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Title:

Beyond Isolated Word Recognition

Abstract:

In this commentary we concur with Frost's view of the centrality of universal principles in models of word identification. However, we argue that other processes in sentence comprehension also fundamentally constrain the nature of written word identification. Furthermore, these processes appear to be universal. We, therefore, argue that universality in word identification should not be considered in isolation, but instead in the context of other linguistic processes that occur during normal reading.

Main Text:

We are broadly sympathetic with Frost's target article, his considerations in relation to universality, and the stance he takes. We share his view that it is extremely important to explore lexical processing, and other aspects of reading, across languages, in order to be able to investigate issues of universality and, specifically, how universal principles might constrain theoretical accounts of language processing.

At a critical level, we question the use of the word "reading" in the title, and throughout the article. Footnote 1 notwithstanding, whilst we accept that lexical processing is a central and fundamental sub-process of reading, it is just one aspect of a more complex psychological processing system involving numerous other sub-processes. We do not consider the theoretical account in the target article to constitute a move toward a "theory of reading"; rather, this is a move toward a theory of lexical identification. Let us now turn to our main points.

The majority of work investigating word recognition (some of which is cited in this article) employs methodologies in which words (or nonwords) are presented in isolation, and we question the ecological validity of such methods as an approximation of how lexical identification occurs during normal reading (Rayner & Liversedge, 2011). The use of more natural methodologies such as recording eye movements to study reading leads us to consider whether there are other important (and potentially universal) aspects of reading that themselves constrain, or even determine, the nature of word identification. Reading is a visually mediated process (except in the special case of Braille), and people of all cultures make the same stylised patterns of saccades (orienting the eye such that light reflected from as yet unread words is caused to fall on the fovea), and fixations (brief pauses during which the orthographic code is extracted from the page) in order to read. The nature of eye movements during reading, along with attention and the physiological make up of the retina, means that information about words is delivered piecemeal to the language processing system via a series of "snapshots", rather than as a steady and smooth stream. It is not the case that all the orthographic code associated with a word is necessarily available during a particular fixation. Also, the quality of the orthographic information that the visual system delivers varies contingent on where it falls on the retina and how attention is allocated to that area of the visual array. Given that fixations are temporally (and spatially) distributed, the sequential delivery of

orthographic information fundamentally determines the nature and time course of the word identification process. Furthermore, since the basic characteristics of eye movements are cross-culturally uniform, then it is plausible that their constraint on word identification might be considered one of the universal characteristics that should be incorporated into any realistic model of such processes as they occur during normal reading.

Our second, main point focuses on Frost's argument that fuzzy encoding of letter-order is a cognitive resource-saving strategy that characterizes reading in European languages, and that this strategy would only be meaningful given the characteristics of the lexical space of these languages. While we believe this statement to be well-thought through and, indeed, thought provoking, we would argue that fuzzy encoding in European languages (as a cognitive resource-saving strategy) is in all likelihood only possible due to a reliance on sentential context during normal reading. The sentential context facilitates resolution of lexical ambiguity due to fuzzy letter-order encoding. Thus, complementary to our argument above, word identification (particularly in relation to transposed letter, TL, effects) cannot be considered in isolation from other aspects of processing associated with sentence interpretation. Note also that it is universally the case that during normal reading words are identified within a sentential context.

To support this point, we offer a very brief summary of some of our recent experimental work demonstrating that when readers attempt to identify TL words presented in isolation, performance is poor (Blythe, Johnson, Tbaily, Liversedge & Rayner, 2012). Participants were presented with isolated letter strings and were required to decide whether each was a misspelled word or a nonword (stimuli were 50% 6-letter TL words, e.g., *ANEVUE* for base word *AVENUE*, and 50% 6-letter nonwords, with no retrievable base word). Response accuracy was quite low (82%) for adjacent TL words, and when a letter intervened between TLs, performance did not differ from chance; participants were effectively guessing (note, however that for eight letter words where a smaller proportion of the word was disrupted by the TL manipulation, performance improved to better than chance). Recall, participants were responding to isolated words in this study. In contrast, when the same six letter TL words were presented within meaningful sentential contexts (in an eye movement experiment), we found that readers experienced little, if any, difficulty understanding the sentences even when a letter intervened between TLs; also, accuracy on comprehension questions was high (91%). Thus, it appears that lexical identification of TL words is facilitated by contextual information when this is available.

In summary, we welcome the concerns raised by Frost in relation to universality, and generic models of word identification that account for phenomena restricted to a specific group of languages. However, we have voiced our own concerns regarding aspects of word identification that occur in the context of normal reading, but do not occur in isolated word identification. We believe that these are important and may be universal. Lexical identification in the context of sentence processing will be the foundation of a general theory of reading, taking into account the specificities associated with processing coherent passages of text.

References:

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