Structural repetition in sentence production conditioned by verb semantic similarity

Eunkyung Yi, Jean-Pierre Koenig, & Gail Mauner (University at Buffalo)

eyi@buffalo.edu

Although the tendency to reuse the syntactic structure of a previous sentence (a.k.a. syntactic priming) occurs without lexical repetition between prime and target sentences (Bock and Loebel, 1990), lexical repetition increases priming magnitude (Hartsuiker et al. 2007, for a review). Some studies show that priming is modulated by semantic factors (Cleland & Pickering, 2003; Chang et al., 2003; Griffin & Weinstein-Tull, 2003; Melinger & Dobel, 2005). However, none have shown that repetition of verb meaning in the absence of lexical repetition increases structural priming (c.f., Tooley, et al., 2009). Four experiments investigated whether semantic similarity between prime and target sentences affects the likelihood that a syntactic frame is reused. We hypothesize greater priming effect when verbs in prime and target sentences describe highly similar events (*promise-guarantee*) than when they do not (*promise-bounce*).

On every trial, participants began by reading two sentences in alternative syntactic frames presented via Rapid Serial Visual Presentation at 200ms per word [reading phase]. First sentences were either structural alternates of second sentences or were structurally different controls. Participants were then shown the first few words of sentences as cues to recall them in reverse order of presentation [recall phase] (Potter & Lombardi, 1998; Griffin & Weinstein-Tull, 2003). Thus 1st recalled sentences became primes and 2nd recalled sentences became targets (see Table 1). Experiments 1-2 examined the Double Object (DO)/ Prepositional Object (PO) alternation; Experiments 3-4 examined the Location Object (LO)/ Material Object (MO) alternation. Presentation order of these syntactic frames was counterbalanced across experiment pairs (see Table 2).

We conducted mixed-effects logistic regressions on participant responses to cues (shift/no-shift in syntactic frame) with participants and items as crossed random effects and prime type (High vs. Low similar verb vs. control) as a fixed factor. In every experiment, significantly more structural shifts were observed when verbs were highly similar across prime and target sentences relative to control sentences. Structural priming was only observed in the low similarity condition when targets shifted from DO to PO in Experiment 2. This was probably because the PO frame is overwhelmingly preferred for the verbs in Experiments 1-2. Shifts from the dispreferred DO frame to the preferred PO frame do not require an additional 'boost' from the semantic similarity of verbs between prime and target sentences.

These results provide converging evidence that syntactic priming can be conditioned by verb semantic similarity between prime and target sentences. The critical role of semantic similarity in our experiments raises the possibility that some prior reported results might also reflect, at least in part, influences of semantic similarity, since verbs with similar syntactic distributions are often semantically similar. Our results also suggest that sentence production models should incorporate a lexical-semantic component that ensures verbs closer in semantic space exert a stronger influence on the structure of subsequent sentences than verbs farther apart in semantic space.

Table 1

Exp 1	Presentation order	Condition	Sentences
Reading	Target (PO)		*The producer promised a large part to the actress.*
	Prime (DO)	1. Control	*Organic food is increasing in popularity recently.*
		2. High similarity	*The CEO guaranteed all employees a Christmas bonus.*
		3. Low similarity	*The ball boy bounced the player a new ball.*
Recall	Prime (DO)		(First few words up to verb from 1~3) _____.
	Target		*The producer promised _____.*

Table 2

Recall phase	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Prime recall	DO	PO	LO	MO
Shift in target if priming occurs	PO → DO	DO → PO	MO → LO	LO → MO