

# Rotational remapping between “decision-potent” and “decision-null” representations in visual working memory

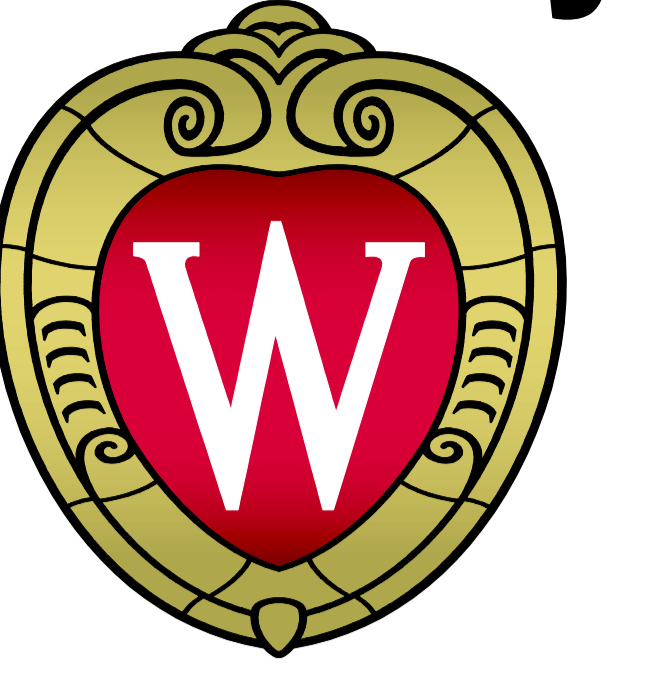


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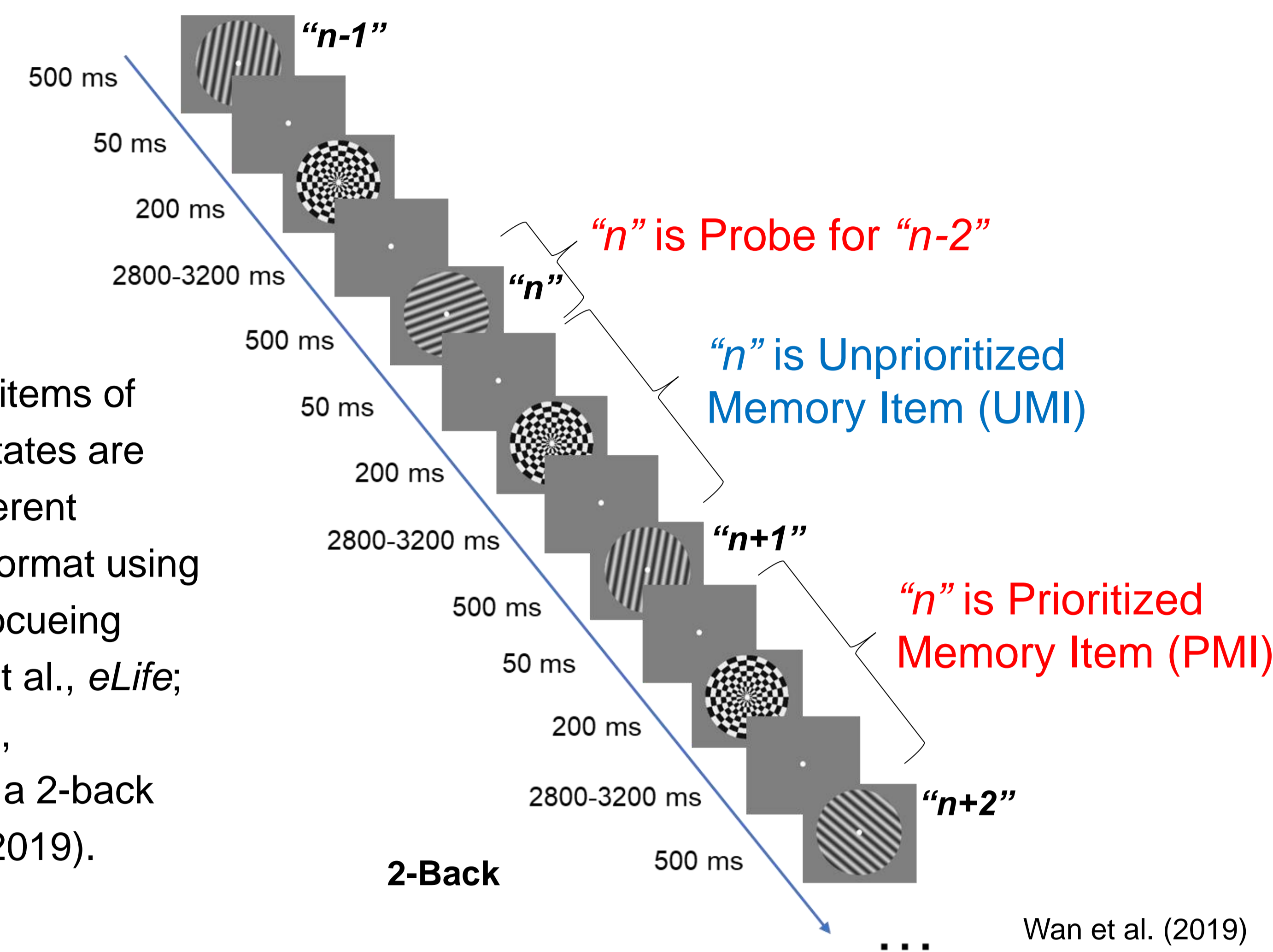
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## Background

Working memory items of different priority states are maintained in different representational format using double serial retrocuing tasks (van Loon et al., *eLife*; Yu, Teng & Postle, *unpublished*) and a 2-back task (Wan et al., 2019).

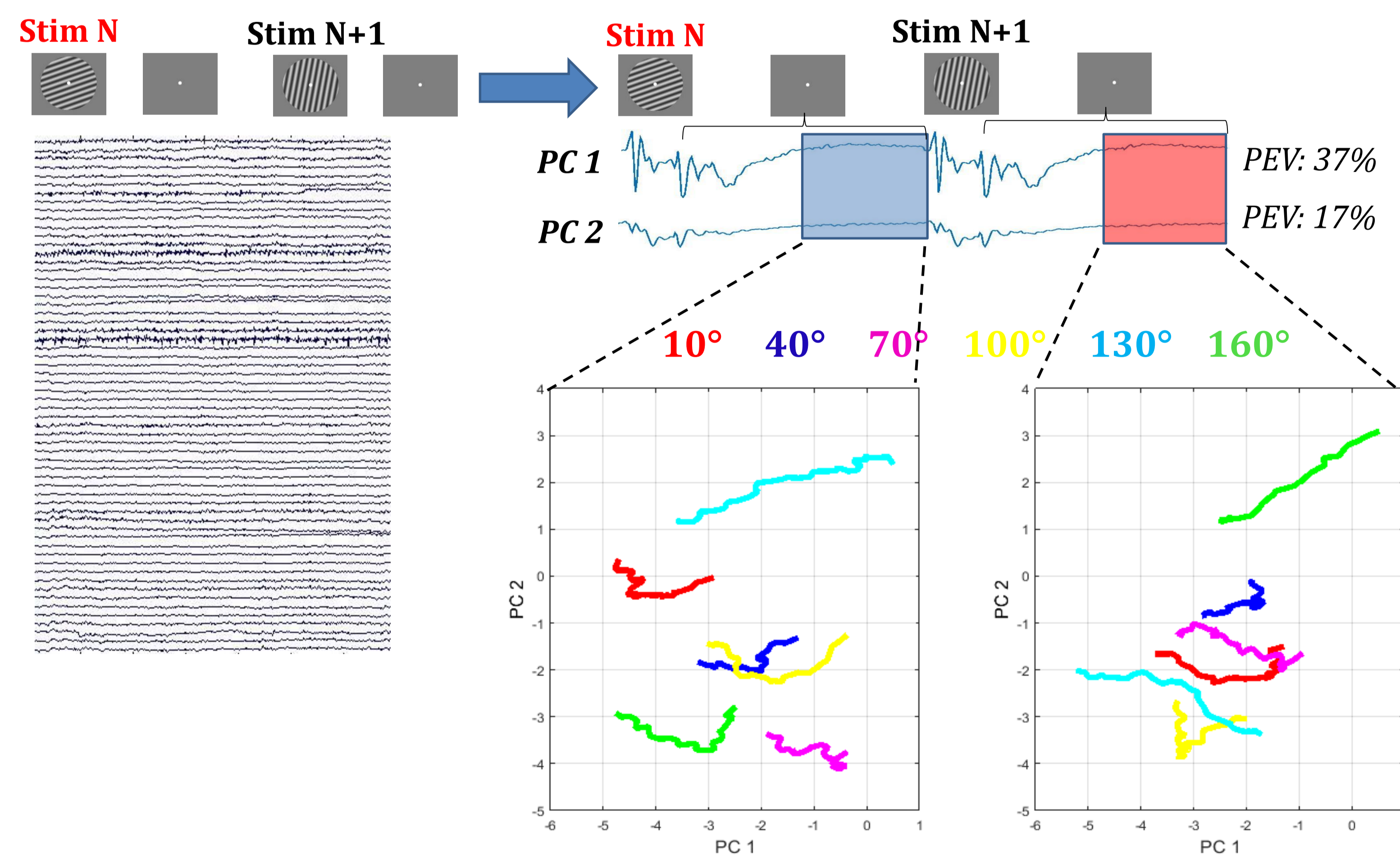


Wan et al. (2019)

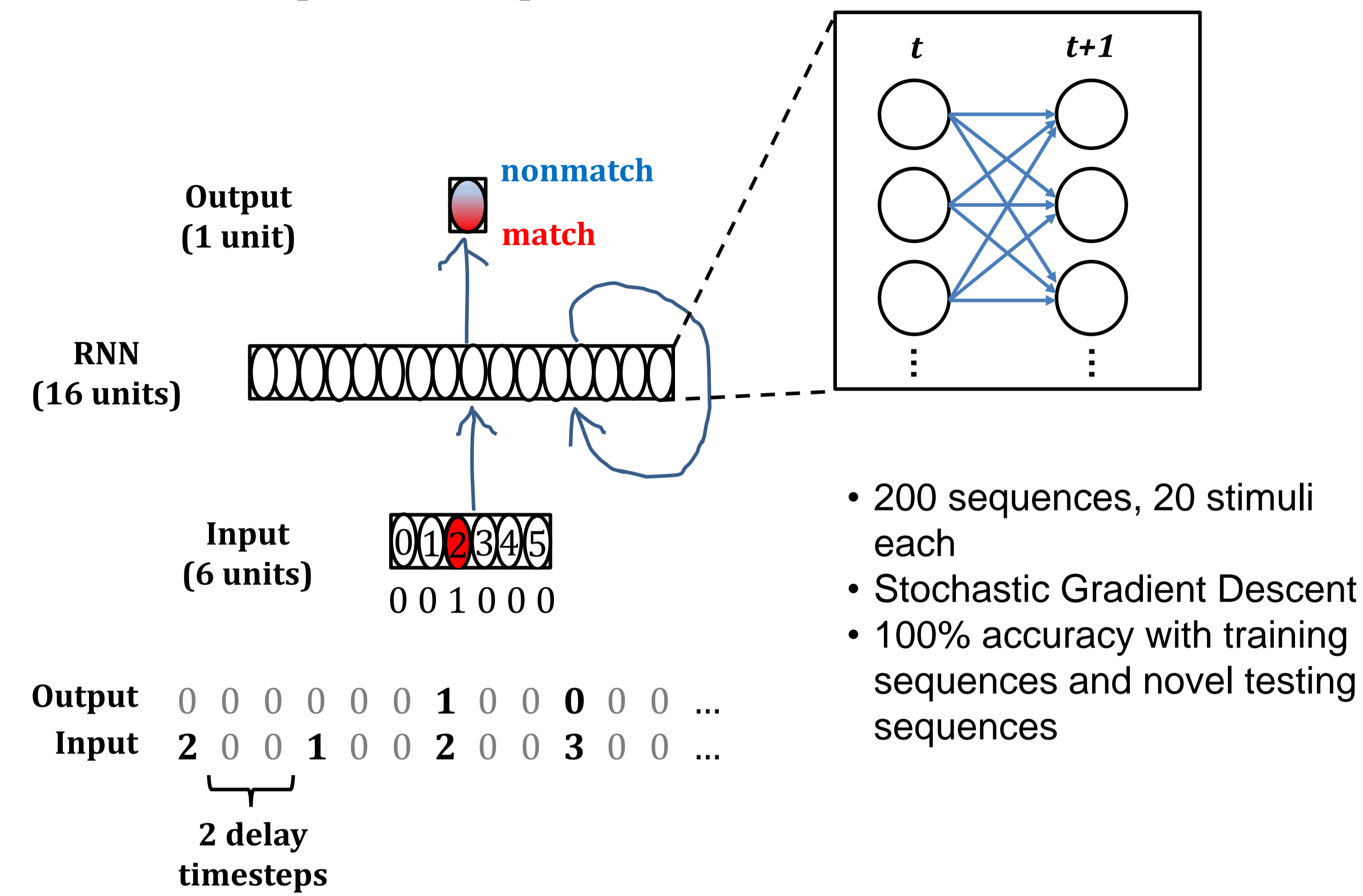
**Question:** How does the neural representation of the working memory items transform between different priority states to minimize interference between memoranda and appropriately drive behavior?

## Methods (EEG)

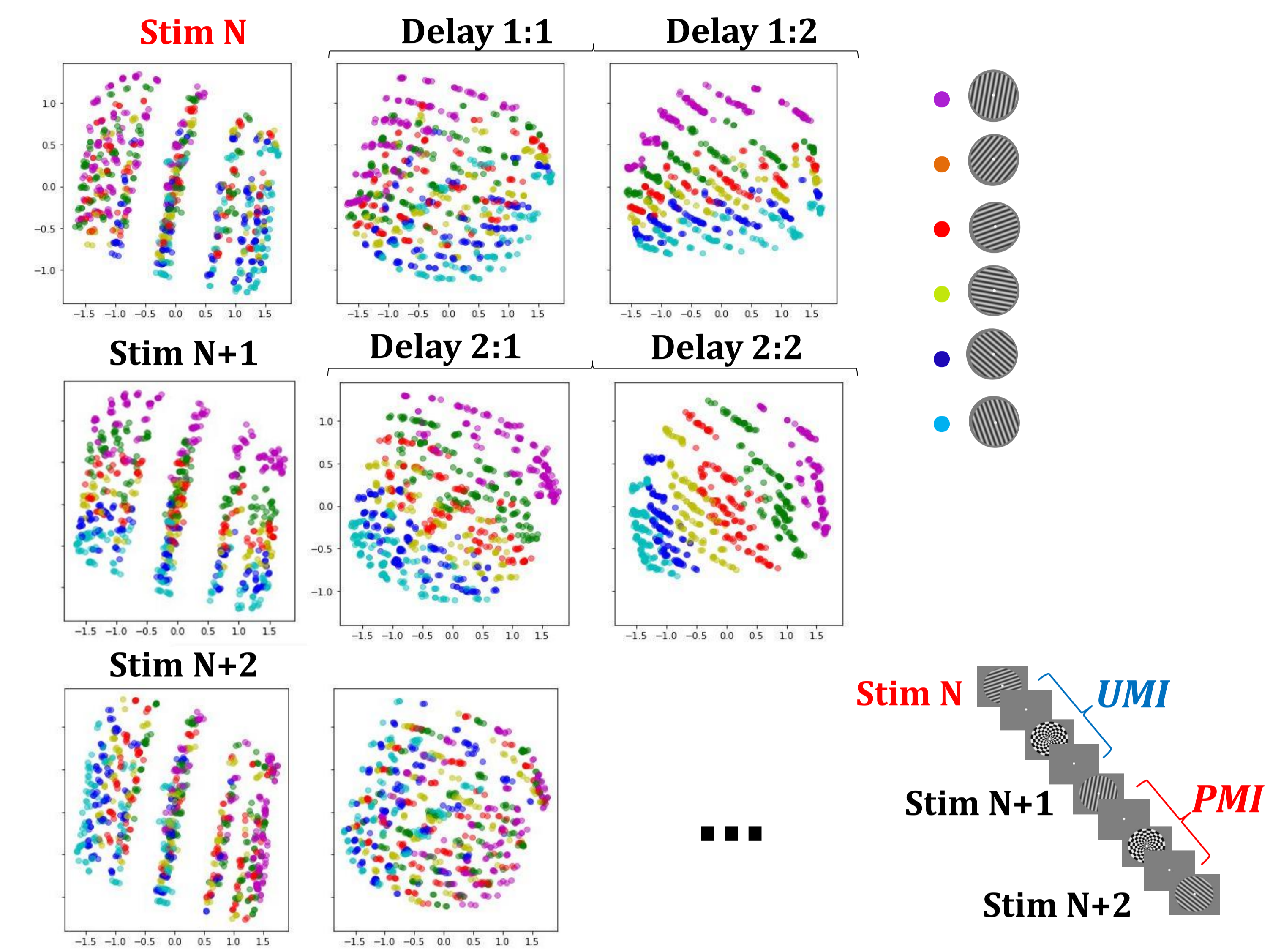
- $N = 29$ ; 60-channel EEG
- 2-back task with sinewave gratings of 6 orientations
- Principle Component Analysis (PCA):
  - Compute covariance matrix for every trial and subject then averaged
  - Eigendecomposition of covariance matrix



## Methods (RNN)



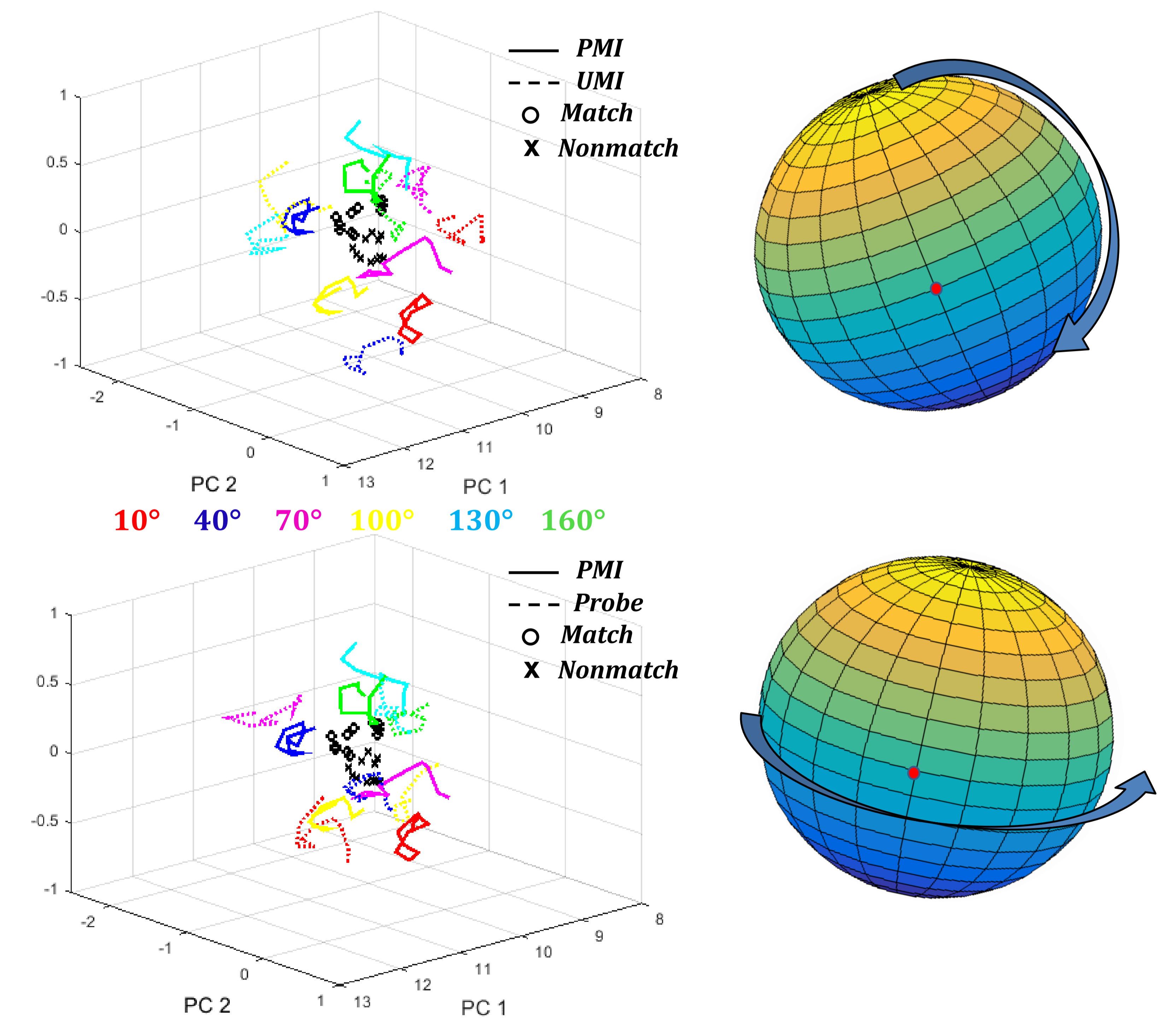
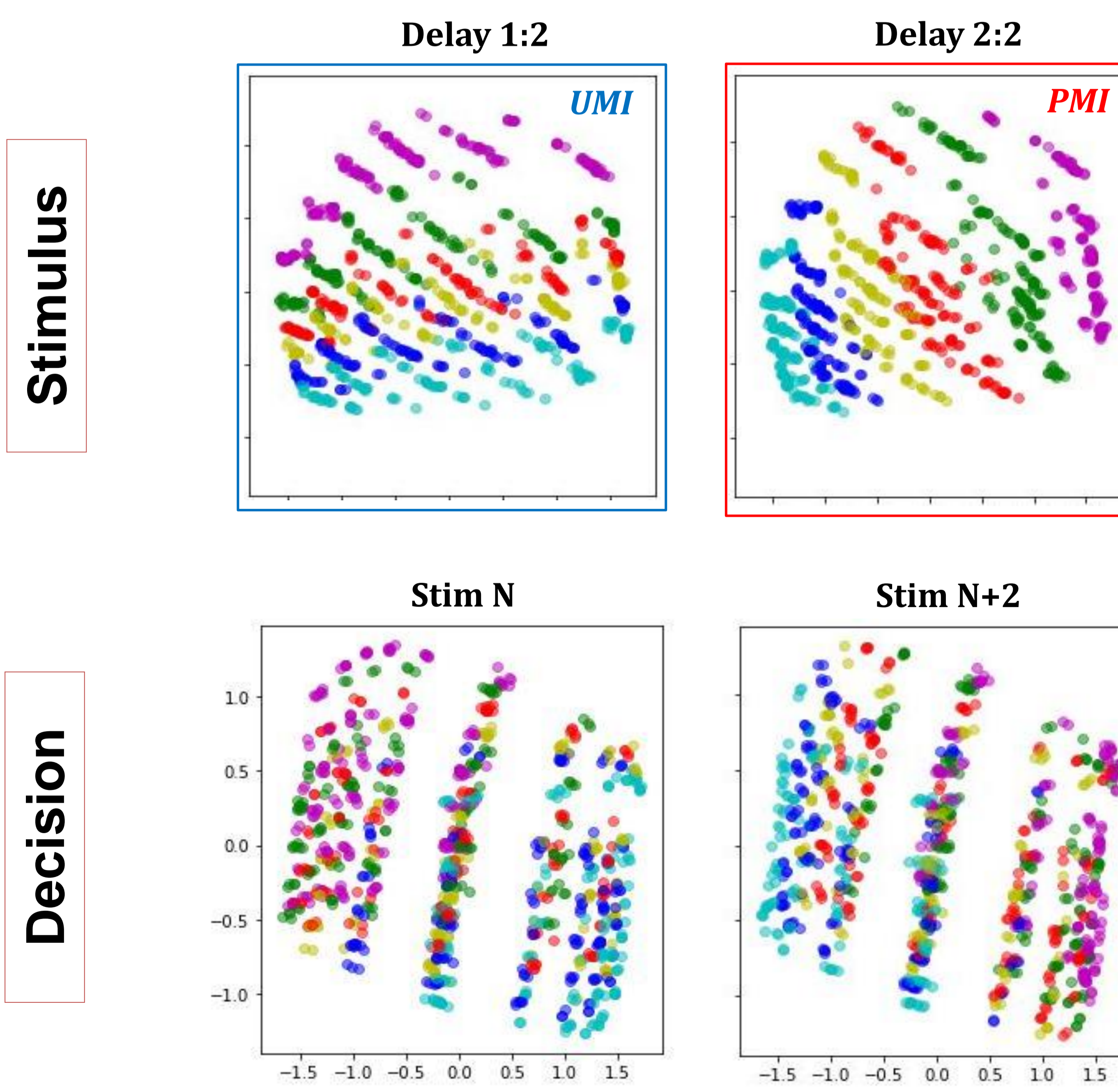
- 200 sequences, 20 stimuli each
- Stochastic Gradient Descent
- 100% accuracy with training sequences and novel testing sequences



## Results

RNN

EEG



## References

- van Loon, A.M., Olmos-Solis, K., Fahrenfort, J.J., & Olivers, C.N.L. Current and future goals are represented in opposite patterns in object-selective cortex. *eLife*.
- Wan, Q., Cai, Y., Samaha, J., & Postle, B.R. (in-principle accepted registered report). Tracking stimulus representation across a 2-back visual working memory task. *Royal Society Open Science*.
- Yu, Q., Teng, C., & Postle, B.R. Different states of priority recruit different neural representations in visual working memory. *Unpublished manuscript under review*.

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## Conclusion

- Priority in working memory may be implemented by rotational remapping of neural representation between decision-potent versus decision-null formats.
- The rotational axis for such remapping may be orthogonal to the rotational axis for decision making to minimize interference between memoranda and drive behavior.

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