Readers target words where they expect to find maximal information based on the structure of the lexicon

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Skilled readers can decipher written language with remarkable ease and efficiency, relying on multiple heuristics to guide how they explore a text. One such heuristic is the way in which orthographic information about word identity is typically spread across words. In many – but not all – languages, the left-hand side of words tends to be more information rich. For example, the first three letters of the word *guarded* is more informative than the last three, since there are few words that begin with *gua-* and many that end with *-ded*. This would predict that readers should favour landing on the left side of words. Any such effect will, however, be modulated by innate constraints on perception (e.g., Brysbaert & D'Ydewalle, 1988) and may potentially be masked by various linguistic confounds. These issues have previously made it difficult to establish a causal connection between language structure and reading behaviour.

We address this by constructing an artificial lexicon in which we can manipulate information spread. In a first experiment (n = 60), we show that participants who learned a "left-heavy" lexicon found it easier to identify words when fixating them left-of-centre, while participants who learned a "right-heavy" lexicon found it easier to identify words when fixating them centrally, replicating the classic *optimal viewing position effect* (O'Regan et al., 1984) in an artificial language learning context. In a second eye-tracking experiment (n = 80), we show that participants actively target different parts of words depending on whether they had been exposed to the left- or right-heavy lexicon.

Our findings provide a causal demonstration that the way in which the lexicon distributes information affects how readers visually explore words. Furthermore, we support our analyses with a formal model of visual word recognition and a cross-linguistic study of information distribution in nine natural languages.

Brysbaert, M., & D'Ydewalle, G. (1988). Callosal transmission in reading. In G. Lüer, U. Lass, & J. Shallo-Hoffman (Eds.), *Eye movement research: Physiological and psychological aspects* (pp. 246–266). Hogrefe.

O'Regan, J. K., Lévy-Schoen, A., Pynte, J., & Brugaillère, B. (1984). Convenient fixation location within isolated words of different length and structure. *Journal of Experimental Psychology: Human Perception and Performance*, *10*(2), 250–257.