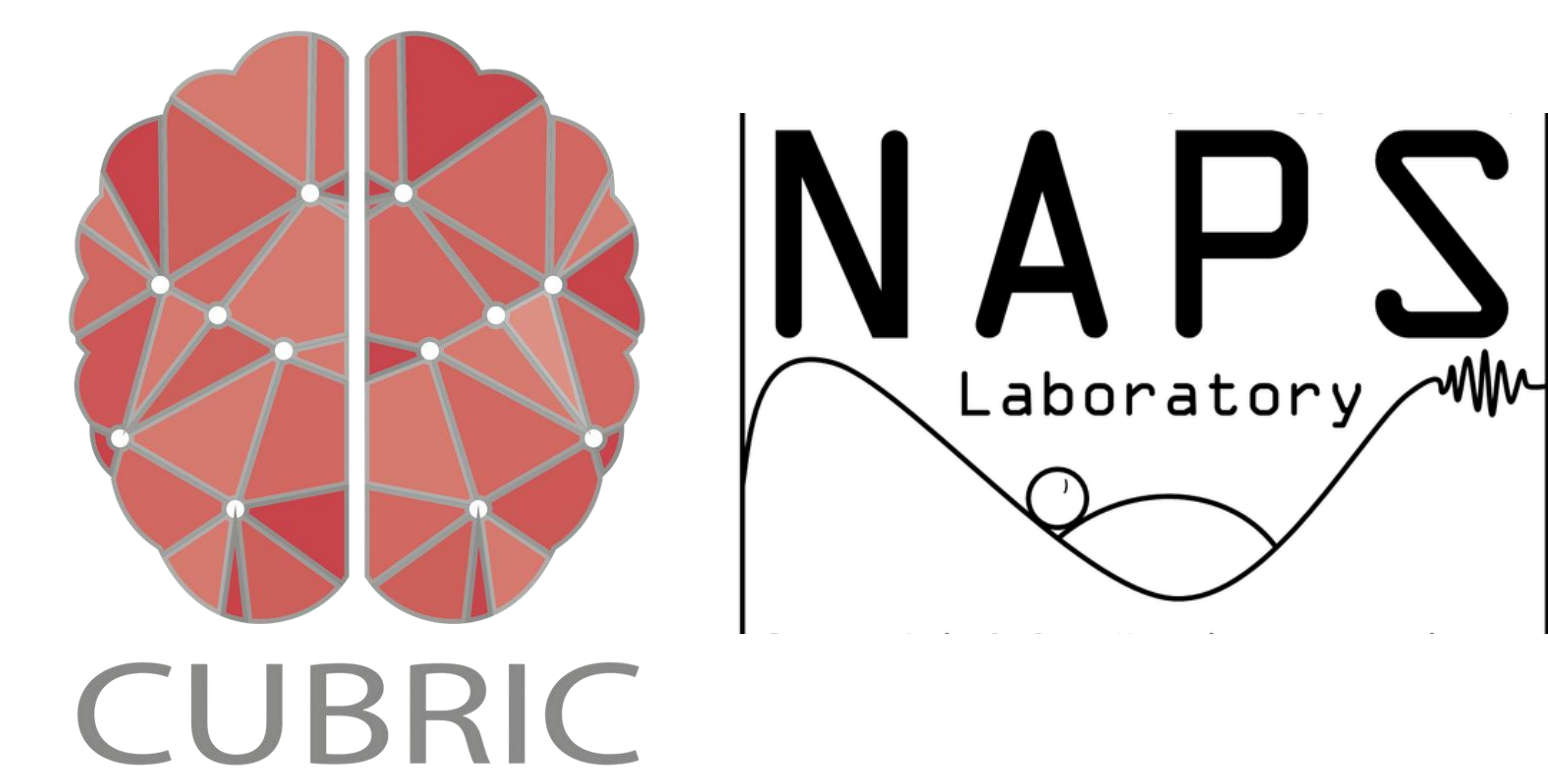


The effect of REM TMR on emotion processing and memory of negative stimuli

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Background

Hutchison et al., 2021:

- TMR in REM, but not SWS selectively reduces subjective arousal responses.
- Effect stronger for more negative memories.

Greco et al., 2024 (preprint):

- Heart rate deceleration (HRD) is reduced for cued items.
- Subjective arousal ratings are reduced for highly arousing images.

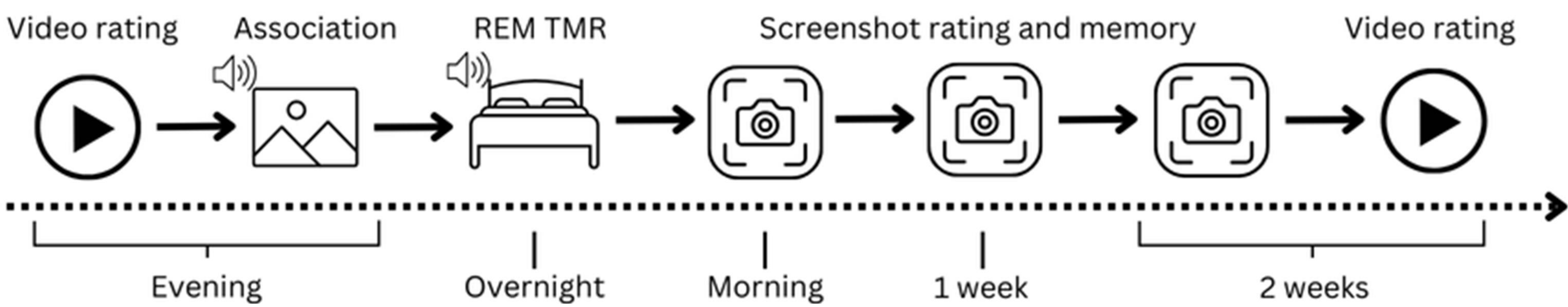
Picard-Deland et al., 2021:

- Targeted memory reactivation (TMR) applied in REM sleep improves whole-body procedural learning.

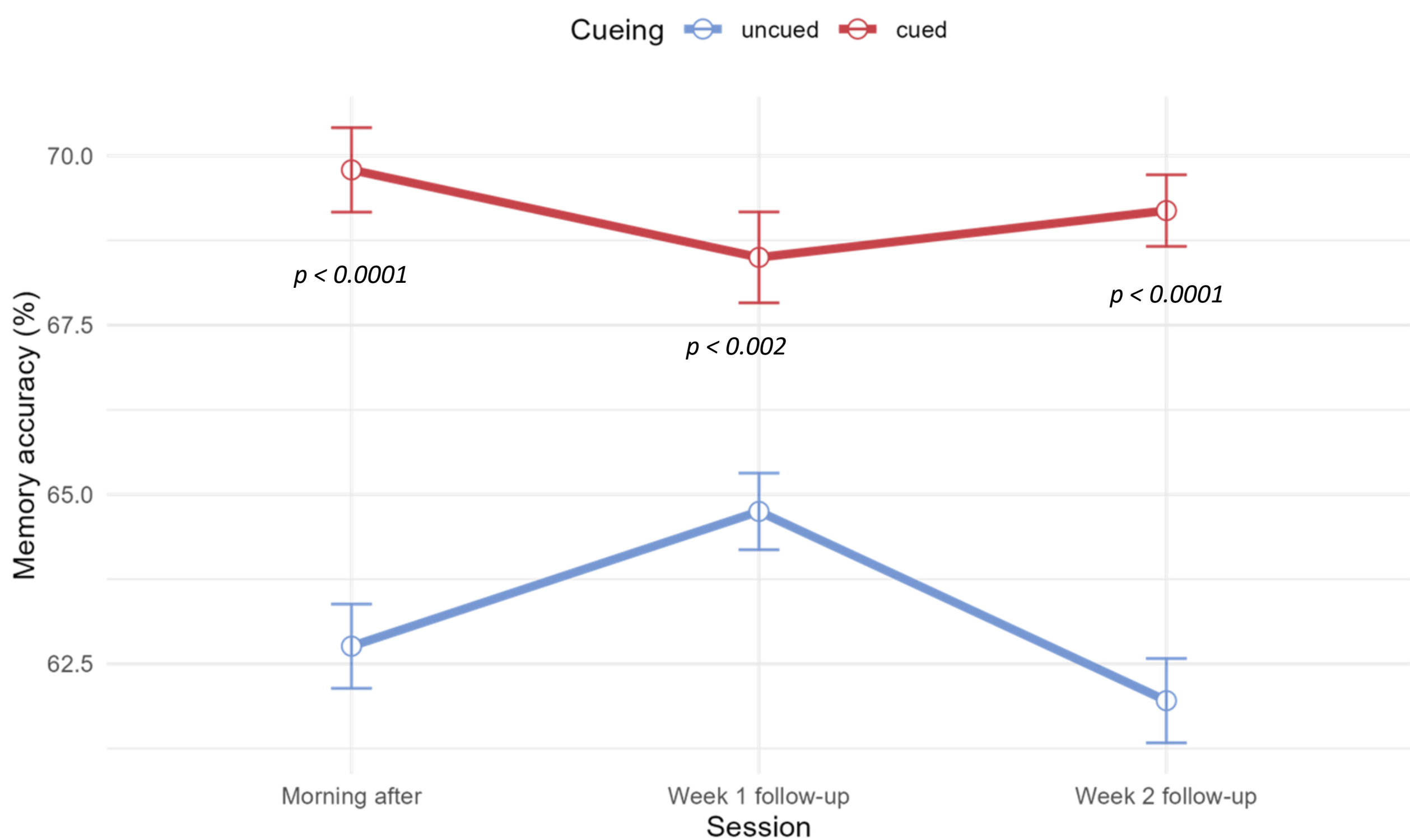
In this study

- We extend previous work by using videos instead of images.
- We include a follow-up session after 2 weeks to see if the effect persists over time.
- We include ECG and GSR recordings at all sessions to see how the physiological response changes over time.
- We add valence ratings and a memory task.

Protocol [N = 25]



Memory results

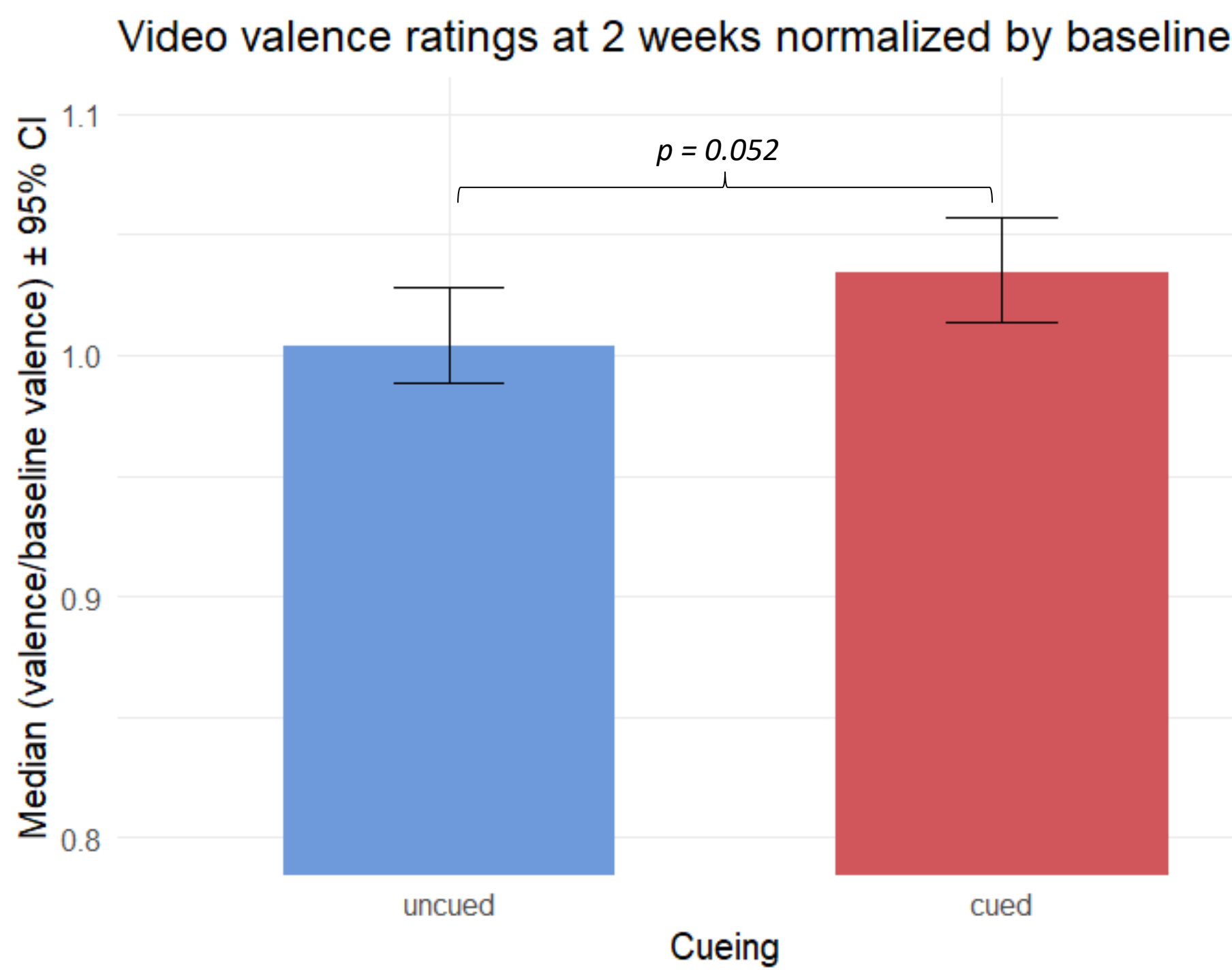


memory ~ cueing + (cueing|subject)

A linear mixed model showed a **significant positive effect of cueing** on mean memory performance (estimate = 0.056, $t = 2.35$, $p \approx 0.02$), indicating **better memory for cued items**. Random intercepts and slopes for cueing were included for subjects to capture individual variability.

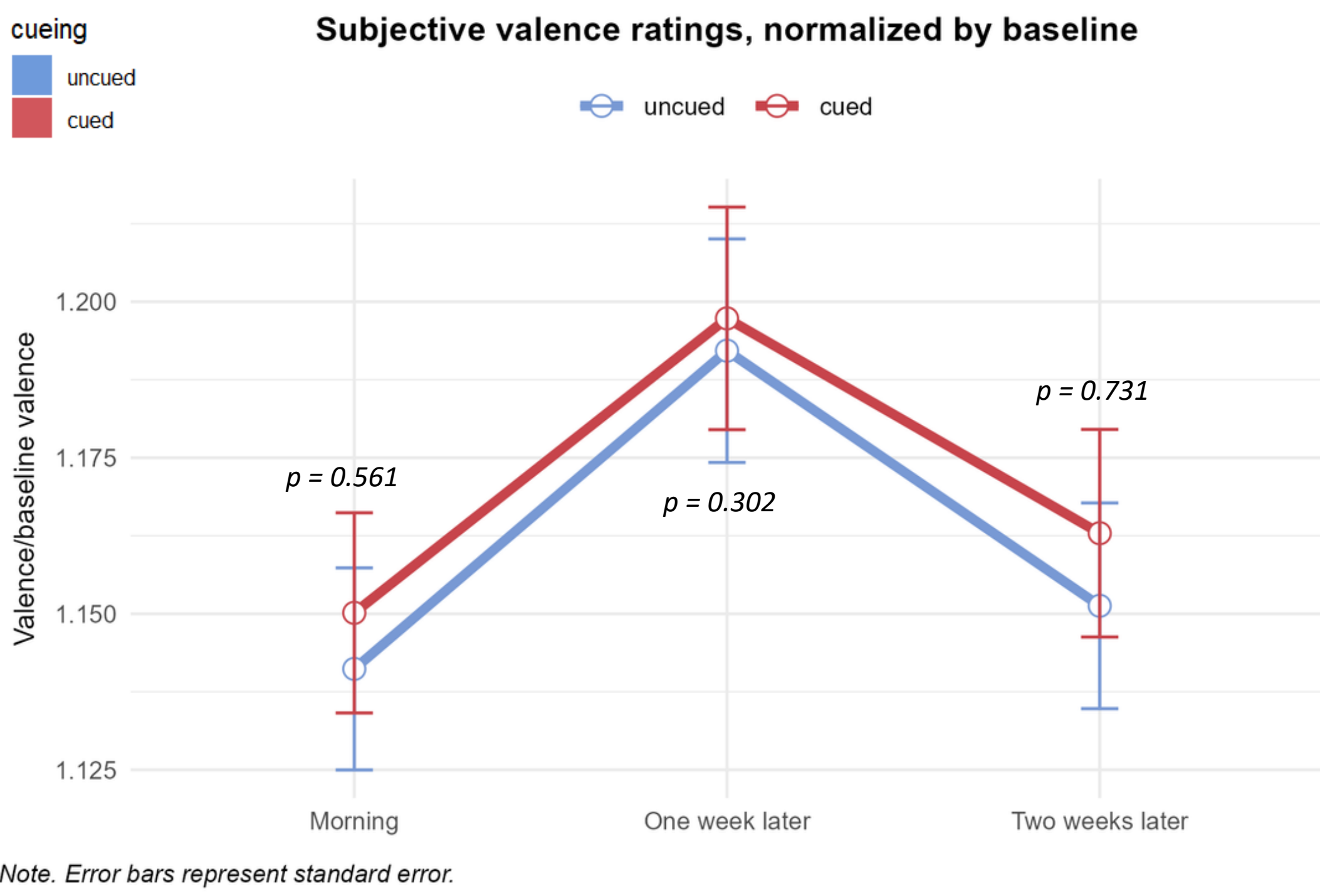
Effect on emotional component

Subjective valence scores over time



FULL VIDEO VALENCE

There was a marginally significant ($p = 0.052$) difference between cued and uncued valence ratings (normalized by baseline) 2 weeks post cueing, suggesting that cueing pushed subjective valence ratings towards less negative/more positive.



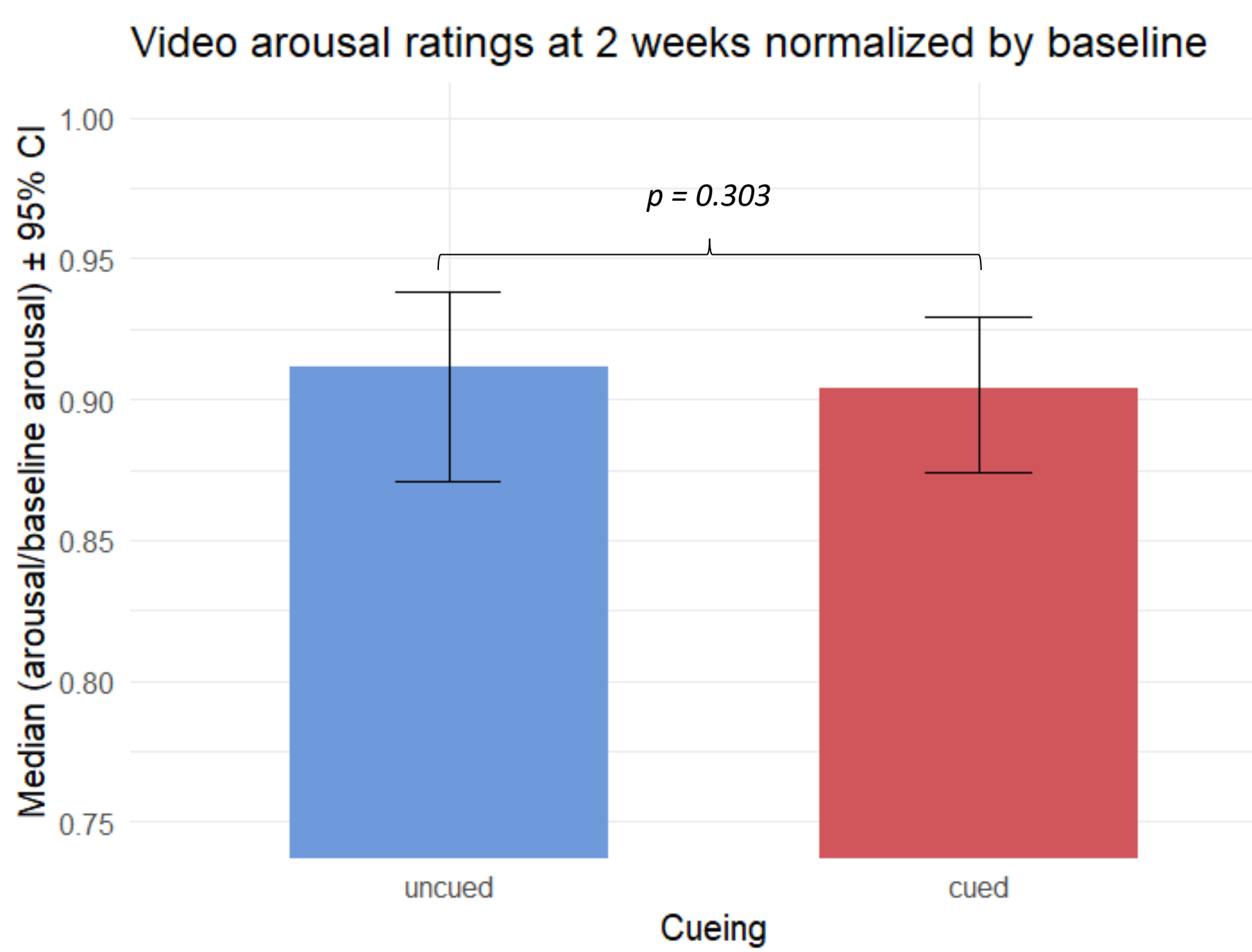
Note. Error bars represent standard error.

SCREENSHOT VALENCE

normalized valence ~ cueing + (1|stimulus) + (cueing|participant)

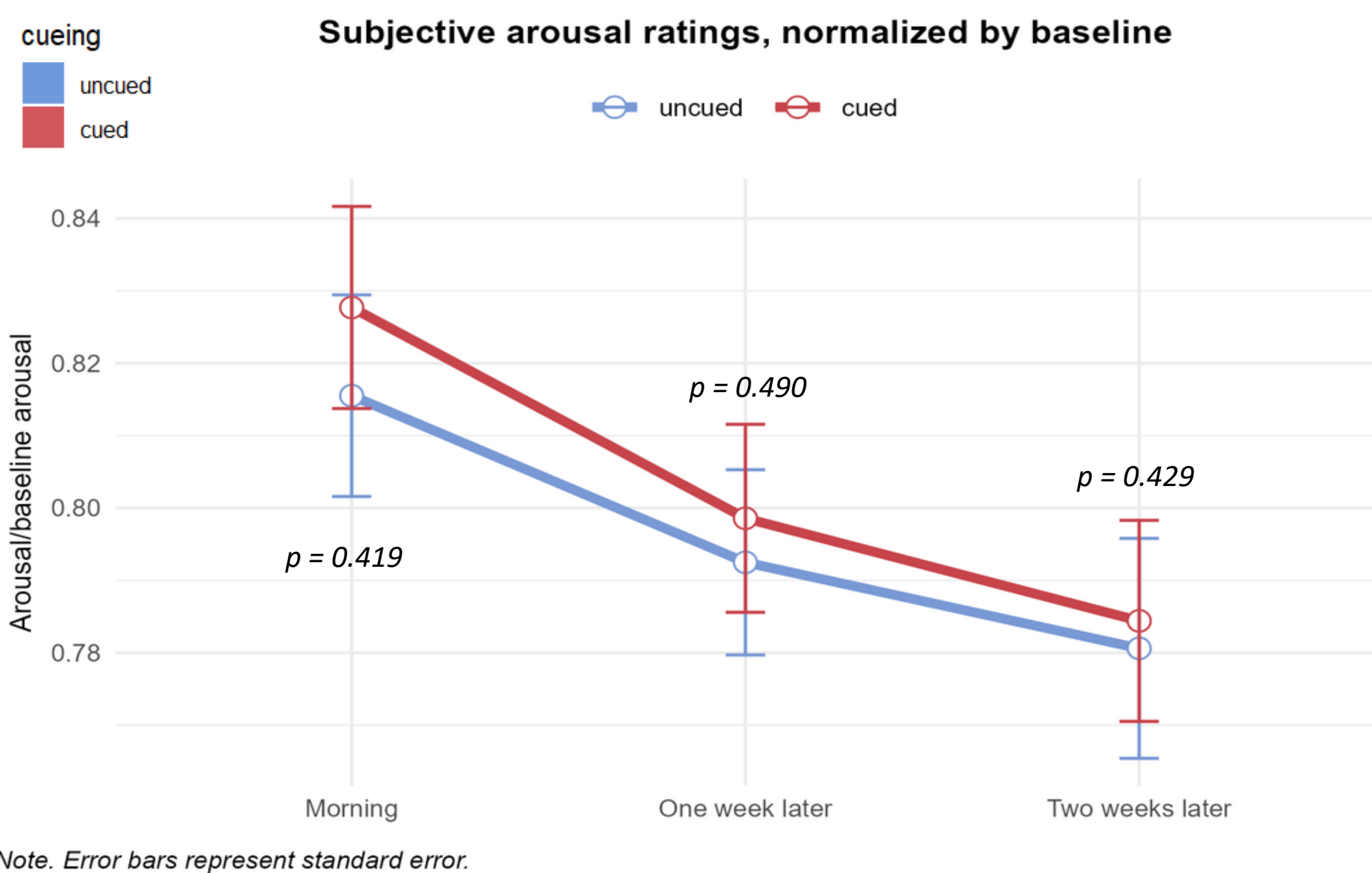
Cueing had no significant effect on normalized valence ratings (estimate = 0.009227, $t = 0.374$, $p = 0.708$). Random intercepts for stimulus and random intercepts and slopes for participants captured data variability.

Subjective arousal scores over time



FULL VIDEO AROUSAL

There was no significant difference ($p = 0.303$) between cued and uncued normalized arousal ratings at 2 weeks, suggesting that cueing did not reduce subjective arousal.



Note. Error bars represent standard error.

SCREENSHOT AROUSAL

normalized arousal ~ cueing + time + TMD + (cueing|stimulus) + (cueing|participant)

Time had a significant negative effect on normalized arousal ratings (estimate = -9.448e-05, $t = -2.923$, $p = 0.004$). Cueing had no significant effect (estimate = 4.283e-03, $t = 0.270$, $p = 0.787$). Total mood disturbance (TMD) had a significant negative effect (estimate = -1.916e-03, $t = -2.454$, $p = 0.014$). Random intercepts and slopes for participant and stimulus captured data variability.

References

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- Hutchison, I. C., et al., (2021). Targeted memory reactivation in REM but not SWS selectively reduces arousal responses. Communications Biology, 4(1), 404.
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