

THE ROLE OF SWITCHING AND SEMANTIC RELATEDNESS IN LEXICAL RETRIEVAL: EVIDENCE FROM A PICTURE NAMING TASK WITH CHINESE-ENGLISH BILINGUALS

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Lexical access has been a topic of interest for many years, and the processes are generally well-documented and widely recognized: 1) nonlinguistic concept formation, 2) lemma activation, 3) sound representation and articulation (Levelt et al., 1999). But where the locus of language control lies still subjects to controversies. There is a divide in the proposed functional locus or loci of language control, with some models suggesting the concept level and others suggesting that it occurs at the lemma level.

As a response to this controversy, we used picture naming task to investigate a switch at what stage, non-linguistic concept formation or sound representation, could exert a bigger influence on lexical retrieval. Specifically, we used a modified picture naming task a semantic prime was presented before the target picture. Two variables are manipulated: 1) semantic relatedness, that is, whether the semantic prime and the target picture is related or not, and 2) naming language, that is, whether the language required for this trial is the same as the language for the previous trial (see Fig.1). Thirty Chinese–English bilinguals participated in the experiment. Each participant completed 200 trials. The semantic prime was the strongest semantic associate of the target word, decided by USF Free Association Norms. Language History Questionnaire (LHQ-3) was chosen to measure their language ability.

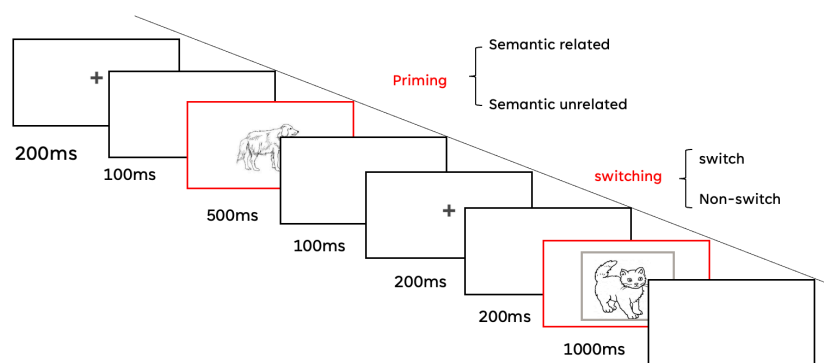


Figure 1 Flowchart of a single trial

In analyzing the results, we firstly conducted Bayesian ANOVA to determine which factors significantly contributed to picture naming latencies. The analysis yielded a higher Bayes factor for the model including switching alone than the model including semantic relatedness alone. Next, to further model the relationship between semantic relatedness and picture naming latencies, we used hierarchical Bayesian, with each participant being

modeled as a random effect. The study used the PyMC3 package in Python, and ran the MCMC algorithm with a total of 1000 iterations, discarding the first 500 iterations as burn-in samples, and the target acceptance rate for the Metropolis-Hastings algorithm used in the sampling is set to be 0.8. The results indicate that the effect of semantic relatedness was weak and not statistically significant, as the credible interval centers around zero.

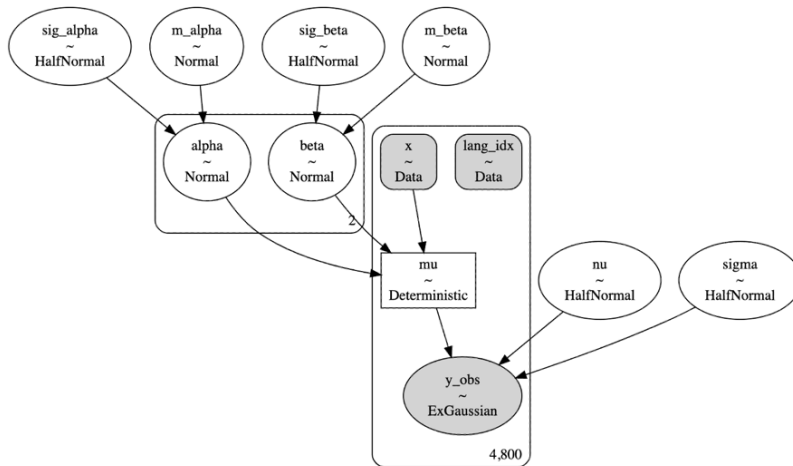


Figure 2 Graphic representation of parameters in ex-Gaussian model

Our findings suggest that switching at the third stage, that is, phonological representation stage, has a stronger effect on picture naming latencies, while semantic relatedness has little or even reverse effect. This indicates that language control might play a bigger role at the third stage, than the other two stages.