Language comprehension



Comprehension is the ability to understand something.

Language comprehension is one of the most automatic tasks that humans perform. Yet it is also one of the most complex, requiring the simultaneous integration of many different types of information, such as knowledge about letters and their sounds, spelling, grammar, word meanings, and general world knowledge. In addition, general cognitive abilities such as attention monitoring, inferencing, and memory retrieval are used in order to organise this information into a single meaningful representation.

For the most part, we take the ability to accomplish this task for granted. However, for those with language-based disabilities – including developmental disabilities (such as dyslexia, specific comprehension impairment, or speech deficits) and acquired disabilities (such as language impairment after brain injury) – assembling all this information accurately is a major challenge. While clinicians and educators are on the frontlines in helping individuals to overcome these challenges, scientists in the field of psycholinguistics are conducting the basic research that investigates: how the brain processes spoken and written language; what brain functions go awry in the case of language disability; and how to most effectively remediate deficits when they occur.

Sudden comprehension-or insight-during problem-solving can enhance learning, but the underlying neural processes are largely unknown.

Kizilirmak et al., investigated neural correlates of learning from sudden comprehension using functional magnetic resonance imaging and a verbal problem-solving task. Solutions and "solutions" to solvable and unsolvable verbal problems, respectively, were presented to induce sudden comprehension or continued incomprehension. They found activations of the hippocampus, medial prefrontal cortex (mPFC), amygdala, and striatum during sudden comprehension. Notably, however, mPFC and temporo-parietal neocortical structures rather than the hippocampus were associated with later learning of suddenly comprehended solutions. Moreover, difficult compared to easy sudden comprehension elicited midbrain activations and was associated with successful learning, pointing to learning via intrinsic reward. Sudden comprehension of novel semantic associations may constitute a special case of long-term memory formation primarily mediated by the mPFC, expanding our knowledge of its role in prior-knowledge-dependent memory ¹.

1)

Kizilirmak JM, Schott BH, Thuerich H, Sweeney-Reed CM, Richter A, Folta-Schoofs K, Richardson-Klavehn A. Learning of novel semantic relationships via sudden comprehension is associated with a hippocampus-independent network. Conscious Cogn. 2019 Feb 11;69:113-132. doi: 10.1016/j.concog.2019.01.005. [Epub ahead of print] PubMed PMID: 30763808.

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