HOW DOES SEMANTIC MEMORY INFLUENCE EPISODIC RETRIEVAL?
An Event Related Potential (ERP) study of associative recognition.
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INTRODUCTION
Throughout our lives we acquire general knowledge about the world (semantic memory) whilst also retaining memories of specific events (episodic memory). Whilst these two memory systems are dissociable e.g. in neuropsychological data, it is clear that they interact in normal cognition. Depth of processing is an example of such an interaction: episodic memory retrieval is enhanced when stimuli are processed more deeply (i.e. in a semantically meaningful way). Dual process theories assume that recollection and familiarity contribute to episodic memory. Depth of processing studies suggest that semantic memory benefits episodic retrieval by enhancing recollection. However, the present study supports the opposite finding.

The present study provides strong evidence for the finding that semantic memory can support episodic retrieval by enhancing familiarity.

METHODS
At study randomised lists of category words were displayed each followed by a word pair that required a judgement of its relatedness to the category. At test old/new recognition memory was assessed for 9 types of stimuli (Table 1).

Table 1. Experimental Design
<table>
<thead>
<tr>
<th>PHASE</th>
<th>TASK</th>
<th>STIMULUS</th>
<th>CONDITION</th>
<th>EXAMPLE</th>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>associative learning</td>
<td>category word pair</td>
<td>non-semantic</td>
<td>animal</td>
<td>unrelated</td>
</tr>
<tr>
<td>Test</td>
<td>associative recognition</td>
<td>old/new</td>
<td>non &amp; semantic</td>
<td>animal</td>
<td>non &amp; semantic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>old/new pair</td>
<td>non-semantic</td>
<td>door-script</td>
<td>rabbit-mouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>new</td>
<td>non-semantic</td>
<td>door-script</td>
<td>rabbit-mouse</td>
</tr>
</tbody>
</table>
| EEGs  | recorded from 61 electrodes using linked-mastoid referene (n=15). ERP were formed for correct responses in same and new test pairs.
| Three epochs: 300-600ms, 600-900ms and 1200-2000ms were compared.

RESULTS
Behavioural results show a significant interaction between study (semantic, non-semantic) and test condition (same, rearranged, new). Performance for semantic compared to non-semantic conditions was significantly increased in the old condition, significantly decreased in the rearranged conditions and similar in the new condition.

ERP MEMORY EFFECTS
ERP components elicited for correctly identified old and new items are reported to index:
- Familiarity: early frontal old/new effect
- Recollection: left parietal old/new effect.

SUMMARY
A semantic manipulation of to-be-remembered information (defined in terms of semantically related vs. unrelated word pairs) was employed during an associative recognition memory test.

Behavioural results revealed that associative recognition is significantly enhanced for semantically compared to non-semantic material.

ERP data show for both the semantic and non-semantic condition a significant early bilateral frontal old/new effect (indexing familiarity) as well as a significant left parietal old/new effect (indexing recollection). However, the data reveal a significant increase in familiarity: larger early frontal effects for semantic compared to non-semantic material at 300-600ms, whereas no difference was present in the ERP correlate of recollection - the left parietal old/new effect at 600-900ms (see Fig 6).

CONCLUSION
This study shows a clear interaction between episodic and semantic memory: the data provide strong evidence that semantic memory can support episodic memory retrieval by enhancing familiarity.

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