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The Effect of Sleep and Emotion on Pattern Separation

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The Effect of Sleep and Emotion on Pattern Separation

Alanna N. Osmanski, Colleen M. Parks, Laisha Sanchez Espitia

INTRODUCTION

- I. Slow wave sleep has been considered an important aspect of memory consolidation, most commonly through a model known as **active systems consolidation**¹
 - I. Newly encoded memories are repeatedly activated, driven by slow oscillations that occur in the neocortex.
- II. A widely accepted view is that emotional memories are preferentially consolidated during sleep making them easily obtainable for retrieval.
 - I. However, recent meta-analyses of sleep, emotion, and memory have suggested that this effect may not be as robust as we once thought^{2,3}.
- III. A relatively new way to investigate sleep and emotional effects on memory is with a pattern separation task called the Mnemonic Similarity Task (MST)⁴.
- IV. The current study examined pattern separation and item recognition using an emotional variation of the MST consisting of negative and neutral images.

METHOD

- I. Participants (N=92) viewed a series of 120 negative and 120 neutral images and made valence judgements by rating each image.
- II. The recognition task took place 12-hours after the incidental encoding phase for the sleep and wake groups, and 1-hour after the incidental encoding phase for the AM and PM control groups.
 - I. Participants viewed a series of 120 old images (targets), and an additional 240 new images (new and lures).
 - II. For each image, participants identified the image as being “old” or “new” on a 6-point confidence scale.

Study



Negative | 2 3 Positive

Test

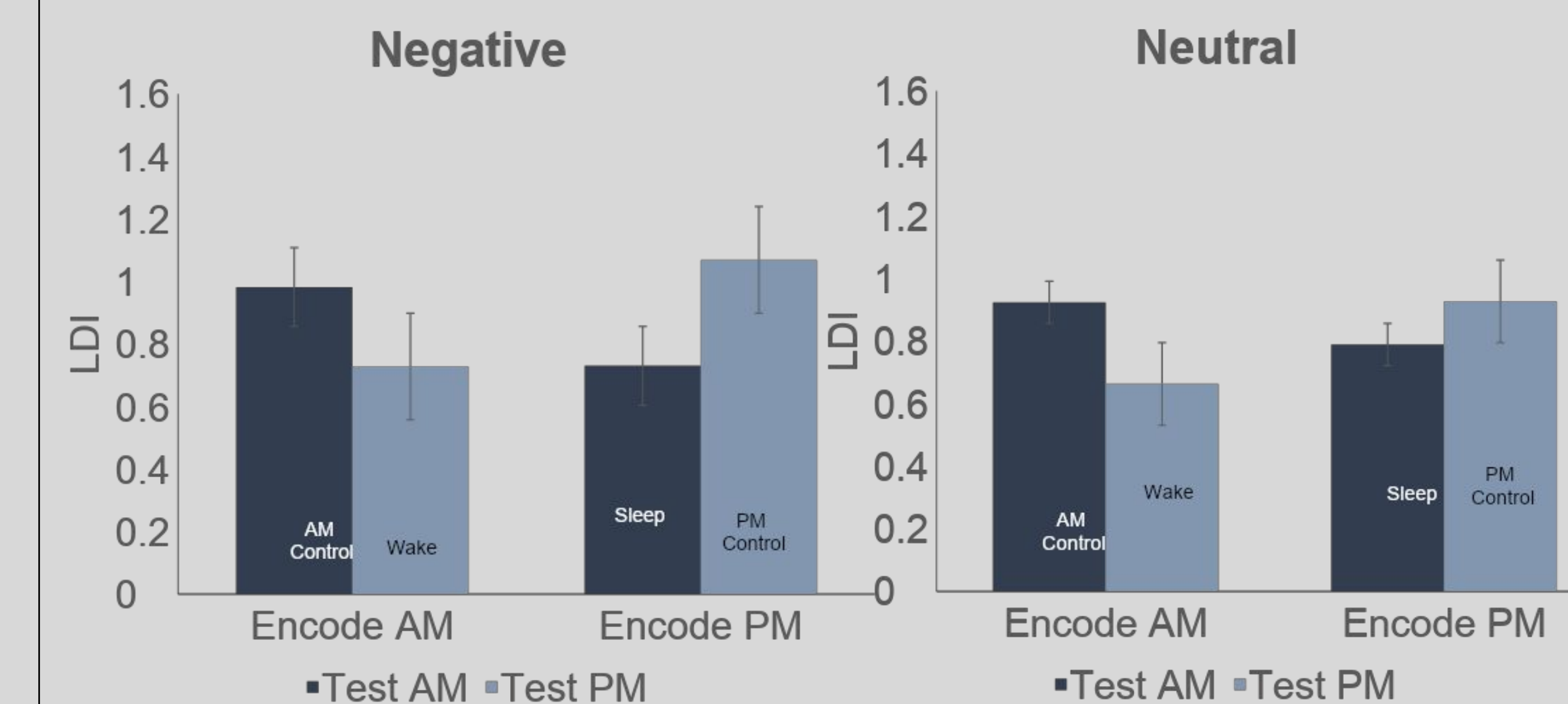


Sure New | ... 6 Sure Old

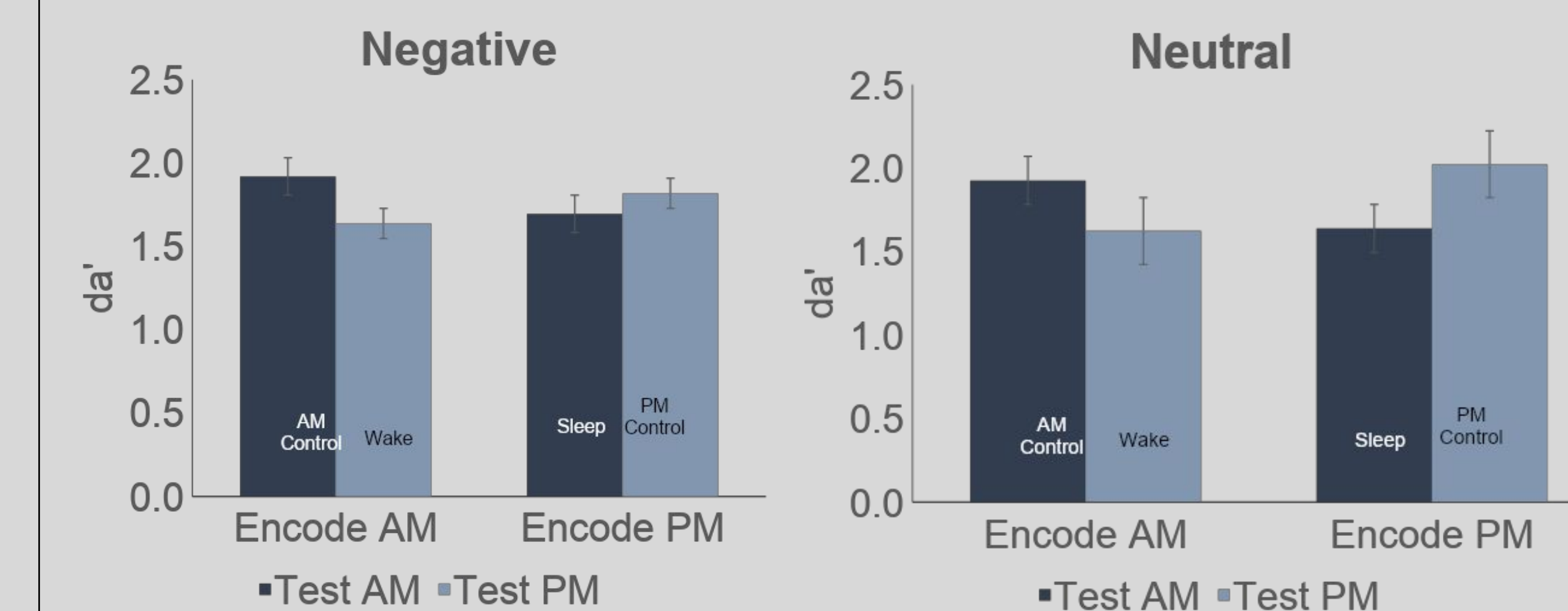
RESULTS

- I. We ran Bayesian ANOVAs to examine interactions between encoding time, test time, emotion, and test type item recognition and pattern separation.
- II. All indicated a Bayes Factor below 1.00, providing no support for effects of sleep or emotion on memory.

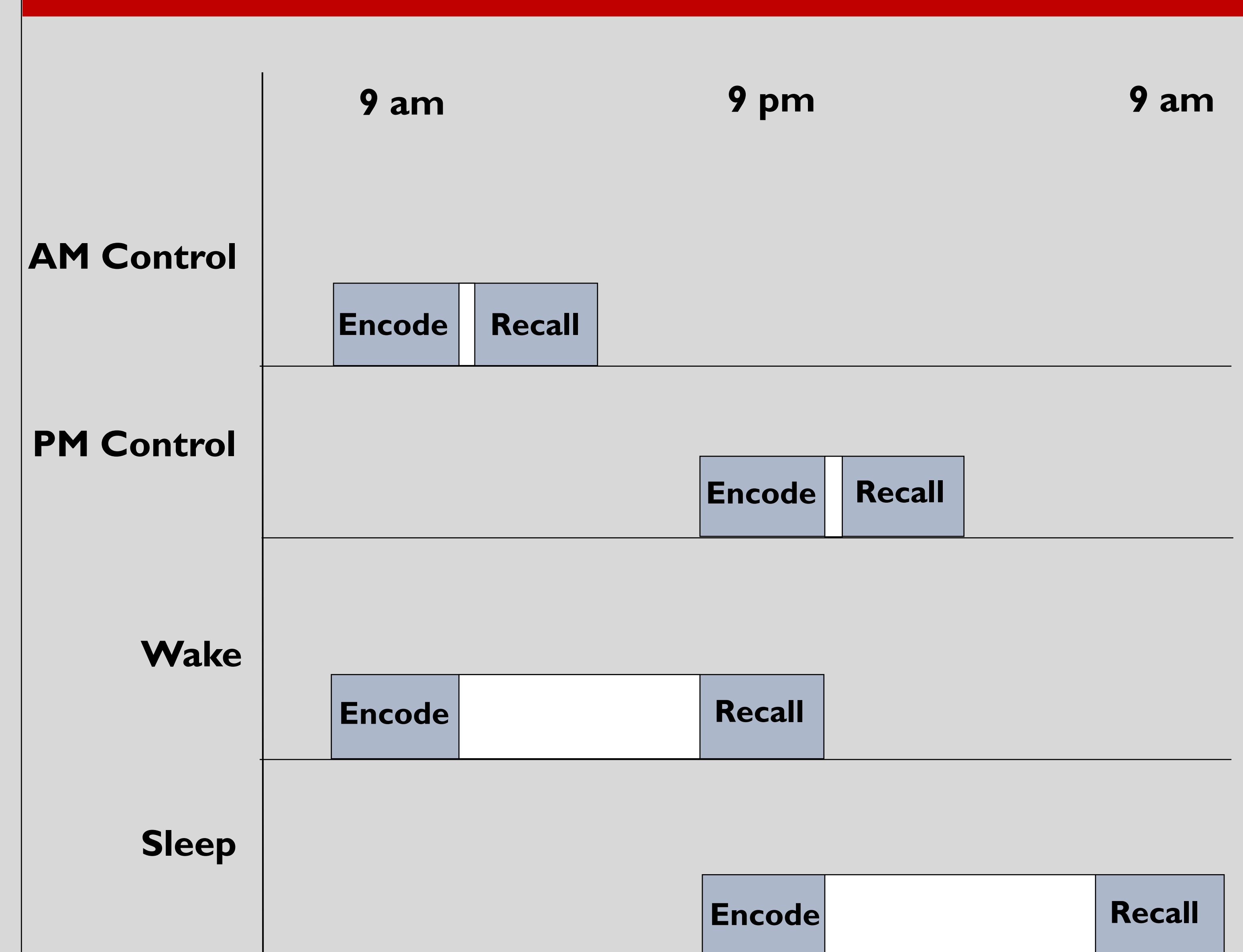
Pattern Separation



Item Recognition



METHOD



DISCUSSION

- I. Preliminary results suggested no difference in pattern separation and item recognition as a function of sleep and emotion.
- II. Though this contradicts our hypotheses, the findings support a more current claim in the literature that sleep does not enhance emotional memories more than neutral memories.

REFERENCES

¹Rasch, B., Born, J. (2013). About sleep's role in memory. *Psychological Reviews*, 93(2), 681-766; ²Lipinska, G., Stuart, B., Thomas, K., Baldwin, D. S., & Bolinger, E. (2019). Preferential Consolidation of Emotional Memory During Sleep: A Meta-Analysis. *Frontiers in psychology*, 10, 1014; ³Schäfer, S. K., et al. (2020). Sleep's impact on emotional recognition memory: A meta-analysis of whole-night, nap, and REM sleep effects. *Sleep medicine reviews*, 51, 101280; ⁴Stark, S. M., Kirwan, C. B., & Stark, C. E. (2019). Mnemonic similarity task: A tool for assessing hippocampal integrity. *Trends in cognitive sciences*, 23(11), 938-951.