were included in mixed-effect logistic regressions (*Glmer* in R). In this study, the syntactic priming effect is operationalized as the priming difference between the control and the two verb-copying conditions; the lexical boost effect is operationalized as the priming difference between the *Repetition* and the *V-copy* conditions.

**Results Figs.1-2** display average proportions of verb-copying constructions produced by participants after being primed. In **Exp. 1**, the statistical model revealed a main effect of *Prime Type* ( $p<0.001$ ) driven by the fact that *V-copy* and *Repetition* prime conditions lead to higher proportions of verb-copying constructions compared to controls, indicating a syntactic priming effect across L1 and L2 groups. There was also a *Prime Type* x *Group* interaction ( $p<0.005$ ): for the L1 group, the two verb-copying prime conditions elicited higher proportions of verb-copying sentences than controls (i.e., *priming effect significant*), but the *Repetition* primes did not differ from *V-copy* primes in terms of priming effect (i.e., *verb-related lexical boost effect not significant*). For the L2 group, the syntactic priming and the verb-related lexical boost effects were both significant. In **Exp. 2**, the statistical model suggests that both the priming effect and the adverbial-related lexical boost effect were significant across L1 and L2 groups.

**Discussion** In sum, syntactic priming effects were identified for both L1 and L2 speakers as the verb-copying primes elicited higher proportions of verb-copying productions compared to control primes. However, L1 and L2 speakers behaved differently regarding the lexical boost effect: L1 speakers only showed the lexical boost effect when the adverbials (but not the verbs) were repeated between the primes and the to-be-produced targets while L2 speakers showed consistent lexical boost effects across the two experiments. We speculate that the divergent patterns are related to the information structure of the verb-copying constructions. Specifically, since background information is hard to be activated (Ambridge & Goldberg'08), verbs (part of the presupposed information) did not lead to extra priming for L1 speakers. Only adverbials (representing foregrounded information) did. However, L2 speakers presumably did not fully acquire this property (which is related to syntax-pragmatics interface) and thus showed lexical boost effects even with verbs. Overall, this study suggests that the lexical boost effect is constrained/suppressed by information structure.

(1) **Exp.1:** Example stimuli (Chinese characters translated to English words below).

Prime condition	Prime sentence on top: view picture, read aloud, and judge match/no match	Target visual stimuli (adverbial cue printed on top): produce a sentence
V-copy	他开车开得非常快。 'He drive car drive very fast.'	'very tired' 很累 
Repetition	他写作业写得很认真。 'He write homework write very attentively.'	'very beautiful' 很漂亮 

The verb above should also be 'write', hence the verb repetition.

(2) **Exp.2:** Example stimuli

Prime condition	Prime sentence on top: view picture, read aloud, and judge match/no match	Target visual stimuli (adverbial cue printed on top): produce a sentence
V-copy	他开车开得非常快。 'He drive car drive very fast.'	'very tired' 很累 
Repetition	她写汉字写得很好。 'She write characters write very well.'	'very well' 很好 

The adverbial above is 'very well', hence the adverbial repetition.

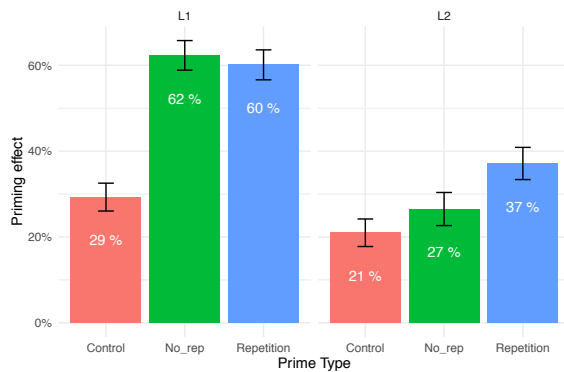


Fig.1: Priming effects in Exp.1.

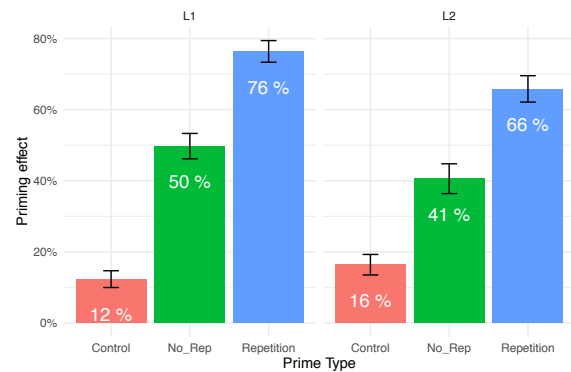


Fig.2: Priming effects in Exp.2.

**Selected references**

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