

## Word order priming in Tagalog (Western Austronesian), a symmetrical voice language

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Structural priming describes the tendency for speakers to produce a sentence structure they have previously heard (Branigan & Pickering, 2017), an effect that is amplified when the same lexical verb is re-used (Mahowald et al., 2016). In languages like English, priming is independent of morphological marking on the verb (e.g., tense/aspect), suggesting priming occurs at the lemma level (Pickering & Branigan, 1998). Symmetrical voice languages like Tagalog contain rich verbal morphology that result in changes in mapping between syntactic positions and thematic roles, without demoting any arguments to lower ranking positions (as in the passive in Indo-European languages). In this research we investigated whether voice morphology blocks structural priming in Tagalog, under the assumption that agent and patient voice marking on the same lemma represent different structural options (Riesberg et al., 2019). Accordingly, we tested whether lexical overlap interacts with verbal voice morphology in word order priming.

Tagalog is verb-initial with a flexible post-verbal argument order. Thematic roles are determined by voice-marking on the verb. In the agent voice, the infix *-um-* assigns the subject the agent role (Ex. 1, 2). In the patient voice, the infix *-in-* assigns the subject the patient role (Ex. 3, 4). Word order preference seems to be conditional on voice: patient voice prefers agent-initial structure but agent voice has no preference (Garcia et al., 2018). We conducted two unsupervised web-based priming experiments hosted on Gorilla. For each experiment, we analyzed data from 64 Tagalog native speakers from Metro Manila. Participants were presented with a transitive sentence with two animate arguments (prime; Ex. 1-4). To ensure that participants engaged with the prime sentence, participants completed a picture-sentence matching task before receiving the target prompt (see Fig. 1). Participants then saw a voice-marked verb and were asked to use this prompt to describe an action picture that was presented immediately after. We used a full factorial 2x2x2 design, manipulating the thematic role order of the prime (agent-initial, patient-initial), voice of the target verb prompt (agent voice, patient voice), and lexical overlap of the prime and target verb (overlap, no overlap). Agent and patient depicted in prime and target were never identical. The two experiments differed only with regard to the voice-marking of the verb in the prime sentence: agent voice (Exp. 1), patient voice (Exp. 2). The dependent variable was whether or not participants produced a patient-initial utterance.

Data were analysed using Bayesian logistic mixed models. Experiment 1 revealed an interaction of thematic role order of the prime and target voice: priming and lexical boost were observed for agent voice target prompts (when prime and target were in the same voice; see Fig. 2), but not for patient voice target prompts. In Experiment 2, there was an interaction of thematic role order, target voice and lexical overlap: priming happened only when both target verb and its voice matched the prime.

Overall, our results suggest that structural priming is conditional on voice overlap between the prime and target sentence. Voice mismatch blocks priming. This effect cannot be explained by reasons related to differences in verb morphology because: (1) we found priming for different lexical verb morphemes, and (2) priming effects are known to reproduce across tense, number, and aspect (Pickering & Branigan, 1998). Instead the results suggest that priming in Tagalog is licensed by voice, supporting linguistic analyses of symmetrical voice options as distinct structural options. This is further supported by the different pattern of priming across voice, which suggests that priming varied with the degree of word order flexibility in each voice type, an effect licensed by probabilistic grammatical preferences of Tagalog. These language-internal restrictions on priming are consistent with learning-based accounts of sentence production, where language-specific representations for syntax emerge across developmental time (Chang et al., 2015).

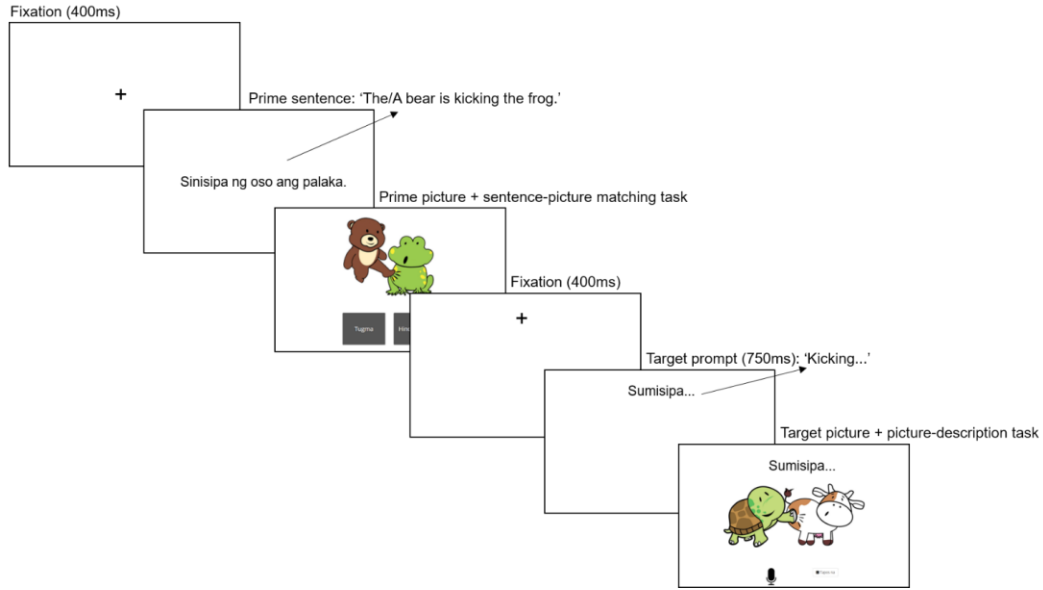


Fig. 1. Time course of an experimental trial in Experiments 1 and 2.

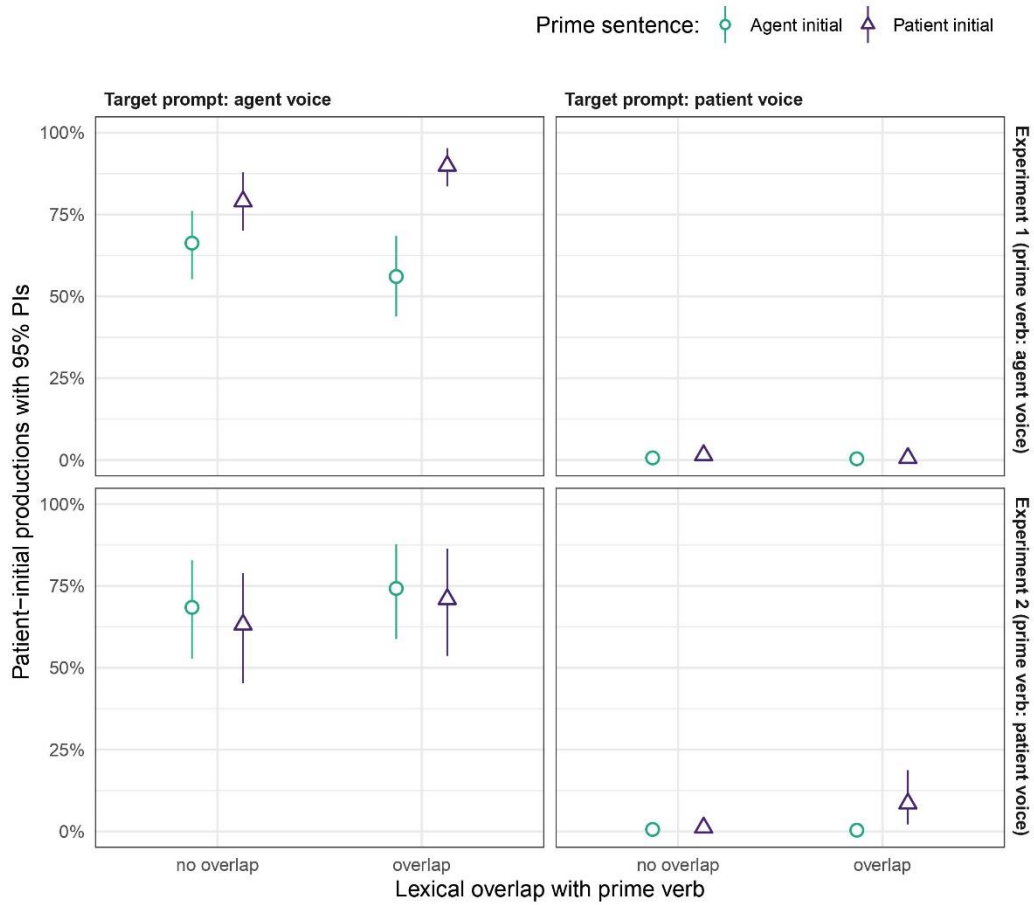


Fig. 2. Proportion of patient-initial productions shown by thematic role order of the prime and target verb voice, with/out lexical verb overlap in Experiments 1 & 2. *PIs* are probability intervals.

Ex. 1. Agent voice agent-initial	S<um>isipa	ang	<b>oso</b>	ng	palaka
	<AV>kick	SUBJ	bear	NSBJ	frog
2. Agent voice patient-initial	S<um>isipa	ng	palaka	ang	<b>oso</b>
	<AV>kick	NSBJ	frog	SUBJ	bear
3. Patient voice agent-initial	S<in>isipa	ng	<b>oso</b>	ang	palaka
	<PV>kick	NSBJ	bear	SUBJ	frog
4. Patient voice patient-initial	S<in>isipa	ang	palaka	ng	<b>oso</b>
	<PV>kick	SUBJ	frog	NSBJ	bear

'The bear is kicking a frog.'

*Note.* SUBJ refers to subject, NSBJ refers to non-subject.

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