

*Abstract consonants and morphological relations in subliminal speech priming of weak verbs in Moroccan Arabic*

Kevin Schluter – NYU Abu Dhabi

This paper tests the extent to which a word's history defines its morphological families in Moroccan Arabic. Most content words of Semitic languages are considered to be constructed from lexical triconsonantal consonantal roots and grammatical vocalic patterns. Not all words of Semitic, however, consistently display three root consonants in each related form. These weak roots question whether the surface consonants alone are necessary for developing morphological relationships between words, or if the weak consonants also drive these relationships.

Specifically, this paper tests whether the morphological relationship known as the root is best defined on the basis of surface consonants alone (cf. Davis and Zawaydeh 2001) or if etymological or abstract consonants must be considered when defining the root relationship. This hypothesis is tested with weak verbs of Moroccan Arabic, which do not consistently display three surface consonants as strong Semitic verbs do, using the subliminal speech priming technique (Kouider & Dupoux 2005). Morphological relationships have been shown to obtain for Semitic languages (Ussishkin et al. *submitted*, Schluter 2013) but not phonological relationships.

While others have investigated weak roots in Semitic, they were done so in the context of pattern priming with a non-subliminal technique (Modern Hebrew; Sumner 2002, 2003) or using visual input (Modern Standard Arabic; Boudelaa and Marslen-Wilson 2004). This paper presents the first subliminal auditory-only study of abstract consonants in Semitic. This is crucial because the consonant-heavy writing system of Hebrew and Arabic may influence their morphological processing while reading (cf. Maltese; Perea et al. 2012).

Experiment 1 tests whether or not pairs like /bna/ <  $\sqrt{bny}$  'he built' prime /ban/ <  $\sqrt{byn}$  'it seemed'. Repetition priming obtains (*Estimate* = -52ms, *SE* = 19.349, *t* = -2.685, *pMCMC* = .0070) but there was no difference between the related and control conditions (*p* > .05). The lack of priming between consonantly-similar but etymologically distinct forms suggests that surface relationships based on consonants alone do not define morphological families in Moroccan Arabic.

Experiment 2 provides further evidence by testing hollow and biconsonantal or geminated verbs [sab] <  $\sqrt{syb}$  'he rebelled' [sebb] <  $\sqrt{sb}$  'he insulted'. Similar to experiment 1, repetition priming obtained (*Estimate* = -76ms, *SE* = 21.29, *t* = -3.575, *pMCMC* = .0010) but not the related condition (*p* > .05).

Experiment 3 uses a non-subliminal auditory technique to replicate the results of experiment 1. When the subjects clearly hear both targets and primes, there is facilitation in the repetition condition (*Estimate* = -153ms, *SE* = 11.90067, *t* =

-12.841,  $pMCMC = .0001$ ) as well as the related condition ( $Estimate = -85.ms$ ,  $SE = 11.95510$ ,  $t = -7.089$ ,  $pMCMC = .0001$ ). This suggests that phonology alone can activate these pairs based on surface consonants, but the phonological relationship is not immediate and automatic.

These results of these experiments suggest that weak verbs are organized into morphological families on the basis of abstract phonological principles, and the etymological definition of the root defines morphological families in Moroccan Arabic. During the earliest stages of auditory lexical access in Semitic languages, it is only morphological relationships that are important, not phonological ones.

#### References:

- Boudelaa, S. and W. Marslen-Wilson (2004). Allomorphic variation in Arabic: Implications for lexical processing and representation. *Brain and Language*, **90**(1-3), 106–116
- Davis, S. and B. A. Zawaydeh (2001). Arabic hypocoristics and the status of the consonantal root. *Linguistic Inquiry*, **32**(3), 512–520.
- Kouider, S. and E. Dupoux (2005). Subliminal speech priming. *Psychological Science*, **16**(8), 617–625.
- Perea, M., A. Gatt, C. Moret-Tatay, R. Fabri. (2012). Are all Semitic languages immune to letter transpositions? The case of Maltese. *Psychon Bull Rev.* **19**:942-947.
- Schluter, K. (2013). Hearing words without structure: Subliminal speech priming and the organization of the Moroccan Arabic lexicon. PhD Dissertation: University of Arizona.
- Sumner, M. (2003). Testing the abstractness of phonological representations in Modern Hebrew weak verbs. PhD Dissertation: SUNY Stony Brook.
- Sumner, M. (2002). The reality of abstract representations in Modern Hebrew. In L. Mikkelsen and C. Potts (eds.), *Proceedings of the West Coast Conference on Formal Linguistics*, vol. 21. Somerville, MA: Cascadilla Press, 429-442.
- Ussishkin, A., A. Wedel, K. Schluter, and C. Dawson (*submitted*). Auditory masked priming in Maltese spoken word recognition.