

Weakly encoded memories benefit from reactivation during sleep following a memory suppression task

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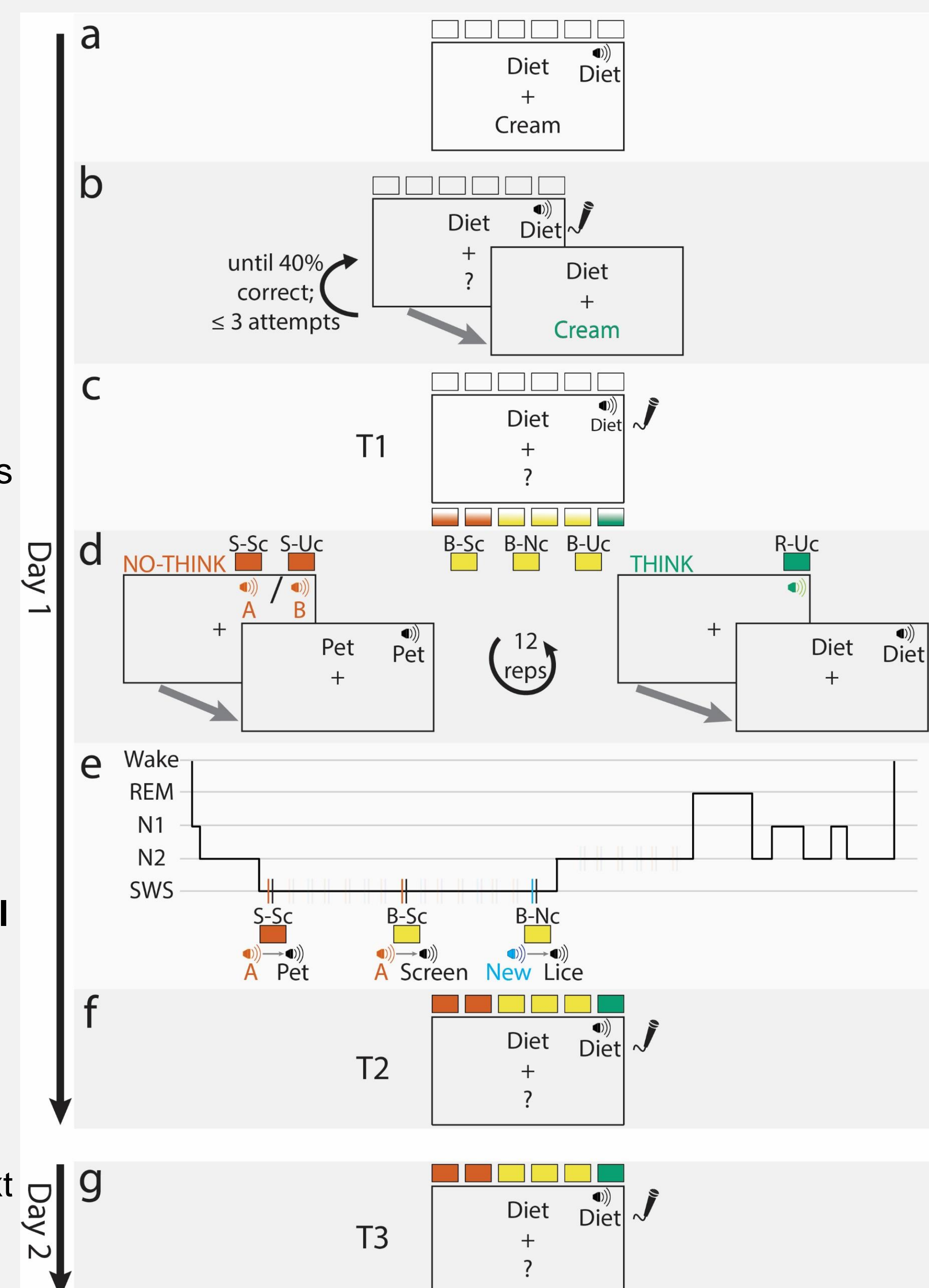
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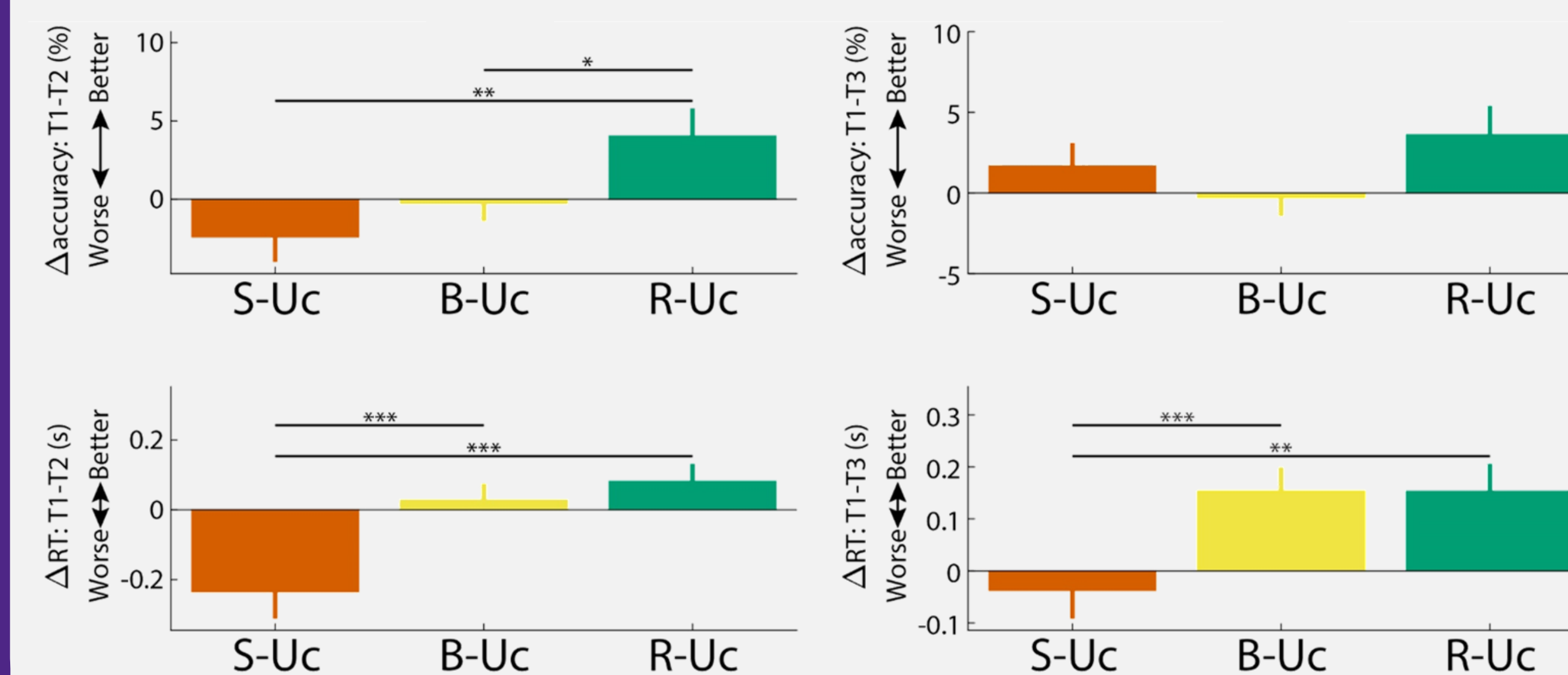
Introduction & Methods

- ❖ Sleep's role in memory consolidation is widely acknowledged, but its role in the weakening of memories is still debated. Like enhancement, memory weakening is evolutionarily beneficial and makes an integral contribution to cognition.
- ❖ In this study, we sought evidence on whether sleep-based memory processing can enhance memory suppression. To bias memory processing during sleep, we used targeted memory reactivation (TMR), a procedure involving the unobtrusive presentation of learning-related cues, thereby benefiting consolidation.
- ❖ Participants ($N = 31$) first linked 72 hint words with associable target words (e.g., Diet – Cream) up to criterion (**panels a & b**). After a final test (T1; panel c), pairs were divided to six groups of 12 pairs each (see table).
- ❖ Think-no-think manipulation: participants were shown the hint word and required to either recall the target word (group R-Uc; see table) or suppress it (groups S-Uc & S-Sc; **panel d**). Instructions were conveyed by arbitrary sounds (one per group). Groups B-Sc, B-Nc & B-Uc were not presented.
- ❖ Participants then napped for 90 minutes, during which sounds were presented followed by hint words (**panel e**).
- ❖ Sounds were either previously acquired suppression cues or novel sounds; words belonged to baseline or previously-suppressed groups (see table).
- ❖ Memory for all pairs was then tested (T2; **panel f**). Participants were instructed to try their best for all groups.
- ❖ This test was repeated the next day (T3; **panel g**).

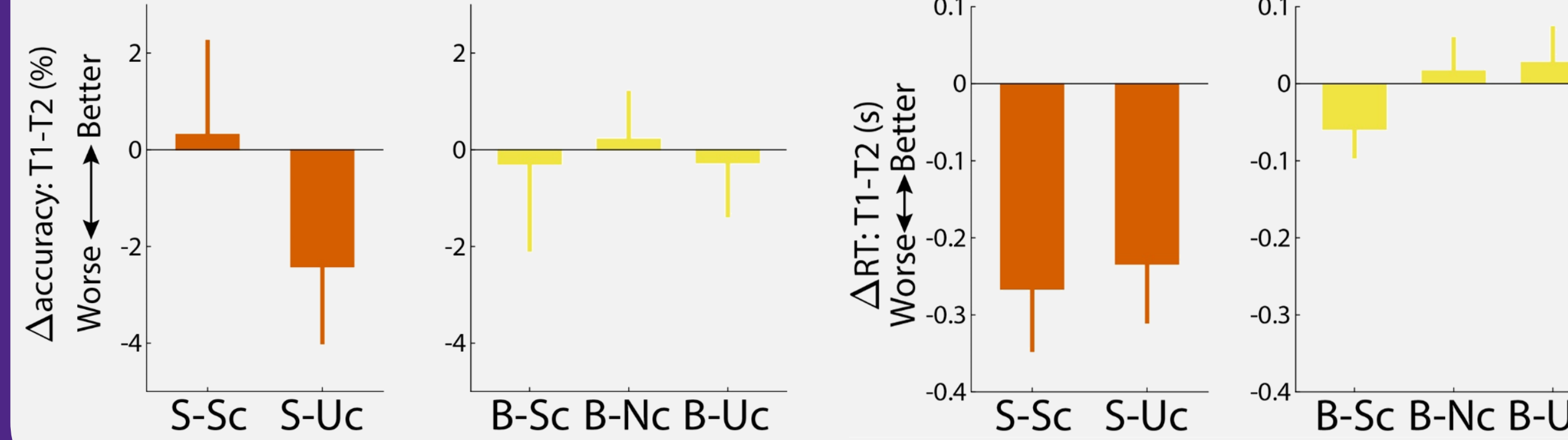


Condition	Training	Think / No-think	Sleep Cuing
Suppression + Supp. cues	S-Sc	No-think	Supp. sound
Suppression (uncued)	S-Uc	No-think	–
Respond (uncued)	R-Uc	Think	–
Baseline + Supp. cues	B-Sc	–	Supp. sound
Baseline + Novel cues	B-Nc	–	Novel sound
Baseline (uncued)	B-Uc	–	–

The think-no-think manipulation effectively impacted memory retrieval...



But the suppression effect was not enhanced by targeted memory reactivation (TMR)



Take Home

- No suppressive effect of sleep cues on memory.
- This is possibly due to specific aspects of the design such as the parameters governing the interaction between sounds during sleep.
- Surprisingly, memory was improved for cued pairs that were weakly learned before sleep.
- These findings complement the literature suggesting that sleep reactivation benefits weak memories more than it does strong ones.

Color code: Suppression Baseline Respond

Unexpectedly, weak memories are enhanced by reactivation, whether they were previously suppressed or not

