**BACKGROUND**

In verbal self-monitoring tasks, the semantic context in which items are presented influences naming latencies. When items are blocked within object category (homogeneous context), naming takes longer when compared with items blocked between category (heterogeneous context). Investigating the neuroanatomical correlates of this effect may inform us about the cognitive mechanisms responsible for this difference in behavioural performance.

**METHOD**

• 18 subjects were scanned using perfusion fMRI on a Bruker Medspec 4T system equipped with a TEM head coil, and 8 people participated in a behavioural experiment identical to the fMRI paradigm.

• Subjects overtly named objects presented in either homogeneous or heterogeneous blocks. Responses were recorded.

• There were 50 stimuli in total, taken equally from 5 object categories: animals, fruits, vegetables, clothing & vehicles. 50% of stimuli were visually similar, 50% were visually dissimilar, based on published feature norms.

• The context and visual feature manipulations resulted in 4 conditions:
  1. Homogeneous (i.e. within category) blocks comprising 25 visually similar objects (HetV+).
  2. Homogeneous blocks comprising 25 visually dissimilar objects (HetV-).
  3. Heterogeneous (i.e. between category) blocks comprised of the 25 visually similar objects from condition 1 (HetV+).
  4. Heterogeneous blocks, comprised of the 25 visually dissimilar objects from condition 2 (HetV-).

**PREPROCESSING**

The perfusion time series was obtained through pairwise subtraction of temporally adjacent tagged and non-tagged perfusion images. Preprocessing involved realignment using INTRalign, co-registration to each subject’s T1, normalisation to the MNI template, and smoothing at 10mm FWHM in SPM8.

**DATA ANALYSIS**

Each trial type was modelled independently at the first level. Contrast images for each condition relative to baseline were then fed into a second level 2*2 ANOVA modelling context (Het vs Het) and visual similarity (V+ vs V-).

**RESULTS**

Increased perfusion bilaterally in the hippocampal ROI for homogeneous relative to heterogeneous blocks. Signal rendered on an averaged T1 coronal section of the standardised brain (render at p<.001 unc.).

**ANATOMICAL HYPOTHESES**

1. A stimulus was presented on the screen for 800ms then replaced immediately by a centrally positioned black fixation cross for 2200 ms.

2. Five presentations per block resulted in a total block time of 15 seconds.

3. Between blocks, the screen was blank (white) for 4000 ms, followed by the presentation of a fixation cross 1000 ms prior to the onset of the next block.

4. There were 80 blocks in total, counter-balanced within and between subjects.

**SUMMARY & CONCLUSIONS**

• Blocking items according to semantic category resulted in increased naming latencies, consistent with previous literature.

• This semantic context effect was associated with significantly increased perfusion signal in the left middle temporal gyrus for homogeneous relative to heterogeneous blocks.

• No perfusion changes were observed in the left middle temporal gyrus ROI. This is not consistent with proposals that the semantic block effect occurs via inhibition or excitation of lexico-semantic representations.

• Instead, we report increased signal bilaterally in the hippocampal ROIs, suggesting that the functional mechanism underlying the blocking effect is incremental learning of associations between semantic features & names.

• Although naming latencies were not modulated by the number of shared visual features within a block, there was an interaction with the context in which items were presented at the anatomical level, manifesting as perfusion increases in the anterior medial temporal lobe in particular perirhinal cortex.

**REFERENCES**