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Where memory meets language: a dynamic neural architecture of language comprehension

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Our semantic and real-world knowledge is highly distributed across the brain. How much of this stored knowledge can we draw upon to make sense of language? And how quickly can we mobilize it during real-time comprehension? I will discuss ERP, MEG and fMRI studies suggesting that, through connections to the left anterior temporal cortex, *all* our stored semantic knowledge is potentially available to facilitate our access to the semantic features of an incoming word within only 250ms of its onset. Moreover, in a locally constraining context, a pre-activated semantic representation can be linked to its stored orthographic, phonological and syntactic representation(s) to generate a lexical prediction within the left posterior lateral temporal cortex. I propose that we actually begin to integrate these lexical predictions into their context, ahead of any bottom-up input. This means that if an incoming word matches a prediction, it is very easily integrated. If, however, there is a prediction error at any level of representation (semantic, syntactic, phonological or orthographic), we recruit left inferior frontal, inferior parietal and sometimes dorsolateral prefrontal cortices in additional, and sometimes prolonged, attempts to combinatorially integrate that word into its context. Thus, direct neural links between semantic memory, the lexicon and domain-general control regions allow for a highly dynamic language comprehension system. This Bayesian framework helps us understand how we use our semantic and real-world knowledge to resolve ambiguity, protect us from misinterpretations in noisy environments, flexibly allocate resources in response to environmental demands, and learn new linguistic and non-linguistic information.