The effects of task on frequency and predictability effects

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Studying eye movement behavior in different language processing tasks can provide insight into how people adapt their eye movement strategies and yield evidence about the common or differing processes underlying a range of language tasks. For example, Rayner and Raney (1996) demonstrated that the effect of word frequency—longer reading times on lower frequency words—which was robust when reading for comprehension, was absent when searching for a particular word in text. This presumably reflects the fact that a word search task can be accurately performed by visually matching the probe to each word. Therefore, most words do not need to be fully identified (i.e., to the point of lexical identification) to be ruled out, and thus word frequency information is less relevant. Under this interpretation, the result suggests that readers have the flexibility to ignore a source of information that they would otherwise usually utilize. A contrasting result is provided by Kaakinen and Hyönä (2010), who demonstrated a different interaction of word frequency and task: relative to reading for comprehension, the size of the frequency effect increased in a proofreading task in which readers searched for spelling errors (non-words).

There are at least two possible explanations of Kaakinen and Hyönä's result. One possibility is that, because searching for non-words does not require constructing sentence-level representations, readers are not doing so. Instead, subjects are effectively performing a sequence of isolated-word lexical decisions and the interaction arises because frequency effects are larger in lexical decision than in reading (Schilling, Rayner, & Chumbley, 1998). Under this account, Kaakinen and Hyönä's result suggests that, like in the Rayner and Raney study, proofreaders ignore information they would otherwise use: predictability. That is, the standard predictability effect—longer reading times on less predictable words—would be reduced in proofreading. An alternative possibility is that readers do identify each word, but must do so more carefully to rule out possible misspellings. Under this account, Kaakinen and Hyönä's result indicates that readers rely to a greater extent on non-visual information about a word (i.e., frequency) to enable more careful word identification. Therefore, one would expect that readers would also rely more on other non-visual information, like predictability.

Thus, these accounts make conflicting predictions for how predictability effects would change between the two tasks. We tested these with an experiment analogous to that of Kaakinen and Hyönä, in which subjects both read for comprehension and proofread for spelling errors (non-words produced by transposing letters, e.g., *fltue* for *flute*). We factorially manipulated not only word frequency but also predictability and analyzed how the magnitude of these effects changed between tasks. Overall, reading times (e.g., gaze durations) were longer in the proofreading task than the reading task. Crucially, both frequency and predictability effects were magnified in the proofreading task compared to reading. These results replicate Kaakinen and Hyönä's findings for overall task effects and for frequency, and provide evidence against an account in which readers ignore predictability information during this proofreading task. Together with the aforementioned studies, these data form a coherent picture of the relationship between word frequency and/or predictability and task demands, in which these effects increase as the task emphasizes more careful word identification: from negligible in visual search, to robust in reading for comprehension, to even larger in proofreading for spelling errors.

References

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