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Supplemental Information

Sleep Spindle Refractoriness Segregates Periods of Memory Reactivation

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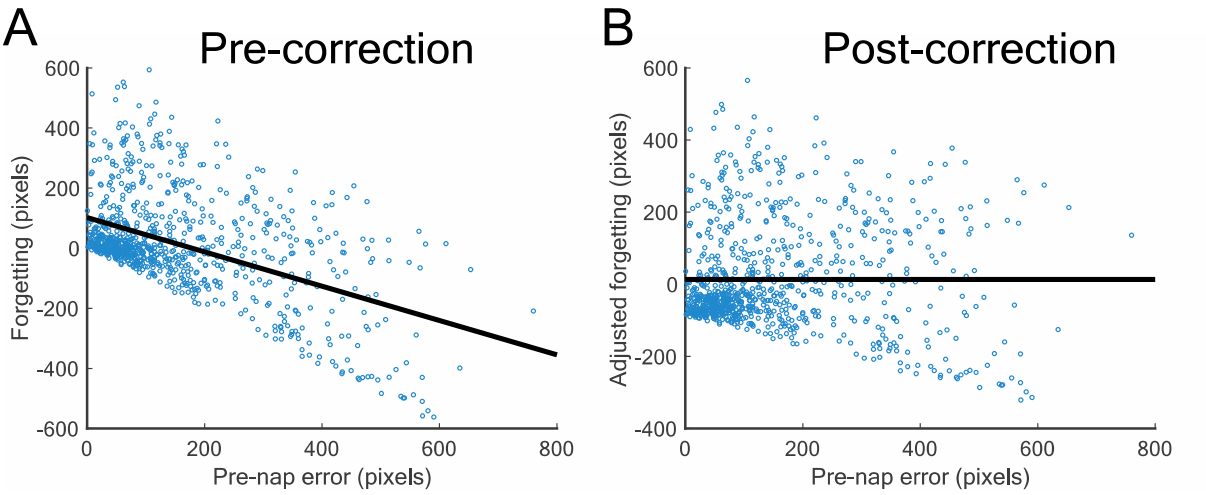

Figure S1. Residual analysis used in the forgetting metric. Related to Figure 1. (A) Pre-nap error significantly predicts forgetting (post- – pre-nap error). **(B)** Corrected (residual) forgetting values after regressing out pre-nap error.

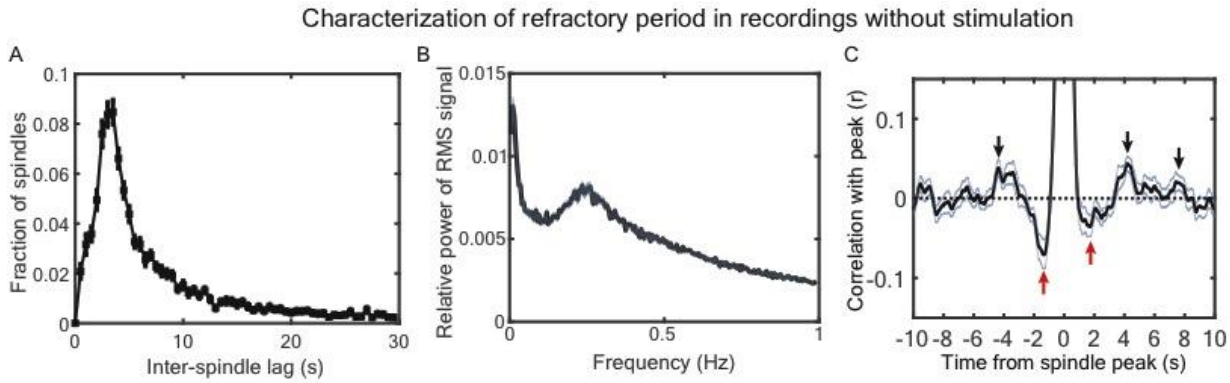

Figure S2. Spindle refractory period analyses on non-TMR data. Related to Figure 3. A-C represent a variant of the graphs from Figure 3A, B, and D using data from an experiment with no TMR cues (*N*=28). We relied on data from the Pz electrode because EEG acquisition did not include CPz. All error measurements indicate SEM.

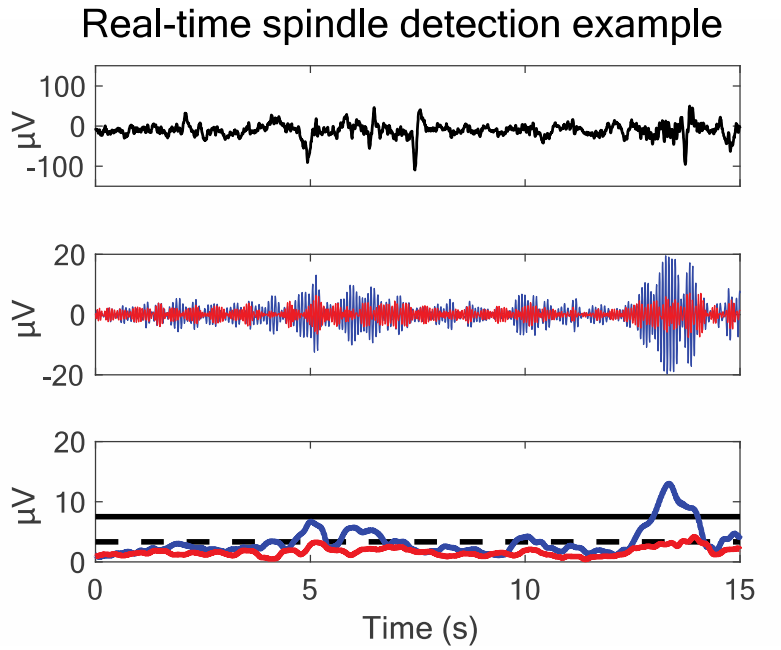

Figure S3. Example of a spindle detected by online spindle algorithm. Related to Figure 4. (Top) Raw EEG signal. **(Middle)** Signals filtered in the sigma (11-16 Hz, blue) and lower beta (16-21 Hz, red) bands. **(Bottom)** RMS sigma (blue) and lower beta (red) signals along with the first (dashed black) and second (solid black) spindle thresholds, which were multiplications of 2 and 4.5 times the mean lower beta power, respectively. Any sigma signal above the first threshold between 0.5 – 3 s and above the second threshold at any point was considered a spindle. One spindle was thus detected near the end of the interval.

Time in each stage (min)		Wake	S1	S2	S3	REM
Exp 1	Mean	27.69	5.78	24.25	20.81	3.08
	SEM	3.96	0.69	2.90	4.20	1.07
Exp 2	Mean	21.22	5.97	22.69	20.16	4.28
	SEM	3.51	0.95	2.54	3.23	1.35
Exp 3	Mean	21.43	5.83	26.68	17.45	4.98
	SEM	3.59	0.56	2.49	2.41	1.53
Mean sounds per stage						
Exp 1	Mean	4.17	2.61	43.11	120.50	0.00
	SEM	1.50	0.97	13.24	19.91	0.00
Exp 2	Mean	1.81	1.44	97.31	217.25	0.00
	SEM	0.70	0.83	26.90	30.97	0.00
Exp 3	Mean	1.30	0.80	35.90	54.30	0.85
	SEM	0.42	0.30	3.97	9.88	0.43

Table S1. Sleep staging and cue quantification. Related to Figures 1 & 4. Mean amount of time in each sleep stage (min ± SEM) is displayed together with the number of cues per stage for Experiments 1, 2, and 3.

Autocorrelation peaks

Peak time (s)	Peak type
-8.414	Negative
-7.277	Negative
-5.941	Positive
-4.727	Negative
-3.240	Positive †
-1.480	Negative
0.000	Positive
1.480	Negative
3.016	Positive
4.496	Negative
5.547	Positive
7.723	Positive
8.371	Negative

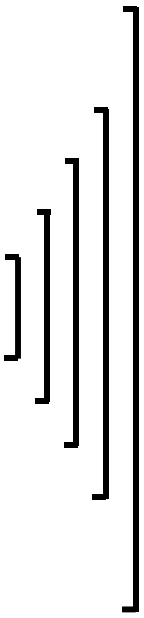

Table S2. Timing of autocorrelation peaks in sigma RMS signal. Related to Figure 3. Shown are all positive and negative autocorrelation peaks with each time point and $t = 0$ from Figure 3D. Brackets indicate approximately symmetric peaks around $t = 0$. All peaks are significant at $p < 0.05$ level, except †, where $0.05 < p < 0.1$.