The Dynamic Substructure of Words

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Traditional psycholinguistic approaches to morphological processing have taken as their starting point that compound and affixed words can be assigned an invariant morphological structure. These studies then typically proceed to test the extent to which the lexical processing of language users shows sensitivity to that morphological structure. The assumptions underlying this approach have been challenged recently in papers that question the value of morphemes as psycholinguistic constructs (e.g., Baayen et al., 2019) and the assumption of invariant morphological structure (Libben, 2017). In this latter approach, it is claimed that compound and complex words are in morphological superposition, such that they do not have a fixed representation in the mind.

In the research, we have set out to test these challenges to the assumption of invariant mental morphological representation. We have done this through a series of experiments examining the microstructure of word production in English and French. The key to the research has been the creation of a stimulus set of 100 words that vary in their morphological complexity and are visually identical across the two languages, as shown in Table 1 below. Because these words are visually identical in English and French (i.e., with no accented vowel letters) their written production in terms of physical gestures, is also identical across the two languages.

Table 1. Visually Identical English and French stimuli.

Word	English	French
Simple	crocodile	crocodile
Prefix-Stem	implant	implant
Stem-Suffixed	formation	formation

We report results from over 100 participants in both French and English. Our data point to the view that morphological structure is not an invariant property of stimuli. Rather, it emerges as a byproduct of the dynamics involved in lexical production and comprehension. Participants are influenced by the morphological substructure of words in a manner that changes over the course of the experiment and is influenced by interlingual differences in the productivity and transparency of stems and affixes. In both languages, we found that the morphological structuring of word production, as measured by difference in per letter production times, were largest for stem-stem words and smallest for stem-suffix words.

A key feature of this research is its use of data from both typing and handwriting experiments using comparable stimuli. The research builds upon the work of Libben et al. (2016), as well as psycholinguistic demonstrations that constituent effects found in reading words can also be found in the analysis of how people write them (e.g., Alvarez, Cottrell, & Afonso, 2009; Sahel, Nottbusch, Grimm, & Weingarten, 2008). The *pen-tracking* technique that we have employed provides the same data as typing (onset latencies, per letter production times, and total production time). In addition, we record where the writing pen is located, the angle of the pen, the force of the pen, and the pauses that occur both within and between the writing of letters. We discuss how the an analysis of writing patterns in real time enables an extraordinarily fine-grained analysis of language production and a window into the cognitive processes that accompany word production.

References

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