Origins of variability in linguistic experience and its effects on language processing

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People vary substantially in their ability to use language. How does this variability arise? Cultural experiences can have a powerful influence on human cognition. In the present project, we utilized an individual differences approach to investigate whether experience with written language, a human cultural invention, predicts the speed of spoken word recognition. Previous research, using a variety of experimental methods, had obtained inconsistent and contradictory results. Here, we analyzed a large dataset that is unprecedented in size (number of participants) and depth (number of skills assessed), obtained using the Individual Differences in Dutch Language Skills (IDLaS-NL) test battery (Hintz et al. 2024).

I will briefly introduce the IDLaS-NL test battery. The main focus of my presentation, however, will be on examining the relationship between written language experience and spoken word recognition. To that end, we analyzed the data of 655 typically developed native Dutch adults between 18 and 30 years who carried out a standard spoken word recognition task, auditory lexical decision. The participants listened to Dutch words and nonwords and judged their lexical status as quickly as possible. We performed drift diffusion modelling on the lexical decision response times. We focused on drift rate, which refletcts the time required for the nervous system to encode the spoken stimulus, and hypothesized that increased written language experience (literacy) enhances the quality of lexical (including orthographic) representations and, as a consequence, how quickly and efficiently spoken words can be recognized. Hierarchical regression analyses on participants' drift rate parameters showed that literacy predicted the speed of spoken word recognition beyond control (age, education), domain-general (processing speed, working memory, nonverbal reasoning), and phonological and semantic (rhyme judgment, semantic categorization, antonym production) predictors. These results are most consistent with the notion that online recruitment of orthographic knowledge increases the efficiency of spoken word access.

References. Hintz, F., M. Dijkhuis, V. van 't Hoff, M. Huijsmans, R.A. Kievit, J. M. McQueen & A.S. Meyer (2024). Evaluating the factor structure of the Dutch Individual Differences in Language Skills (IDLaS-NL) test battery. *OSF*. • Myers, C. E., A. Interian & A. A. Moustafa (2022). A practical introduction to using the drift diffusion model of decision-making in cognitive psychology, neuroscience, and health sciences. *Frontiers in Psychology* 13:1039172.