Morphological priming without semantic relationship in Hebrew spoken word recognition

Introduction: We report on an auditory masked priming study designed to test the relative influences of semantics and morphology on Hebrew spoken word recognition. Using the visual masked priming paradigm, Frost et al. (1997, 2000, 2005) and Deutsch et al. (1998) have obtained results consistent with a role for Semitic roots in Hebrew visual word recognition: in lexical decision, Hebrew readers are faster to judge the lexicality of Hebrew words primed either by another word sharing their root morpheme or by a nonce letter-string corresponding to their root. Moreover, Frost et al. (1997: Experiment 5) found that morphological priming held even when primes and targets shared their root but were semantically unrelated (e.g., prime *ta**rg**il* 'exercise', target *me**rag**el* 'spy'). However, Hebrew's abjad orthography creates a potential confound: roots are entirely consonantal, and Hebrew is written with a primarily consonantal orthography, so root priming effects could really reflect an orthographic bias. To circumvent these issues, and to extend our understanding of the role of semantics and Semitic morphology into spoken word recognition, we replicated Experiment 5 of Frost et al. (1997) in the auditory modality.

Methods: Participants were 31 native Hebrew speakers, all either students at Tel Aviv University or Amazon Mechanical Turk workers based in Israel. Participants judged the lexicality of 60 Hebrew words, along with an equal number of non-words. Stimuli were presented using the auditory masked priming paradigm (Kouider and Dupoux, 2005), with real-word targets occurring in four priming conditions: repetition (e.g., prime ***pr**i**ts**a*, target ***pr**i**ts**a* 'burglary'), morphological and semantic overlap (M+S+; e.g., prime ***po**re**ts*** 'burglar'); morphological overlap without semantic overlap (M+S−; e.g., prime *mi**fra**ts*** 'gulf'); and unrelated/control (e.g., prime ***ʔa**ri**ts**ut*** 'tyranny'). Participants completed the experiment remotely by downloading a .exe file which, when run, launched the experiment in DMDX and sent results to the investigators upon completion of the experiment. All participants confirmed that they wore headphones during the experiment.

Results: We analyzed reciprocal-transformed response time from target onset using a linear mixed-effects regression analysis, using Satterthwaite approximations for degrees of freedom to assess significance. The model included priming condition (reference level: the unrelated condition) and the control predictors log frequency and log target duration as fixed effects, and subject and item as random effects. Consistent with findings from the visual modality (Frost et al., 1997), participants responded significantly faster in the repetition ($t(1,645)=-4.86$, $p<0.001$; $M=1,058$ ms), M+S+ ($t(1,654)=-3.08$, $p<0.005$; $M=1,065$ms), and M+S− conditions ($t(1,644)=-2.54$, $p<0.05$; $M=1,066$ ms) than in the unrelated condition ($M=1,095$ ms).

Discussion: The results of the present study are consistent with a role for root morphology in Hebrew spoken word recognition. These results are inconsistent with learning-based models of word processing (e.g., the Naive Discriminative Learning model (Baayen et al., 2011)), which hold that apparent morphological priming reflects the coactivation of form and meaning. Instead, they support models of word recognition in which Semitic morphology influences processing independent of semantics. Future work will explore whether morphology influences spoken word processing independent of phonological form (cf. Feldman and Bentin, 1994; Frost et al, 2005).