A Synaptic Story of Limited Working Memory Capacity

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Cowan (2004) summarized the evidence that human subjects can memorize about four chunks in a short-term memory task. However, the neural mechanism underlying the limited capacity of working memory remains largely unknown. Recently, Tsodyks et al (2008) proposed that short-term plasticity (STP) of neuronal synapses may mediate information retrieval in a working memory task. Here, based on this idea, we show that the intrinsic dynamics of a neural circuit mediated by STP can achieve sequential recall of multiple items as was found in the experiment; consequently, the STP dynamics of the network determines the memory capacity.