Morphological derivation as a tool for creating new words that speak to French speakers

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Abstract

In this study, we investigate the role of morphological structure, semantic interpretability and conceptual synonymy in the processing of pseudowords in a lexical decision experiments in French. We used four types of stimuli: 1- non-morphological pseudowords (an English example would be °*sportume*); 2- semantically non-interpretable pseudowords (°*rapidation*); 3- semantically interpretable pseudowords (°*rapidify*); 4- synonym pseudowords (°*gardenist*). The results show significant effects, on lexical decision, of morphological structure and semantic interpretability, but not of conceptual synonymy, illustrating the time-course of a pseudoword's journey from representations of orthographic form to computation of meaning.

Keywords: morphology, derivation, lexical decision, pseudoword

Introduction

In natural languages, many words can be deconstructed into morphemic units, as exemplified by the French term *océanique* ("oceanic"), which consists of the root *océan-* ("ocean") and the adjectival suffix *-ique*. In languages such as English and French, the formation of complex words generally involves attaching an affix to a base morpheme, with the meaning of the resulting word often derivable from the meanings of its constituent parts. Morphologically complex words account for approximately 73% of the entries in a French dictionary (Le Robert Méthodique, 2000) but often with a very low frequency (New et al. 2004). Although listed in the dictionary, these words are unlikely to have been encountered by most speakers; nevertheless, they are often understood during conversations.

Everyday, speakers of a language encounter unfamiliar words with no difficulties to understand them and even more without noticing they are new. Often these are novel combinations of existing morphemes. Take, for example, the pseudoword °*futurness*. It combines the root *futur* with the suffix *-ness*, found in existing complex words like *happiness*. The root conveys the core meaning, while the suffix provides information about grammatical and semantic categories; *vintageness* thus refers to the "quality of something vintage". An English speaker intuitively understands these rules and categories, enabling

them to grasp the meaning of these words and define them even without context.

From a psycholinguistic point of view, the fact that language users can understand complex words that they have never encounter before suggests that some form of morphological information is available in the mental lexicon. This raise the question of how are people able to tell if a given letter string corresponds to a word of their language or not. When performing a lexical decision task, are participants consulting a stored whole-word representation of existing complex words or are they relying on the combination of the two morphemes? Existing research has shown that the lexical decision task is sensitive to morphological structure, grammaticality and semantic interpretability (Beyersmann et al. 2020).

In the experiment presented here, we look at lexical decision on pseudowords for which we manipulated their morphological structure, and explore the role of semantic features. In particular, we tested the role of synonymy: Is it more difficult to reject a pseudoword like *broadify*° because it has the same compositional meaning as *broaden*, an existing word built on the same root? Or would the existence of *broaden* in the mental lexicon make clearer that *broadify*° is not an existing word?

Experience

Materials

We tested four different types of pseudowords, identical to those used as primes in Longtin and Meunier (2005) and Meunier and Longtin (2007): a) non-morphological pseudowords, which were made with an existing French root and an existing orthographic, non-suffixal ending (e.g. *rapiduif*°, made with *rapide* "rapid" and *-uif*); b) non-interpretable pseudowords, made of the ungrammatical combination of an existing root and an existing suffix of French (e.g. *sportation*°, made of the French noun *sport* and the suffix *-ation*, which creates nouns out of verbs); c) interpretable pseudowords, made of the grammatical and semantically interpretable combination of a root and a suffix (e.g. *rapidifier*° "rapid+ify"); d) synonym pseudowords, which were constructed by swapping the suffix of an existing derived word for a semantically equivalent suffix (e.g. *jardineur*°, which was coined by changing the profession suffix *-ier* of the existing word *jardinier* "gardener" with the profession suffix *–eur*; an English equivalent would be *gardenist*. All the pseudowords respected the graphemic and phonological rules of French and could be easily pronounced.

List composition

Overall, we tested 29 non-morphological pseudowords, 28 non-interpretable pseudowords, 28 interpretable pseudowords and 29 synonym pseudowords.

These were distributed among 3 lists, to avoid root repetition. One hundred and ninety fillers (76 simple pseudowords and 114 existing words) were added to the 38 test pseudowords of each list.

Participants

Thirty native speakers of French participated to the experiment. They were randomly assigned to one of the three lists.

Procedure

Each stimulus was presented on the screen for 2000 ms or until the participant pushed a button. The inter-stimulus interval was of 750 ms. Stimuli were randomly presented, in the middle of the screen. Participants were told that they were going to see letter strings and that they had to say, as quickly and accurately as possible, if the letter string corresponded to a word of French or not. The session started with a practice run of 16 items.

Results

Overall, the error rate averaged 5.5 %, a standard rate for such type of task. Response times and error rates for the critical pseudowords were analysed with a GMM including Condition (the 4 types of pseudowords) as a fixed factor and participants and items as random ones.

Condition was significant for response times ($X2(4)=9373$, $p<.001$) and error rates ($X2(3)=63.2$, $p<.001$). Planned comparisons showed that non-morphological complex pseudowords are easier and faster to reject (1.4 % of errors; 844 ms, SD=266) than morphologically complex pseudowords even if non-interpretable (6.1 %; 950 ms, SD=300), and in turn non-interpretable pseudowords are easier and faster to reject than interpretable pseudowords (20.4 %; 1054 ms, SD= 355) and synonym ones (28.9 %; 1051 ms, SD=339); all $ps<.01$ with Bonferroni corrections. These two latter conditions are equivalent and no effect of synonymy is observed neither on response times nor on error rates.

Discussion and conclusion

Our results showed a significant effect of morphological structure and semantic interpretability, both in the response time and the error rates for the different types of pseudowords. Overall, this shows how lexical decision latencies and error rates, in addition to priming effects (e.g. Meunier, Longtin 2007), reflect the time-course of a pseudoword's journey from representations of orthographic form to computation of meaning. Non-morphological pseudowords are rejected at the very

beginning of the recognition process as they cannot be successfully mapped onto orthographic representations during an early, morpho-orthographic decomposition stage. In contrast, non-interpretable pseudowords are correctly processed at this morpho-orthographic decomposition stage but can be rejected since later semantic/syntactic integration fail to generate a coherent grammatical and semantic interpretation of their constituent morphemes. Both interpretable and synonym pseudowords are processed successfully at both processing stages, as they can be easily decomposed and interpreted. The existence of a synonymous word in the mental lexicon does not appear to modulate the decision time. Such model not only explains how language users process novel complex words with such ease, but also why unknown morphologically complex words encountered in real life and in an appropriate sentential context are so easily processed.

References

Beyersmann, E., Mousikou, P., Javourey-Drevet, L., Schroeder, S., Ziegler, J. C., Grainger, J. 2020. Morphological processing across modalities and languages. Scientific Studies of Reading, 24(6), 500-519.

Le Robert Methodique, 2000. Dictionnaire méthodique du français actuel. Le Robert, Paris, 1 vol. 1645 p. rédaction dirigée par J. Rey-Debove.

Longtin, C.-M., Meunier, F 2005. Morphological decomposition in early visual word processing, Journal of Memory and Language, 53, Issue 1, 26-41.

Meunier, F., Longtin, C. 2007. Morphological decomposition and semantic integration in word processing. Journal of Memory and Language, 56, 457-471.

New, B., Pallier, C., Brysbaert, M., Ferrand, L. 2004. Lexique 2 : A New French Lexical Database. Behavior Research Methods, Instruments, & Computers, 36 (3), 516-524.