

A multi-study neuroeducational perspective on vocabulary learning

Peta Baxter

Radboud University Nijmegen: Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

Randi Goertz

Radboud University Nijmegen: Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

Lukas Ansteeg

Radboud University Nijmegen: Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

Josh Ring

Radboud University Nijmegen: Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

Marianne van den Hurk

Radboud University Nijmegen: Behavioral Science Institute, Nijmegen, Netherlands

Mienke Droop

Radboud University Nijmegen: Behavioral Science Institute, Nijmegen, Netherlands

Ton Dijkstra

Radboud University Nijmegen: Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

Harold Bekkering

Radboud University Nijmegen: Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

Frank Leone

Radboud University: Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

Abstract

We aim to apply cognitive neuroscience insights to vocabulary learning practice. Towards this end, we review current educational methods in relation to important characteristics of the mental lexicon, such as similarity-coding. This shows that methods relate poorly to the mental lexicon, and that especially contrasting - explicitly distinguishing similarities - receives little attention. To remedy this, we run experiments to put these findings into practice. First, we ask participants to learn artificial vocabulary using retrieval practice multiple-choice, manipulating the orthographic and semantic similarity of distractors. The prediction is that learning will be harder but more effective depending on similarity and translation direction. Second, we test whether participants show indications of gradient descent learning when guessing in recall retrieval practice. Thirdly, we use cognitive neuroscience and large scale word learning data to model the mental lexicon. Combined, these studies potentially offer relevant scientific and societal insights, applicable to school settings.