Visual naming involves a wide range of cognitive processes that are fundamental for speech, the cortical dynamics of which have yet to be fully described. We contribute to this description using an picture naming task in MEG, in which we manipulated the semantic demands across conditions. In different blocks, participants overtly named: colours from random scrambled patches, line drawings of items from a single semantic category (vehicles), or line drawings of items from four categories. Colour naming demands the least semantic processing, while items from a single category target a smaller semantic "target-space" than items from multiple categories. MEG data were collected on a 4D Neuroimaging system from seventeen subjects, of which two were excluded due to atypical levels of artifactual noise. The continuous signals were band-pass filtered between 0.5 and 35Hz and ERF amplitudes were averaged by subject and condition. Sources were reconstructed on the cortical surface of the MNI template using a Minimum Norm estimates. We performed time-resolved statistics on the source data using pair-wise planned comparisons (Student's t; $p < 0.001$ uncorrected). Significant differences began in occipital cortex 54ms post stimulus, and spreading forward to anterior (R = 117, L = 318) and middle (L = 153ms, R = 122ms) bilateral temporal cortices, left temporo-parietal junction/inferior parietal lobule (232ms), left superior temporal cortex (330ms), bilateral IFG (L = 427ms, R = 232ms), among other significant differences in activity. These regions are associated with visual object recognition, semantics, lexical retrieval, phonology and representational integration. The contrasts reveal early differences in the diffusion of information through a wide network. Notably, effects present in temporal cortices as early as 117 ~ 153ms post stimulus indicate early semantic processing. Reported differences are all present several hundred milliseconds before response onset, before movement-artifact related contamination of the recordings.

B43 Penguins can't fly: how concept typicality affects category verification and verbal memory recognition

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The categorical structure of semantic knowledge provides us a system to organize the world, by establishing similarities and differences among concepts. For a given category (e.g. bird), some exemplars share many features and are therefore typical members of that category (e.g. sparrow), while others are more atypical as they present more distinctive features (e.g. penguin). While the impact of concept typicality on semantic processing has been extensively studied, it is less clear how this variable affects verbal memory retrieval of those concepts. It is well established that processing the meaning of words often aids episodic memory. However, it remains unknown how the categorical structure of concepts may support recognition memory for those concepts. We conducted a behavioral study to explore how two semantic variables – concept typicality and congruency – influence verbal episodic retrieval in healthy young adults. During encoding, 32 participants performed a category verification task, in which a category and an exemplar were presented and participants had to decide if the exemplar belonged to the category. We manipulated concept typicality such that the exemplar was either a typical (e.g. bird-SPARROW) or an atypical member of the category (e.g. bird-PENGUIN). Category congruency was also manipulated, with the exemplar being presented either with the correct category or with a different category (e.g. bird-SUBMARINE). Subsequently, participants performed an item recognition task, in which they saw exemplars presented before and new ones, and had to decide if the item was old or new, along with a Remember/Know judgment for old decisions. As expected, category verification was faster and more accurate for typical than atypical concepts. This concept typicality effect occurred only when the exemplar belonged to the category (i.e. congruent condition). Interestingly, we found the inverse pattern during item recognition, with better item memory and more Remember responses for atypical than typical exemplars, independently of category congruency. There was also a main effect of category congruency such that items encoded with their own category were better recognized and elicited more Remember responses than items encoded with different categories. Together, these results suggest that categorical structure improves verbal episodic recognition in two ways. First, the superior memory for atypical exemplars suggests that processing the unique features of those items (e.g. a penguin is a bird that can't fly) results in richer memory traces, as these items carry more distinctive semantic characteristics that are diagnostic in item recognition. Second, processing information that is congruent with the hierarchical structure of semantic memory also promotes episodic retrieval. We propose that the processing of distinctive categorical information is highly diagnostic during item recognition. A focus on semantic distinctiveness is a promising approach to characterize the interplay between semantic and episodic processing in verbal memory.

B44 Fronto-temporal network promotes verbal memory retrieval via semantic elaboration

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The lexical-semantic properties of words have a significant effect on the ability to later retrieve those words. For example, processing the meaning of words, relative to processing their perceptual features, facilitates recognition. Likewise, concepts with more unique lexical-semantic features (e.g. low-frequency words) are generally better remembered than concepts with less unique features (e.g. high frequency words). Neuroimaging studies often implicate the left lateral prefrontal cortex in verbal memory retrieval. It has been argued that this activation reflects controlled semantic processing that facilitates later recognition. Yet, it remains unclear what aspects of semantic processing predict verbal memory performance and how it relates with prefrontal activation patterns. We addressed these questions in an fMRI paradigm using a verbal episodic recognition task, in which we manipulated the semantic