Supplemental Material

Cued memory reactivation during slow-wave sleep promotes explicit knowledge of a motor sequence

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| SRTT Improvement | Cued-sequence-improvement | Cued-sequence-specific-improvement |
|------------------|---------------------------|-----------------------------------|
| Cued-sequence-recall | Correlation | 0.12 | 0.1 |
| | Significance | p=0.67 | p=0.72 |
| Explicit-cueing-effect | Correlation | 0.03* | 0.005* |
| | Significance | p=0.92 | p=0.99 |

Table 1: Pearson correlations between two explicit knowledge measures and improvement in SRTT performance for sequence trials alone, and SRTT improvement in sequence specific skill (random – sequence). *Spearman’s Rho correlation rather than Pearson’s, on account of the Explicit-cueing-effect not being normally distributed.

| SRTT Cueing Effects | Procedural-cueing-effect | Sequence-specific-cueing-effect |
|---------------------|--------------------------|--------------------------------|
| Cued-sequence-recall | Correlation | 0.03 | -0.24 |
| | Significance | p=0.91 | p=0.4 |
| Explicit-cueing-effect | Correlation | 0.09 | -0.2 |
| | Significance | p=0.75 | p=0.47 |

Table 2: Pearson correlations to examine the relationship between explicit measures and SRTT cueing advantage measures (cued minus un-cued improvement), for sequence trials alone and sequence-specific-skill (random – sequence). *Spearman’s Rho correlation rather than Pearson’s.'
|                             | Experimental-group | Control-group |
|-----------------------------|--------------------|---------------|
|                             | Cued               | Un-cued       | Cued         | Un-cued       |
| SRTT Test blocks            |                    |               |
| Learning (Beginning)        |                    |               |
|                             | Sequence           | 3.8 ± 0.7     | 3.9 ± 0.8    | 4.9 ± 0.8     | 5.5 ± 0.8     |
| Learning (Pre-sleep Test)   |                    |               |
|                             | Sequence           | 7.4 ± 1.2     | 8.6 ± 1.2    | 7.3 ± 1.3     | 8.4 ± 1.5     |
|                             | Random             | 10.8 ± 1.7    | 10.2 ± 1.6   | 9.7 ± 1.6     | 8.5 ± 1.3     |
|                             | Difference         | 3.4 ± 1.2     | 1.5 ± 1.2    | 2.4 ± 1.0     | 0.1 ± 1.7     |
| Retest                      |                    |               |
|                             | Sequence           | 7.1 ± 1.0     | 8.6 ± 1.4    | 7.6 ± 1.5     | 8.2 ± 1.4     |
|                             | Random             | 8.4 ± 1.1     | 9.4 ± 1.2    | 9.3 ± 1.3     | 9.0 ± 1.4     |
|                             | Difference         | 1.3 ± 1.0     | 0.8 ± 1.4    | 1.7 ± 1.3     | 0.8 ± 1.1     |
| Improvement                 |                    |               |
|                             | Sequence           | 0.3 ± 1.3     | 0.0 ± 0.8    | -0.3 ± 1.1    | 0.2 ± 1.0     |
|                             | Random             | 2.4 ± 1.2     | 0.7 ± 1.3    | 0.4 ± 1.2     | -0.6 ± 0.8    |
|                             | Difference         | -2.1 ± 0.9    | -0.7 ± 0.8   | -0.7 ± 1.7    | 0.8 ± 1.3     |

Table 3: Error rates as a percentage of trials across the experiment. With regard to Improvement scores in the final 3 rows, negative figures represent an increase in the number of errors made. Mean ± SEM.

|                             | Frontal  | Central | Parietal |
|-----------------------------|----------|---------|----------|
| CUE PERIOD                  |          |         |          |
| Slow spindles               |          |         |          |
| Correlation                 | -0.05    | 0.43    | 0.29     |
| Significance                | p=0.86   | p=0.17  | p=0.44   |
| Slow oscillation power      |          |         |          |
| Correlation                 | 0.11     | -0.22   | 0.08     |
| Significance                | p=0.8    | p=0.51  | p=0.83   |
| NO-CUE PERIOD               |          |         |          |
| Slow spindles               |          |         |          |
| Correlation                 | 0.08     | -0.14   | -0.24    |
| Significance                | p=0.79   | p=0.66  | p=0.53   |
| Slow oscillation power      |          |         |          |
| Correlation                 | 0.32     | 0.04    | 0.05     |
| Significance                | p=0.3    | p=0.9   | p=0.9    |

Table 4: All correlations performed between the procedural-cueing-effect (un-cued minus cued sequence RT improvement) and EEG features of slow spindle laterality and slow oscillation power.
### Table 5: Correlations between the procedural-cueing-effect (un-cued minus cued sequence RT improvement) and slow oscillation power and slow spindles.

|                   | Frontal | Central | Parietal |
|-------------------|---------|---------|----------|
| **Slow Oscillation Power** |         |         |          |
| **CUE period**    | Correlation | 0.11 | -0.22 | 0.08 |
|                   | Significance | p=0.7  | p=0.51 | p=0.83 |
| **NO-CUE period**| Correlation | 0.32 | 0.04 | 0.05 |
|                   | Significance | p=0.3  | p=0.9  | p=0.9  |
| **Slow Spindles** |         |         |          |
| **CUE period**    | Correlation | -0.05 | 0.43  | 0.29 |
|                   | Significance | p=0.86 | p=0.16 | p=0.44 |
| **NO-CUE period**| Correlation | 0.08 | 0.14 | -0.24 |
|                   | Significance | p=0.79 | p=0.66 | p=0.53 |

### Table 6: Correlations between the explicit-cueing-effect (un-cued minus cued sequence recall) and lateralisation of fast and slow spindles

|                   | Frontal | Central | Parietal |
|-------------------|---------|---------|----------|
| **Slow Spindles** |         |         |          |
| **CUE period**    | Correlation | 0.03 | 0.2  | -0.53 |
|                   | Significance | p=0.9  | p=0.55 | p=0.18 |
| **NO-CUE period**| Correlation | -0.32 | 0.01 | -0.33 |
|                   | Significance | p=0.35 | p=0.99 | p=0.42 |
| **Fast Spindles** |         |         |          |
| **CUE period**    | Correlation | 0.04 | 0.15 | -0.43 |
|                   | Significance | p=0.9  | p=0.67 | p=0.29 |
| **NO-CUE period**| Correlation | 0.1  | 0.13 | -0.43 |
|                   | Significance | p=0.74 | p=0.7  | p=0.3  |

Movie 1: Movie of the serial reaction time task

[http://personalpages.manchester.ac.uk/staff/plewis/SRTT_video_small.mp4](http://personalpages.manchester.ac.uk/staff/plewis/SRTT_video_small.mp4)