

Supplementary Materials for
Sleep onset is a creative sweet spot

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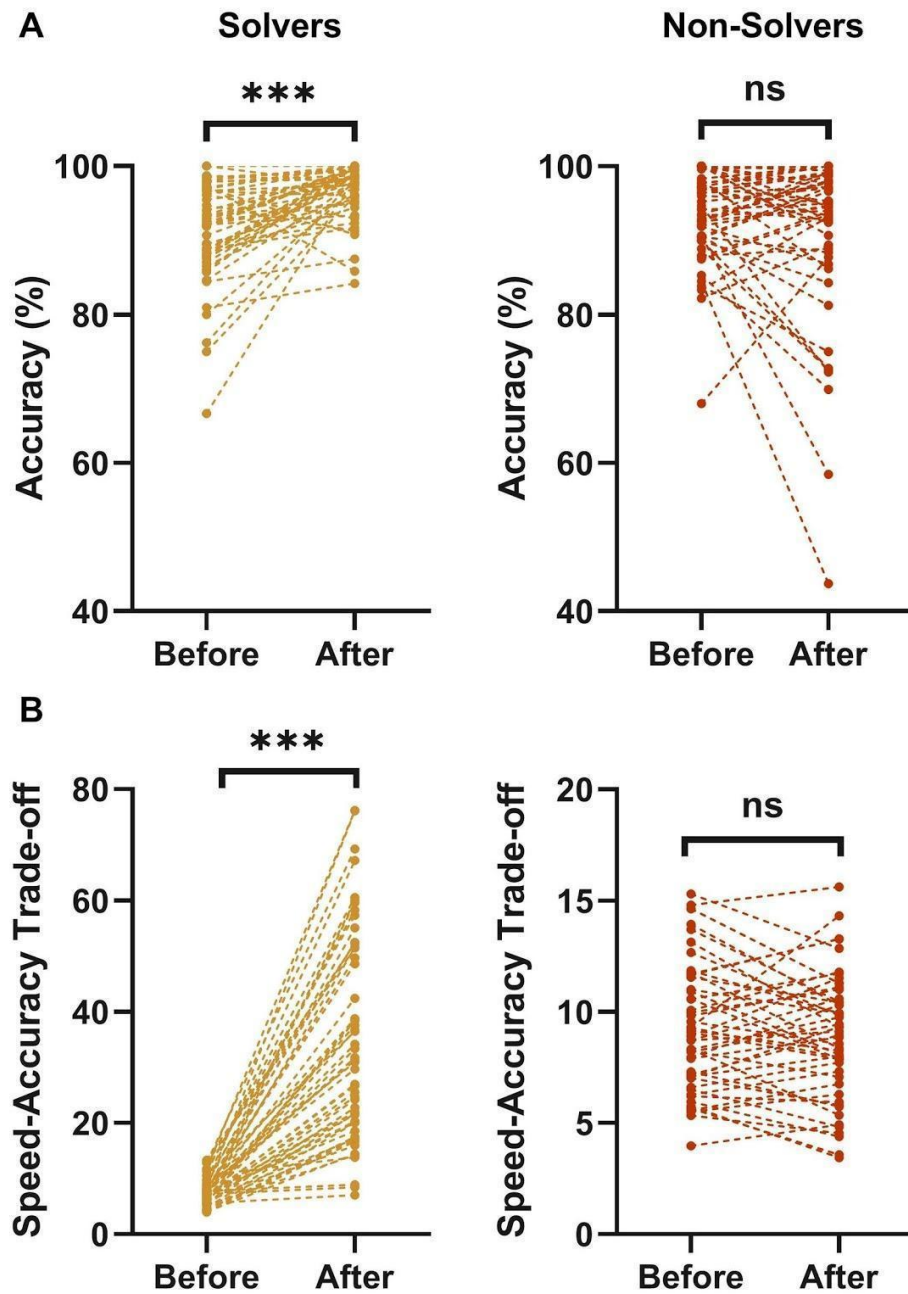
Other Supplementary Material for this manuscript includes the following:

Movie S1

Supplementary Text

Examples of hypnagogic reports

- “I saw geometric shapes, like the old screensavers on computers where there was a square that became a triangle, then a round. Something like that, blurry, with colours.”
- “I saw lots of numbers in black with little triangles. At first, they were far away, and then they came closer. Then, it was calmer, the sea, with little boats in the sand. And then I saw the strings of my guitar and I played piano with the keyboard.”
- “I was in wheat fields.”
- “At one point, I saw a horse in the hospital. There was also a man who was doing the same experiment as me, who was much older and who had a kind of plastic helmet on his face.”
- “I was hearing a sound that said 1,4, 9.”
- “I had the feeling of being at the water's edge, no wind, there were airy sounds, as in a temperate forest in summer.”
- “I was inside the Colosseum in Rome when it was still in its prime. I also saw concentric shapes that were shrinking and certain figures that I called functions that I was trying to identify. One that really struck me was what I called the oscillator that turned one figure into another and then back to the original one.”



*Fig. S1. Performances before and after Eureka. Accuracy (A) and speed-accuracy trade-off (B) prior and after “Eureka” for all solvers (left panel, $N = 53$) and non-solvers (right panel, $N = 50$). ***, $p < 0.001$; n.s. for non-significant differences (Wilcoxon signed-rank for comparisons between two paired samples).*

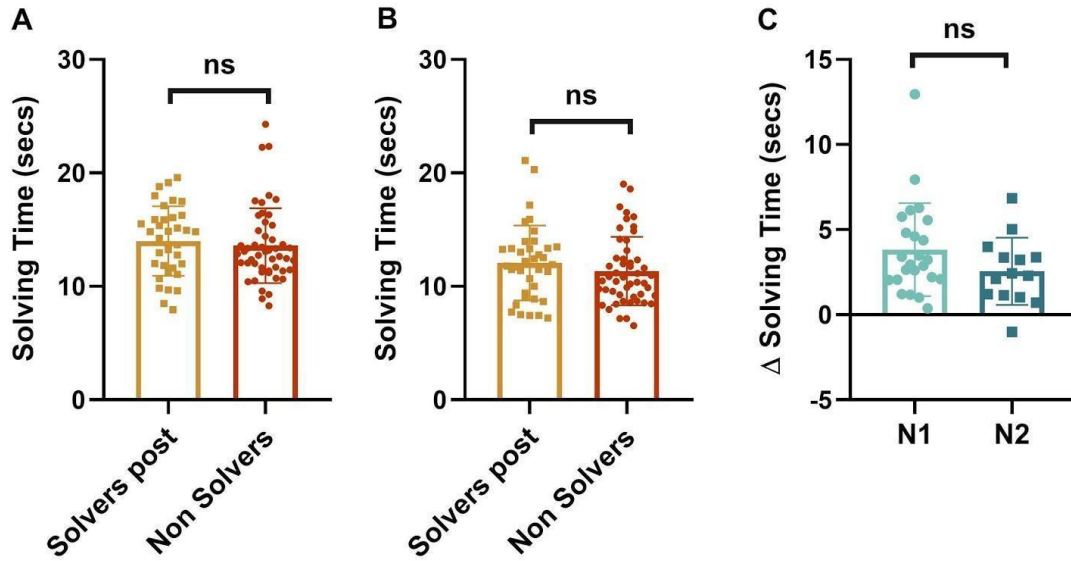


Fig. S2. No evidence for an implicit knowledge before Eureka Mean Solving Time on the last block of the Pre phase (A), and on the Post phase until the Eureka moment (B) for both solvers post and non-solvers (here Eureka was approximated as the mean Eureka moment of solvers post, namely trial 94). (C) Difference in solving time (last block of pre minus first block of post) for N1 and N2 groups. *n.s.* for non-significant differences between groups (Wilcoxon).

	Wake	N1	N2	P
Demographic data				
Age	23.22 ± 3.57	23.17 ± 3.56	24.79 ± 4.49	0.43
Laterality (right-handed), %	81.63	79.17	78.57	0.95
Gender, women, %	77.55	58.33	85.71	0.12
Educational level	6.65 ± 1.57	6.63 ± 1.82	6.79 ± 1.22	0.41
Epworth Score	9.47 ± 2.65	9.21 ± 1.69	9.14 ± 2.21	0.56
Field of expertise (1-4)	2.02 ± 1.22	2.04 ± 1.04	2.08 ± 1.0	0.86
Cofactors				
Accuracy <i>Pre</i> , %	94.51	92.78	93.69	0.76
Solving Time <i>Pre</i> , secs	13.93	15.24	15.21	0.24
PVT RT <i>Pre</i> , msecs	303.3 ± 58.9	294.3 ± 35.2	312.8 ± 36.1	0.23
PVT RT <i>Post</i> , msecs	281.1 ± 26.4	281.7 ± 30.4	304.4 ± 38.5	0.03+
Motivation (1-5)	3.43 ± 1.08	3.21 ± 1.24	3.08 ± 1.19	0.49
Sleepiness (1-5)	2.50 ± 1.07	2.90 ± 0.85	2.58 ± 1.00	0.40
Concentration (1-5)	3.29 ± 0.76	3.04 ± 1.05	3.31 ± 0.85	0.57
Boredom (1-5)	1.84 ± 0.92	2.02 ± 1.04	2.58 ± 0.81	0.03+
Enigma expertise (1-3)	1.37 ± 0.67	1.54 ± 0.72	1.29 ± 0.61	0.36
Sleep data				
Wake duration, min	21.60 ± 1.19	20.15 ± 1.76	15.43 ± 4.28	<0.001\$
N1 duration, min	0 ± 0	1.35 ± 1.20	1.79 ± 2.11	<0.001*
N2 duration, min	0 ± 0	0 ± 0	4.18 ± 2.94	<0.001#
Sleep latency, min	NA	14.46 ± 4.45	11.18 ± 5.04	0.04
MSE data				
MSE duration, min	0.16 ± 0.25	1.90 ± 1.13	2.30 ± 1.89	<0.001*
Wake-to-MSE transitions, N	2.16 ± 3.50	14.29 ± 9.82	15.57 ± 10.96	<0.001*
Bottle data				
% of subjects with drop	34.69	79.17	78.57	<0.001*
MSE duration before fall, secs	3.0 ± 6.38	64.77 ± 43.51	75.11 ± 61.89	<0.001*
MSE bouts before fall, N	0.83 ± 1.79	8.35 ± 6.24	9.16 ± 6.46	<0.001*
Last MSE before fall, secs	1.39 ± 2.17	10.31 ± 7.28	8.21 ± 6.8	<0.001*

Table S1. Demographic and sleep characteristics of each group. Measures are presented as the mean ± the standard deviation or in percentages. $N_{Wake} = 49$, $N_{N1} = 24$, $N_{N2} = 14$. Educational

level is scored according to the International Standard Classification of Education (45). Fields of expertise are categorized as follows: 1 for Sciences, 2 for Humanities, 3 for Arts, and 4 for Others. Enigma expertise is self-reported with 1 for No, 2 for A little, and 3 for Yes. Subjective ratings of motivation, sleepiness, concentration, and boredom were collected at the start of the Post phase. MSE stands for Micro-Sleep Episodes, and MSE duration refers to MSE cumulated time. *p*-values are displayed (ANOVA or Kruskal-Wallis Tests when appropriate: ordinal data or violation of normality assessed with the Shapiro-Wilk test) and significant differences between groups are highlighted in bold. When appropriate, post-hoc comparisons (Tukey-Kramer) have been computed and we report significant difference between Wake and N2 (+), Wake and N1/N2 (*), N2 and Wake/N1 (#), and between all groups (\$).

Coefficient	Estimate	Standard-Error	Chi-squared	P-Value
Sleep Group	-0.64	0.27	6.24	0.01 (*)
Delta_Power	-0.71	0.31	5.99	0.01 (*)
Alpha_Power²	-0.72	0.30	8.11	0.004 (**)

Table S2. Predicting insight with pre-nap, nap and post-nap features. Estimates, Standard Errors, Chi-Squared and P-values for Model 3 (Insight ~ 1 + Sleep_Group + Delta_Power + Alpha_Power²), the best fitting model obtained in our analyses. Significant effects are highlighted in bold fonts.

Supplementary Video. Examples of hypnagogic experiences reported by participants.

Participants reported their mental content either directly after dropping the bottle and at the end of the break.

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