

## Modelling the role of prefixation in determining stress assignment in English verbs

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Set within a generative tradition, most accounts assume that stress in English verbs is determined by a combination of morphological (e.g., prefixation) and phonological (syllable weight) factors. Even so, there is considerable leakage with regard to the pertinent generalizations. Why, for example, is stress initial in *pól-ish*, but final in *commít*, despite their final syllables having the exact same structure? Dabouis and Fournier also highlight the importance of opaque, i.e., etymological prefixes in the lexicon (2023). Moreover, while opaque prefixed disyllabic verbs show a pattern whereby stress is almost categorically retracted to the final syllable (e.g., *repél*), stress on the first syllable (i.e., on the prefix) seems to be regularly tolerated in long verbs (e.g., *désignate*). It is presently unclear how exactly these intricate stress patterns can be accommodated within a coherent theory of the morphology-phonology interface.

Adopting a usage-based view of linguistic generalization (e.g., Bybee, 2010), we hypothesize in this paper that stress assignment to English verbs can be accounted for without recourse to abstract morphological properties and that, instead, these effects emerge as a function of the statistical patterning of stress among recurrent forms in the lexicon. Specifically, we test if and how effects of prefixation can be learned by NDL (e.g., Rescorla & Wagner 1972, Arndt-Lappe 2022), a computational model that is trained using error-driven learning and does not have access to higher-level information about the morphological structure of words.

In NDL, network measures are computed on the basis of cue-outcome associations which may then be used to predict language behavior – in our case main stress placement. The input cues on which we trained NDL were bigrams derived from the orthographic representations of all verbs in the Jones Pronouncing Dictionary (2006; N=1948). The outcomes in our model represent the stress positions as counted from the right edge of the word (i.e., *final*, *penultimate*, etc.). Results show that NDL correctly predicts stress in 85% of all cases under cross-validation training (i.e., when the target item is excluded from the training set), reaching a comparable level of accuracy to competing models that implement prefixation, weight and length as categorical predictors in a regression tree analysis. Closer analysis of the network measures reveals that differences between the morphological categories are reflected in differences in the activation profiles of pertinent words, i.e., in the way in which the distributions of stored weights are skewed within a word. For example, we find that activations for the first syllable

are generally lower in prefixed words, which means that the prefix is classified as being unstressed. Conversely, we find relatively stronger activations for the first syllable in non-prefixed and opaque prefixed words. What is more, activations also vary by each individual prefix as well as its transparency status. What this suggests is that pure formal recurrence of prefix(-like) strings brings about what has been traditionally interpreted as morphological effects. On a more general level, our results lend further support to the idea that stress – and effects of morphology – emerge from low-level (orthographic, phonotactic) representations and their relations in the lexicon.

## References

- Arndt-Lappe, S., R. Schrecklinger & F. Tomaschek (2022). Stratification effects without morphological strata, syllable counting effects without counts: Modelling English stress assignment with Naive Discriminative Learning. *Morphology* 33(4), 433-457.
- Bybee, J. (2010). *Language, Usage and Cognition*. Cambridge: Cambridge University Press.
- Dabouis, Q. & J.-M. Fournier (2023). The stress pattern of English verbs. In N. Ballier, J.-M. Fournier, A. Przewozny & E. Yamada (Eds.), *English Word Stress. Theories, Data and Variation*, 154–191. Edinburgh: Edinburgh University Press.
- Jones, D. (2006). *Cambridge English Pronouncing Dictionary*. Cambridge: Cambridge University Press.
- Rescorla, Robert A., & Allan R. Wagner (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In Abraham. H. Black & William F. Prokasy (eds.), *Classical conditioning II: Current research and theory*, 64–99. New York: Appleton Century Crofts.