

## Paradigms of whole word forms in the mental lexicon

Ruben van de Vijver, Agnes Benkő & Vassiliki Tsouni

Paradigms are hypothesized to be really stored in the mental lexicon on the basis of theoretical considerations (Albright, 2010, 2005), but there has been little experimental work to confirm this (but see Smolka et al., 2007). This raises the question whether they stored as abstract slots or as whole words (Ackerman et al., 2009; Bertram et al., 2000; Schreuder & Baayen, 1997)? In this paper we provide experimental evidence for the reality of paradigms in the mental lexicon as well as evidence for the reality of whole-word storage on the basis of experimental data from German and Hungarian.

We investigated nominal paradigms of German nouns that take a schwa as plural sometimes with accompanying umlaut and sometimes without, as in the pairs *Boot* ~ *Boote* and *Bart* ~ *Bärte*. The diminutive form of both words has an umlaut: *Boötchen* and *Bärtchen*. In a lexical decision task, in which 56 Germans participated, we tested whether the nonce form *Böt* affected the word *Boot* to the same extent as the nonce *Bärt* did with *Bart*. The nonce form *Böt* has support only from the diminutive form and the nonce *Bärt* has support from both the plural and the diminutive form. We also included words such as *Fest* and *Feste* in which there is, obviously, no umlaut.

The results, illustrated in figure 1 show that a nonce such as *Bärt* took longer to reject than a nonce such as *Böt* (the plot for the word *Fost* as nonce for *Fest* is included for completeness sake). This shows that the members of a paradigm are activated during lexical access. Whether it is controversial whether the umlauted plural forms are stored or derived, we performed a second experiment to investigate whether the members of a paradigm are stored as whole words or not.

To this end we investigated monosyllabic nouns in Hungarian, a language that has back harmony. Despite the backness harmony, front, unrounded vowels are transparent and they sometimes take suffixes with back vowels and sometimes take suffixes with front vowels (Benus & Gafos, 2007; Blaho & Szeredi, 2013; Törkenczy, 2011). Experiments contradict each other as to whether transparent vowels that take back suffixes are more retracted phonetically (Benus & Gafos, 2007) or whether they have the same acoustics as those that take front suffixes (Blaho & Szeredi, 2013).

In a reading task 21 Hungarians were asked to silently read a sentence in which an inflected existing monosyllabic word occurred. In the next sentence this word occurred uninflected and they were asked to pronounce this uninflected word. We then measured the F2 of the transparent vowel.

The results, illustrated in figure 2, show that transparent vowels in words that take back vowel suffixes are slightly, but statistically significant, lower than those that take front suffixes. We explain this as an effect of whole word storage.

In short, we provide experimental evidence for the reality of paradigms in the mental lexicon and that the members of a paradigm are stored as wholes.

## References

- Ackerman, F., Blevins, J. P., & Malouf, R. (2009). Parts and wholes: Patterns of relatedness in complex morphological systems and why they matter. *Analogy in grammar: Form and acquisition*, 54–82.
- Albright, A. (2005). The morphological basis of paradigm leveling. In L. J. Downing, T. A. Hall, & R. Raffelsiefen (Eds.), *Paradigms in Phonological Theory* (pp. 17–43). Oxford, UK and Cambridge, MA: Oxford University Press.

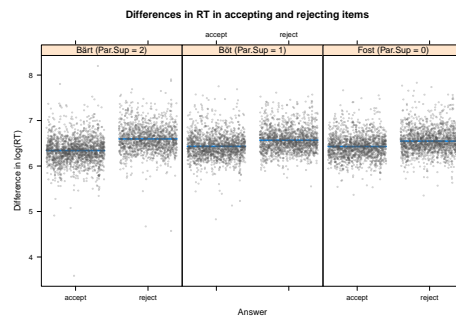


Figure 1: There is a larger difference in latencies between accepting and rejecting *Bart* words (nonce: *Bärt*), than between accepting and rejecting *Boot* words (nonce: *Böt*), and *Fest* words (nonce: *Fost*.)

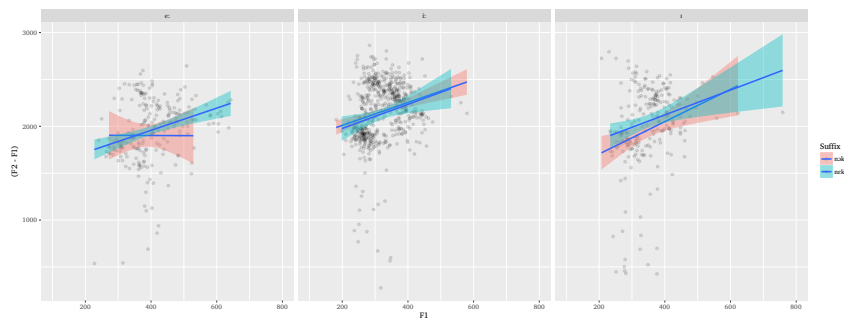


Figure 2: The backness of transparent vowels in monosyllabic words is related the backness of the suffix in its paradigm.

- Albright, A. (2010). Inflectional paradigms have bases too: Arguments from Yiddish. *Natural Language & Linguistic Theory*, 28(3), 475–537.
- Benus, S. & Gafos, A. I. (2007). Articulatory characteristics of hungarian transparent vowels. *Journal of Phonetics*, 35(3), 271–300.
- Bertram, R., Laine, M., Baayen, R. H., Schreuder, R., & Hyönä, J. (2000). Affixal homonymy triggers full-form storage, even with inflected words, even in a morphologically rich language. *Cognition*, 74(2), B13 – B25.
- Blaho, S. & Szeredi, D. (2013). Hungarian neutral vowels: A microcomparison. *Nordlyd*, 40(1), 20–40.
- Schreuder, R. & Baayen, R. H. (1997). How complex simplex words can be. *Journal of Memory and Language*, 37(1), 118–139.
- Smolka, E., Zwitserlood, P., & Rösler, F. (2007). Stem access in regular and irregular inflection: Evidence from German participles. *Journal of Memory and Language*, 57(3), 325–347.
- Törkenczy, M. (2011). Hungarian vowel harmony. In M. van Oostendorp, C. J. Ewen, K. Rice, & E. V. Hume (Eds.), *The Blackwell Companion to Phonology*, volume 5 chapter 123, (pp. 2963–2989). John Wiley & Sons.