EMOTIONAL STATE DYNAMICS IMPACTS TEMPORAL MEMORY

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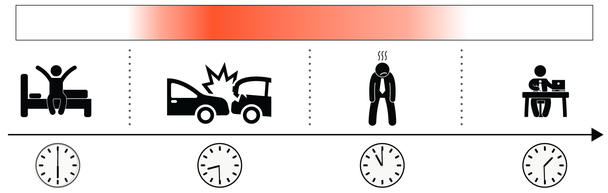
Background

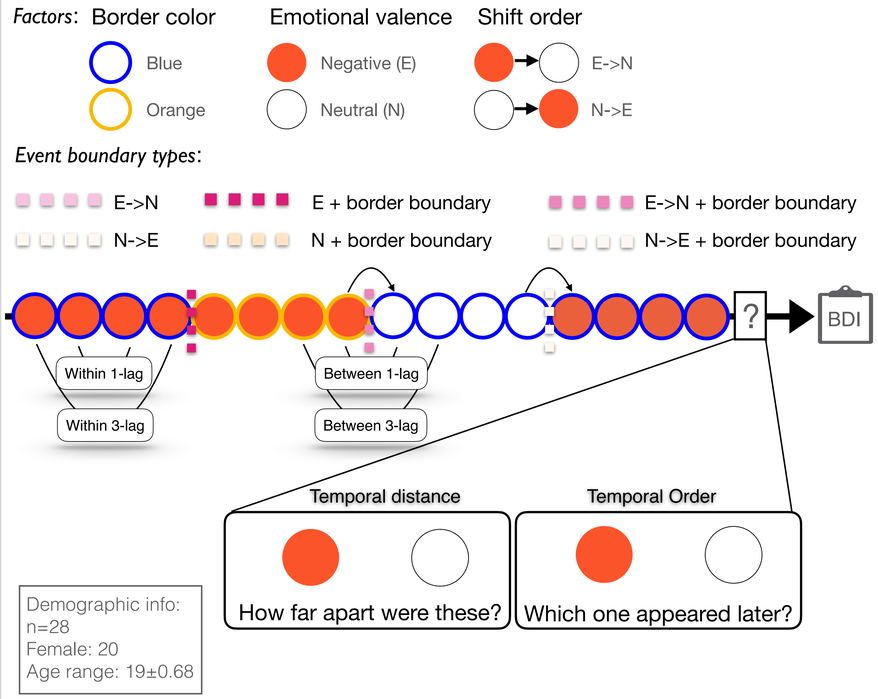
- Event boundaries typically lengthen perceived temporal distance and reduce temporal order accuracy [1,2]



- Certain emotions may blur event boundaries:
  a. Emotional responses that linger over time can bias appraisals of subsequent unrelated, neutral stimuli in the environment - producing 'affective spillover' [3,4]
  b. Emotion-evoked neural activity patterns carry over to subsequent neutral events, but not vice versa, suggesting that the direction of emotional shifts matters [5]

(1) Do emotional states modulate event boundary effects?
(2) Does emotion-modulated event boundary effects depend on the direction of emotional shifts?
(3) Are individual differences in emotion-modulated event boundary effects associated with affective style?

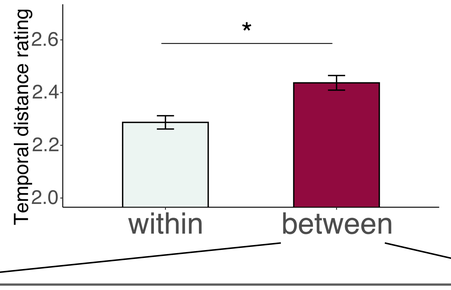
Methods

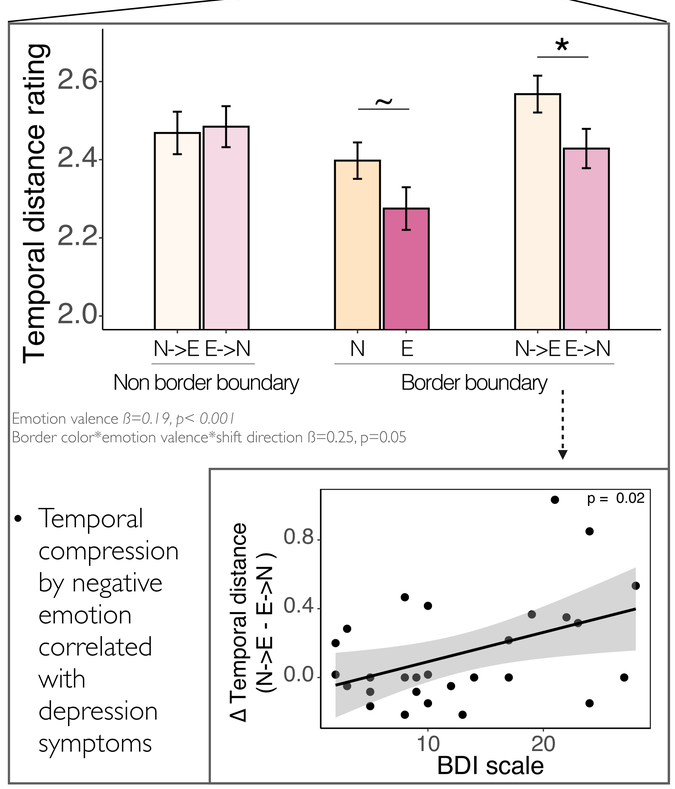


Demographic info:
n=28
Female: 20
Age range: 19±0.68

Results: Temporal distance

- Event boundaries increased the perceived temporal distance between items, replicating prior work [1]
- Negative emotion shortened temporal distances across border-induced event boundaries (at lag-1):
  - Negative emotion tended to shorten perceived temporal distances (overall)
  - Negative emotion significantly shortened the perceived temporal distance between negative and subsequent neutral events





Emotion valence ß=0.19, p< 0.001
Border color*emotion valence*shift direction ß=0.25, p=0.05

- Temporal compression by negative emotion correlated with depression symptoms

Summary

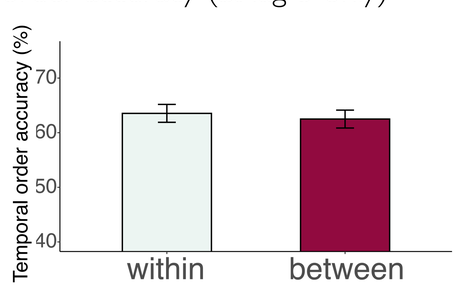
- Negative emotion attenuates event boundaries—suggesting temporal compression
- The magnitude of temporal compression by negative emotion is associated with depression symptoms
- Shifts to negative events tend to impair temporal order accuracy

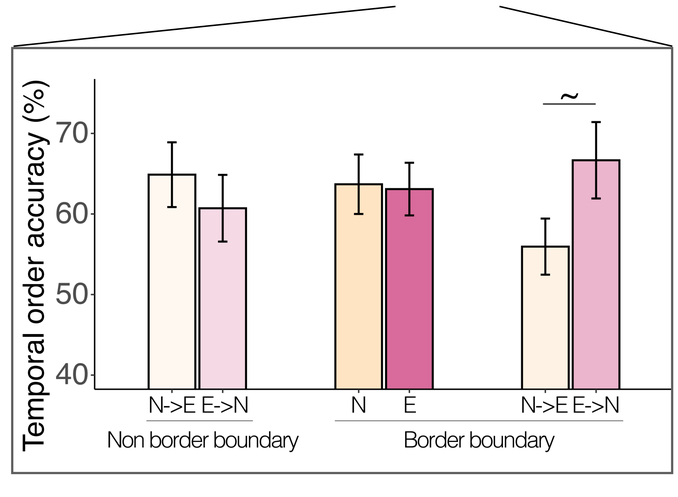
Future directions

- Psychophysiological recordings to probe whether and how trial-wise changes in emotional valence and arousal sculpt temporal memory

Results: Temporal order

- Event boundaries did not significantly impair temporal order memory (unlike in previous work) [1]
- Shifts from neutral to negative events tended to impair temporal order accuracy (at lag-3 only)





Acknowledgments

We thank Mengsi Li and Joanne Stasiak for helpful discussions, Mia Jeffery and Connor Ding for assistance with data collection, and Brooke Schwartzman (photo credit).

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References

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[3] Lapate, R. C. et al. 2016. "Awareness of Emotional Stimuli Determines the Behavioral Consequences of Amygdala Activation and Amygdala-Prefrontal Connectivity." *Scientific Reports* 6 (April): 1–16.
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[5] Tambini, A. et al. 2017. "Emotional Brain States Carry over and Enhance Future Memory Formation" *Nature Neuroscience* 20 (2).