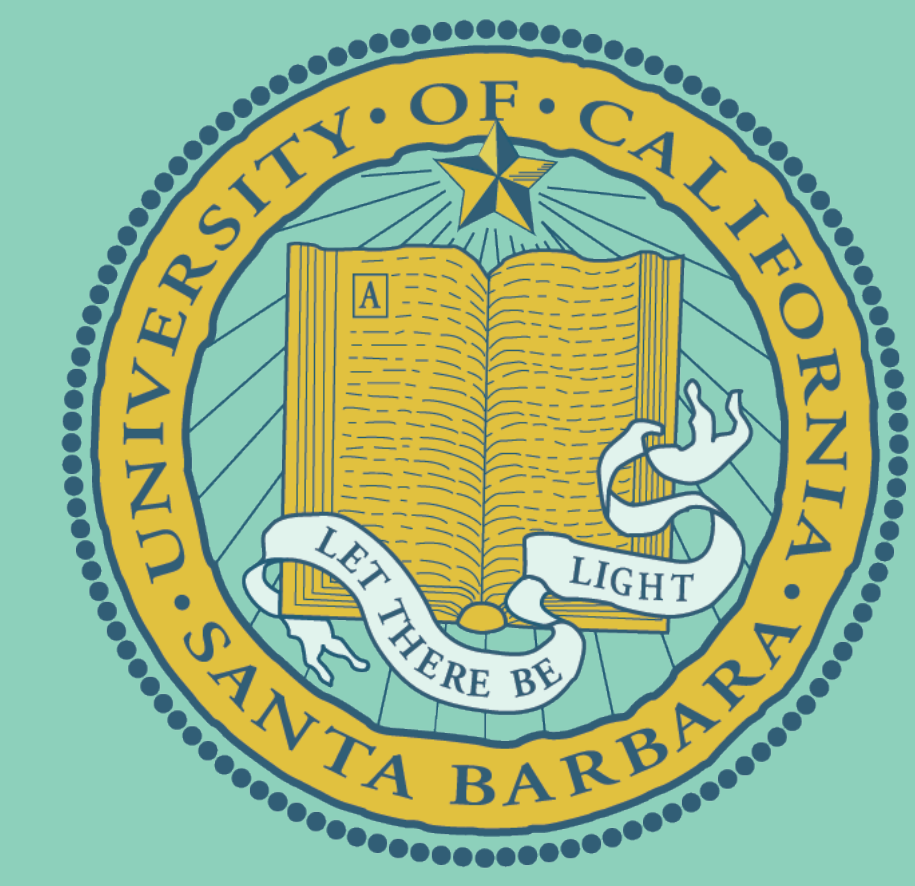




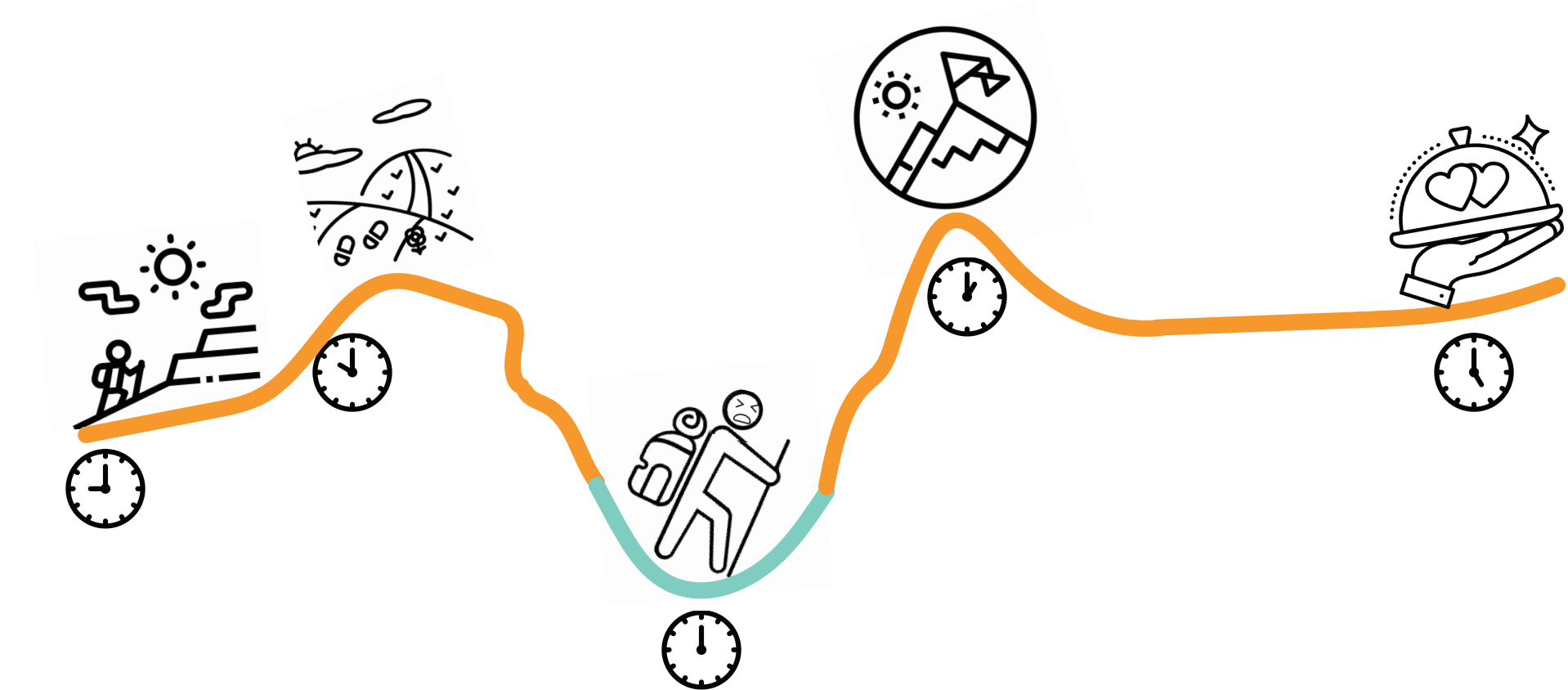
TEMPORAL MEMORY, TIME-EMOTION INTEGRATION, AND EMOTIONAL WELLBEING



Mengsi Li and Regina C. Lapate

BACKGROUND

Emotional experiences are temporally dynamic



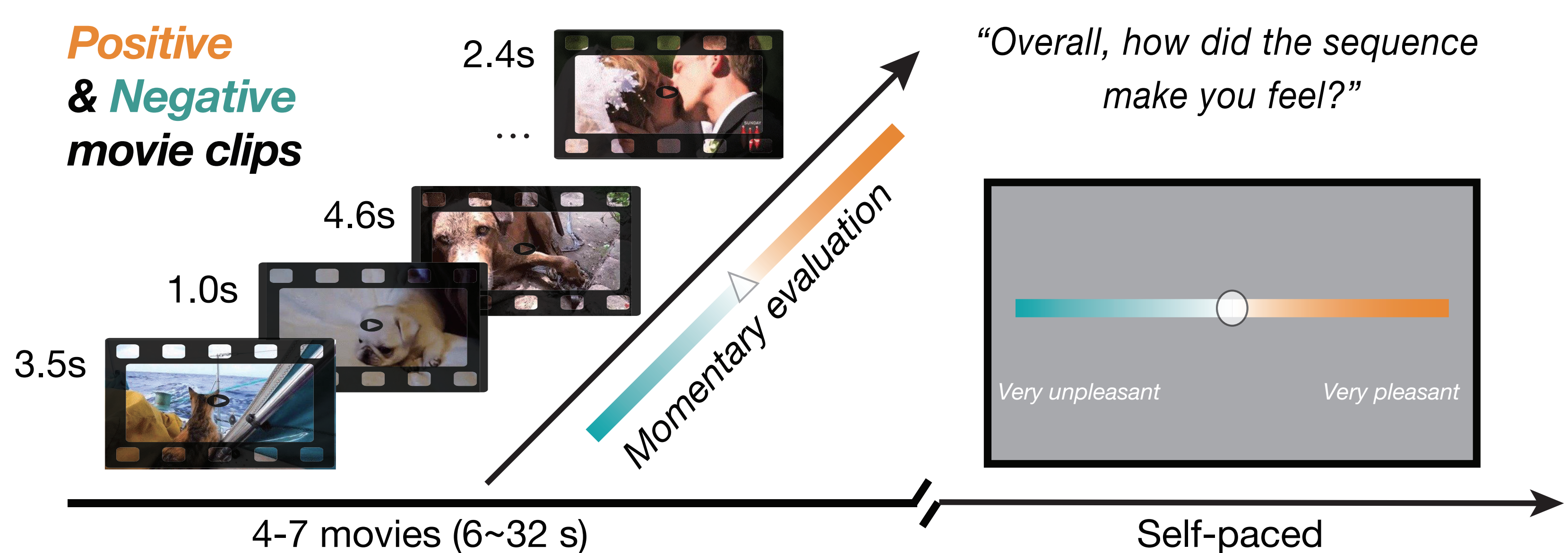
Emotions can distort memory for temporal order and duration [2]

Mood disorders are often characterized by persistent negative emotions (outside of their original temporal context)

- Are **retrospective emotional biases** evident following heterogenous, temporally-dynamic emotional experiences?
- Do retrospective biases increase with **sequence duration** (i.e. suggesting limited time-emotion integration capacity)?
- Does better **temporal memory** (order and duration) **prevent** retrospective emotional biases?
- Are retrospective emotional biases and (lower) temporal memory associated with higher **dispositional negativity**?

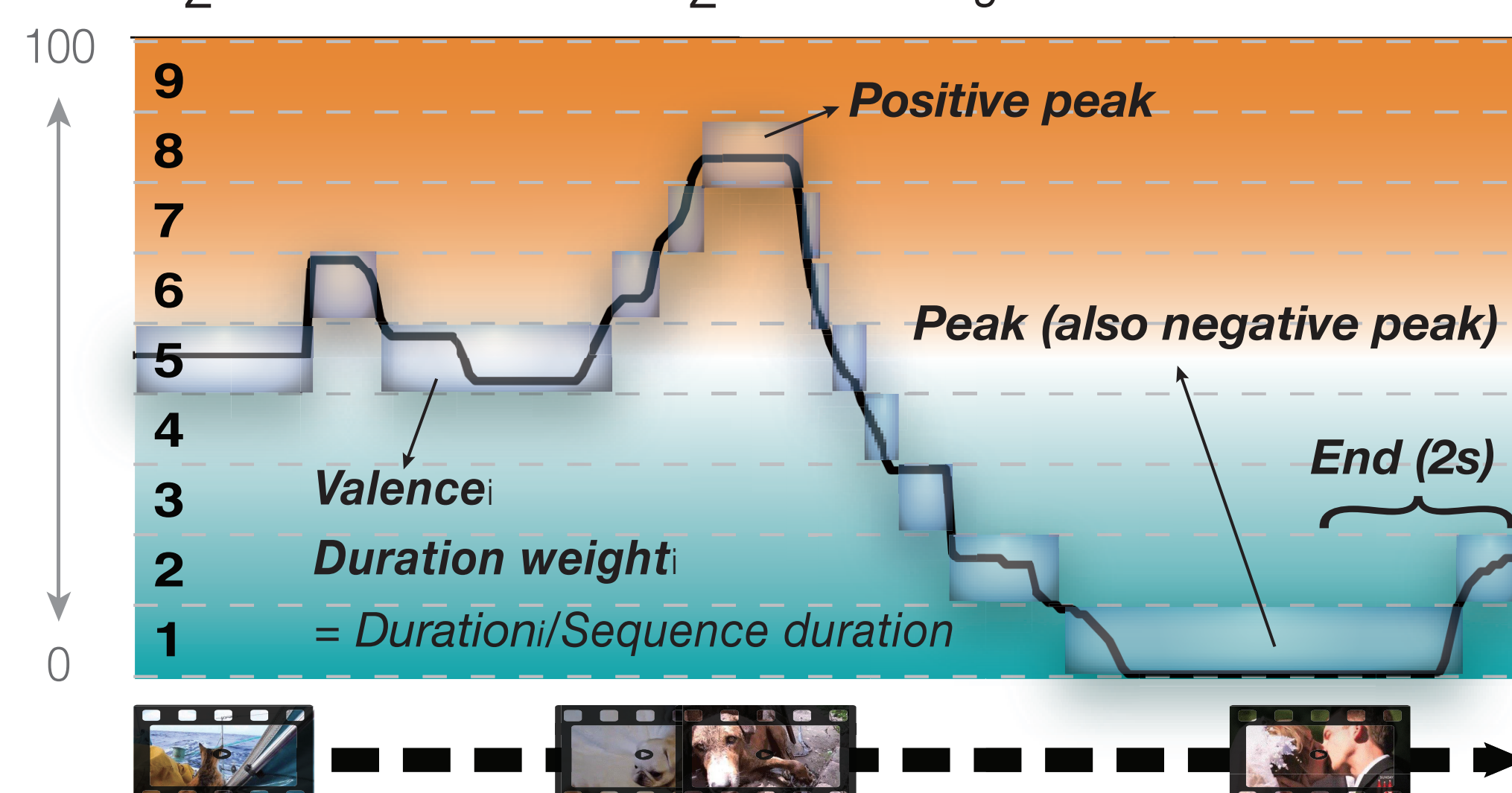
METHODS

Emotion Sequences Task



$$\text{Average} = \sum \text{Valence}_i / n$$

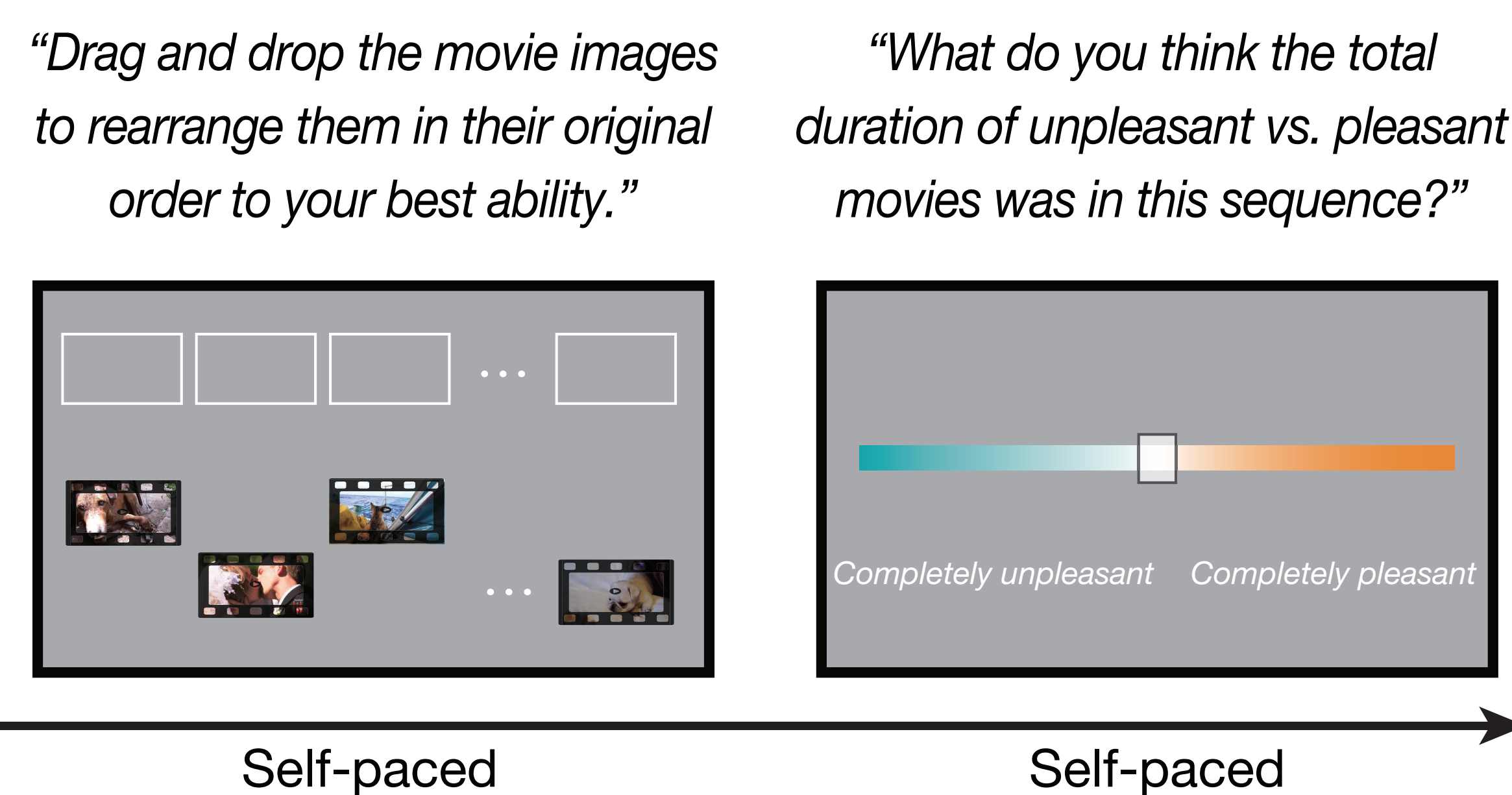
$$\text{Duration-weighted average} = \sum \text{Duration weight}_i * \text{Valence}_i$$



Retrospective emotion evaluation

$$\text{Retrospective emotional bias} = |\text{Duration-weighted average} - \text{Retrospective emotion evaluation}|$$

Temporal Memory Task



Temporal order memory

$$= \text{cor}(\text{Recalled order}, \text{Actual order})$$

Temporal duration error

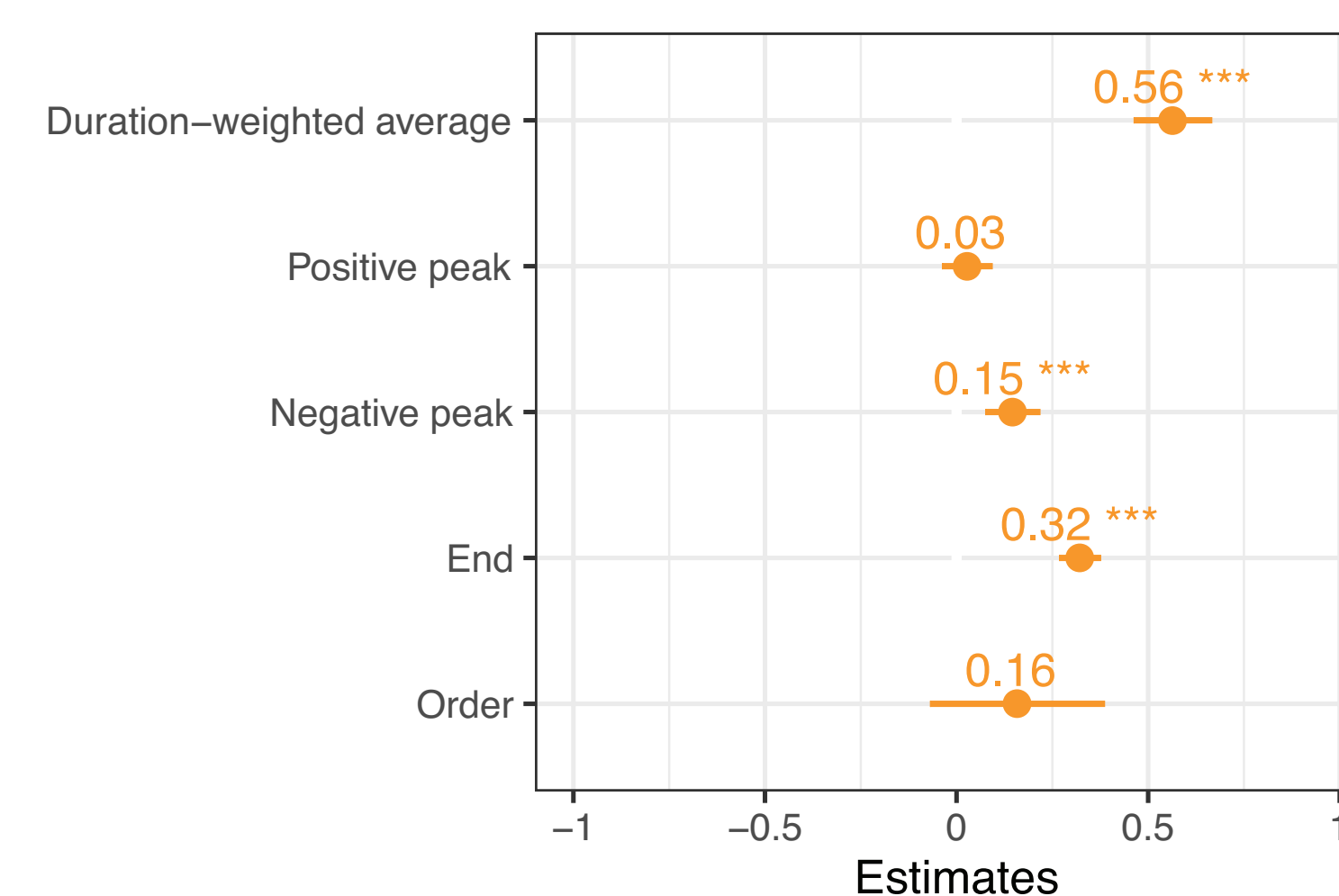
$$= \text{Recalled negative duration ratio} - \text{Actual negative duration ratio}$$

Assuming an ideal observer integrates emotion and duration perfectly, any deviation from this ideal pattern results in a retrospective emotional bias

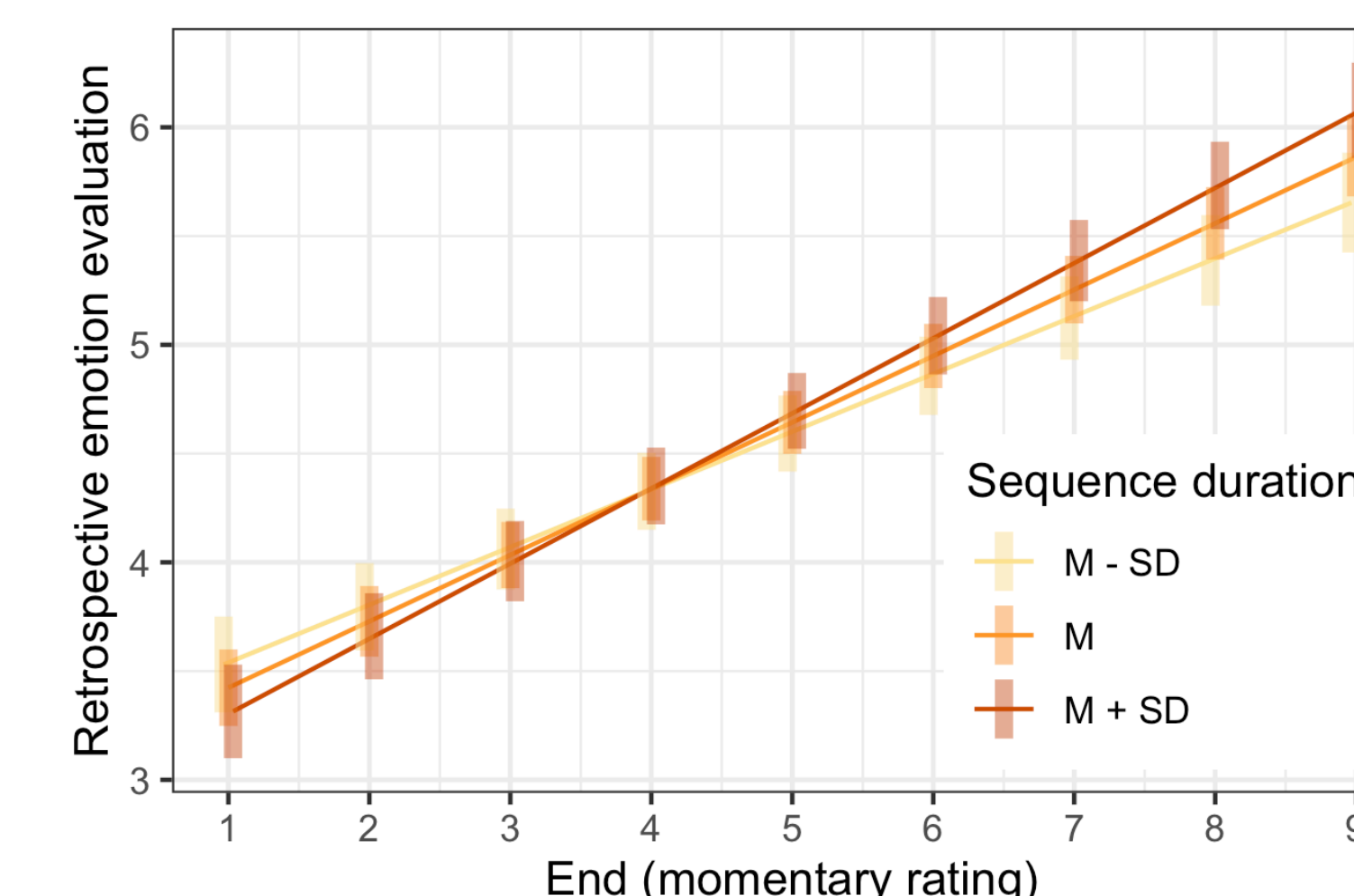
CONCLUSIONS

- Using heterogenous, temporally-dynamic emotional sequences, we observed a peak-end effect (without duration neglect) in retrospective emotion ratings (driven by *negative* ratings)
- Longer sequences produce a larger 'end' effect—suggesting limited time-emotion integration capacity
- Emotional sequences associated with larger memory errors for temporal duration (i.e. remembered as having longer *negative* episodes) produced larger biases in retrospective emotion
- Temporal duration errors are larger in individuals with higher dispositional NA, such that the duration of prior negative emotional episodes appears to be 'dilated' in their memory (suggesting temporal memory distortion)

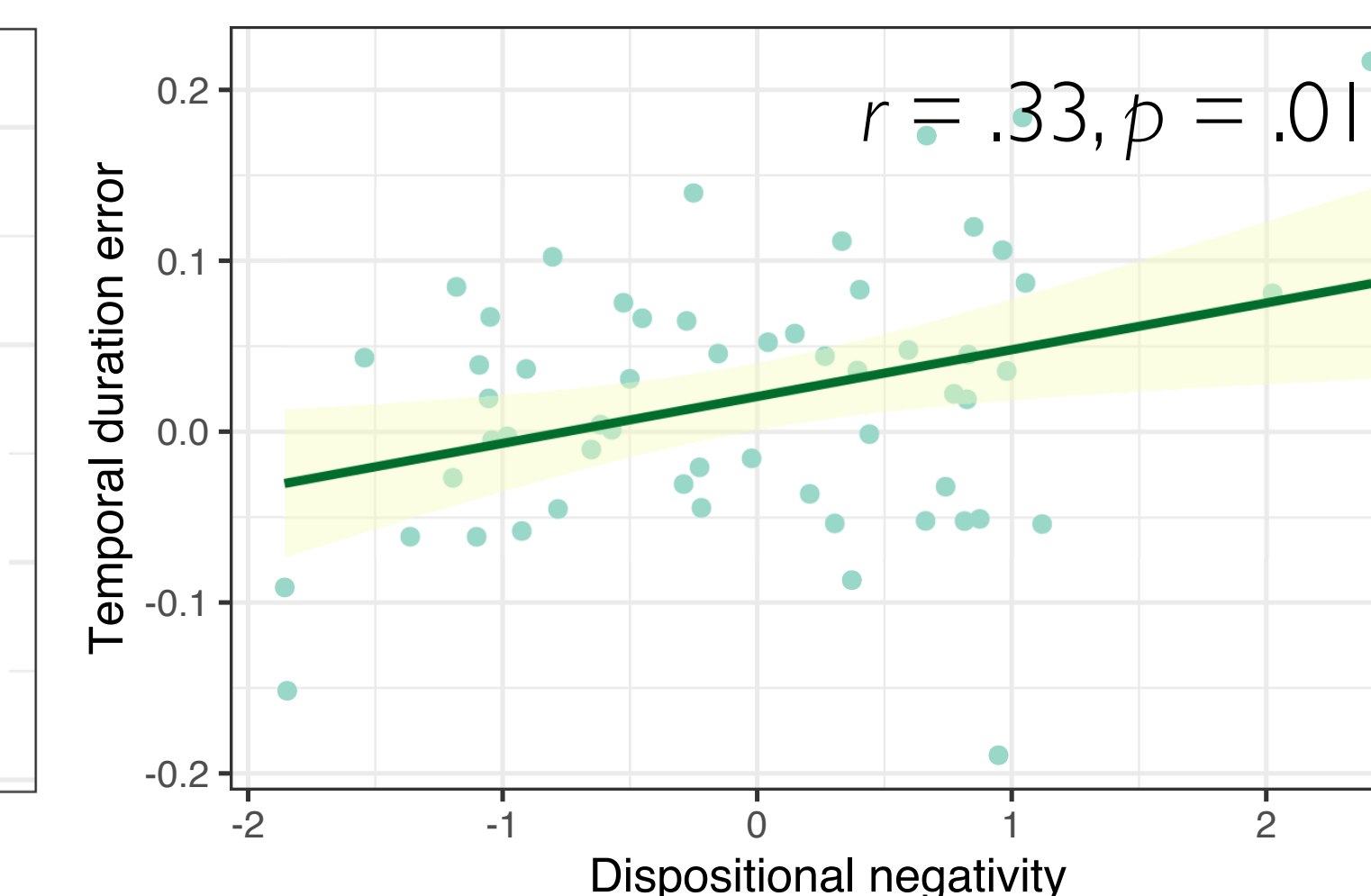
Retrospective emotion evaluation reveals a peak-end effect (driven by *negative* ratings)



The 'end' effect increases with sequence duration

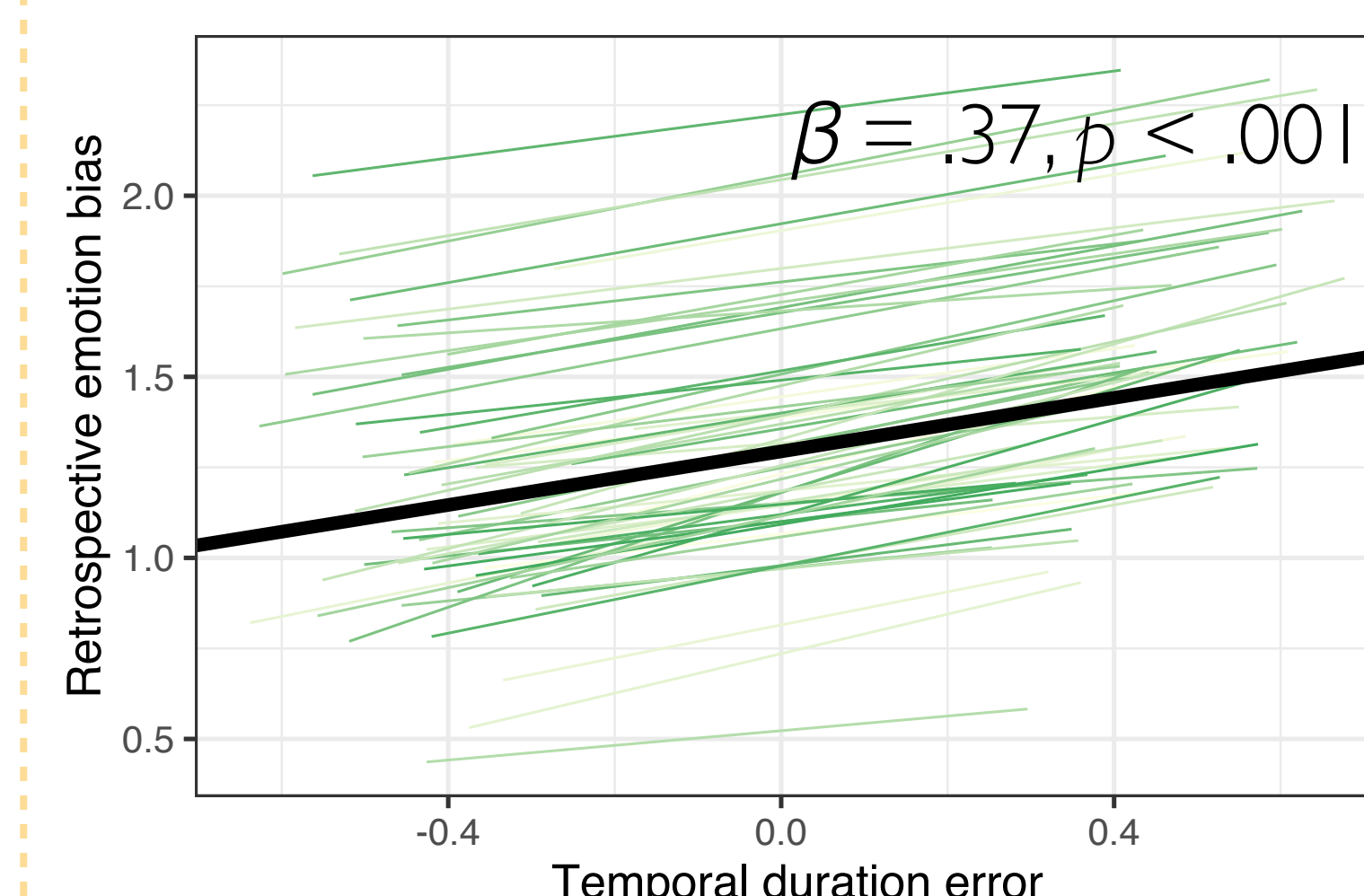


Temporal memory errors are associated with greater dispositional negativity

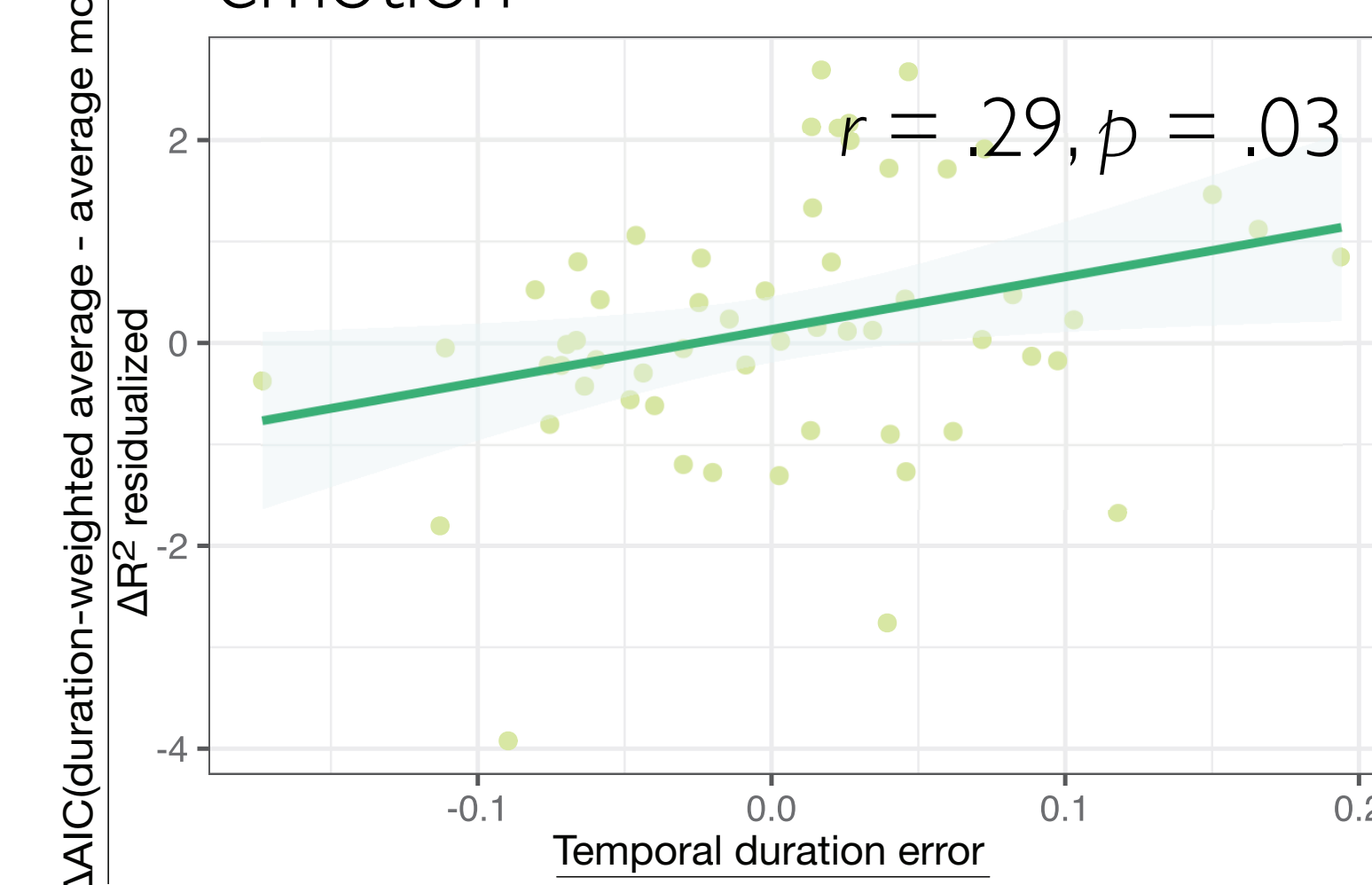


Disentangling different types of biases

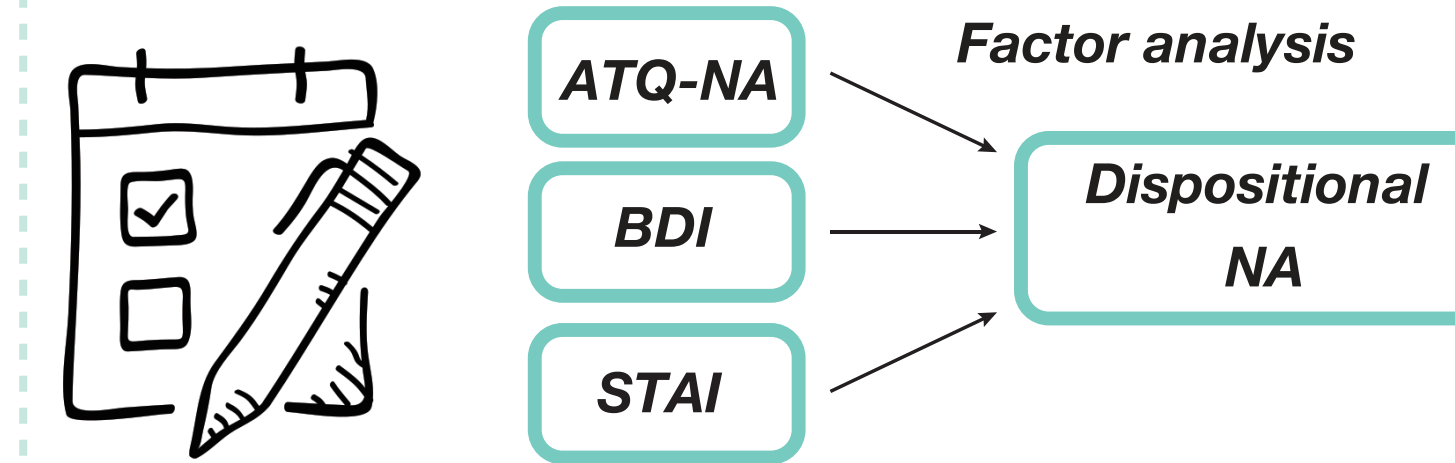
Temporal memory errors predict retrospective emotional biases



Temporal memory errors predict duration neglect in retrospective emotion



Dispositional Negativity



Sample: N = 60 undergraduates at UC Santa Barbara (N = 41 females; Age: M = 19.88, SD = 1.90) participated in an online study (Pavlovica)

Materials: N = 396 short (1-6s) emotional movie clips [3] were grouped into 72 sequences of 4 lengths (4, 5, 6, & 7). One still image was extracted from each movie for subsequent temporal memory tests.

Open science practice: The present study was preregistered on OSF (<https://osf.io/3n8ns>), where we detailed how we determined the sample size, design and manipulations, main and exploratory hypotheses, the data analysis plan, and all data exclusion criteria.

References

- [1] Fredrickson, B. L., & Kahneman, D. (1993). J Pers Soc Psychol 65(1): 45–55.
- [2] Petrucci, A. S., & Palombo, D. J. (2021). Cogn Emot 35(8): 1499–1515.
- [3] Cowen, A. S., & Keltner, D. (2017). PNAS 114(38): E7900-E7909

Acknowledgments

We thank Brooke Schwartzman and Runan Wang for their assistance with data collection. Contact us - Mengsi Li: mengsil@ucsb.edu; Regina Lapate: lapate@ucsb.edu