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CBS Research Seminar

The “Crossword Effect” in free word recall: A retrieval advantage for words encoded in line with their spatial associations

Date: 21 Feb 2024 (Wed)
Time: 5:00 pm - 6:00 pm (HKT)
Venue: Online via Zoom



Presented by
Dr Christoph SCHEEPERS
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Abstract:

According to the perceptual symbol hypothesis (Barsalou, 1999), word concepts trigger mental re-enactments of perceptual states and actions. While many studies have shown how word concepts modulate sensori-motor responses, it is less well known how sensori-motor actions influence access to word concepts in memory. Here, we investigated how well English words with strong horizontal or vertical associations are retrieved from memory dependent on how they are presented during encoding (i.e., horizontally or vertically printed). Initial pre-testing of 129 candidate words yielded 43 words with a strong horizontal association (e.g., floor, beach, border, etc.) and 51 words with a strong vertical association (e.g., tree, crane, bottle, etc.). These were quasi-randomly compiled into 160 ‘crossword arrays’ (e.g., Fig. 1 left), each containing 5 horizontally and 5 vertically printed items drawn from the horizontal association word set, as well as 5 horizontally and 5 vertically printed items drawn from the vertical association word set. The main experiment (160 participants) was preregistered on OSF (<https://osf.io/fb64q/>) and was introduced to participants as “testing how word arrangements affect subsequent mathematical problem solving”. There were three experimental phases: (1) in the encoding phase, each participant studied a uniquely generated crossword array (e.g., Fig. 1 left) for ca. 2 minutes; (2) in the following distractor phase, they had to solve simple mathematical equations for 1 minute; (3) in the final (surprise) free recall phase, they were asked to write down as many words as they could remember from the encoding phase. Dependent variables were likelihood of correctly recalled words and retrieval ranks of correctly recalled words in the recall list. Results showed no appreciable effects in retrieval rank, but a clear interaction ($p < .001$) between word association and word presentation in the likelihood of correct word recall (Fig. 1 right): vertical association words, in particular, were reliably more likely to be recalled correctly when they were presented vertically (i.e., in line with their spatial association) than when they were presented horizontally during encoding. Implications for the perceptual symbol hypothesis will be discussed.

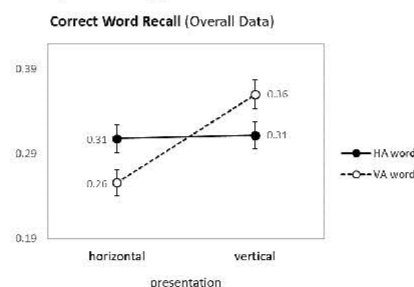
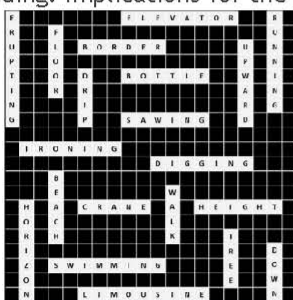


Figure 1: Left: Example ‘crossword array’ for encoding; Right: Likelihood of correct word recall as a function of word type (solid line: Horizontal Association, dashed line: Vertical Association) and word presentation during encoding (x-axis labels); error bars represent standard errors of the means.

Speaker Bio:

Dr Scheepers obtained his psychology degree at the University of Bochum in 1991, and his PhD at the University of Freiburg in 1997. He held a two-year post-doc position at the University of Glasgow (1998-2000) before starting a C1 assistant professorship in computational linguistics at the University of Saarbruecken (2000-2003.). He then held a lectureship in psychology at the University of Dundee (2003-2005) before moving to Glasgow in October 2005 where he currently holds a senior lecturer position. His main research areas are psycholinguistics and the psychology of language. He employs various brain-imaging and behavioural methods in his research, and is an expert in the recording of eye-movements during reading and visual perception. Dr Scheepers is editorial board member for JEP:General, Cognition, Frontiers in Psychology, and Collabra.