

Prediction Error and Memory:

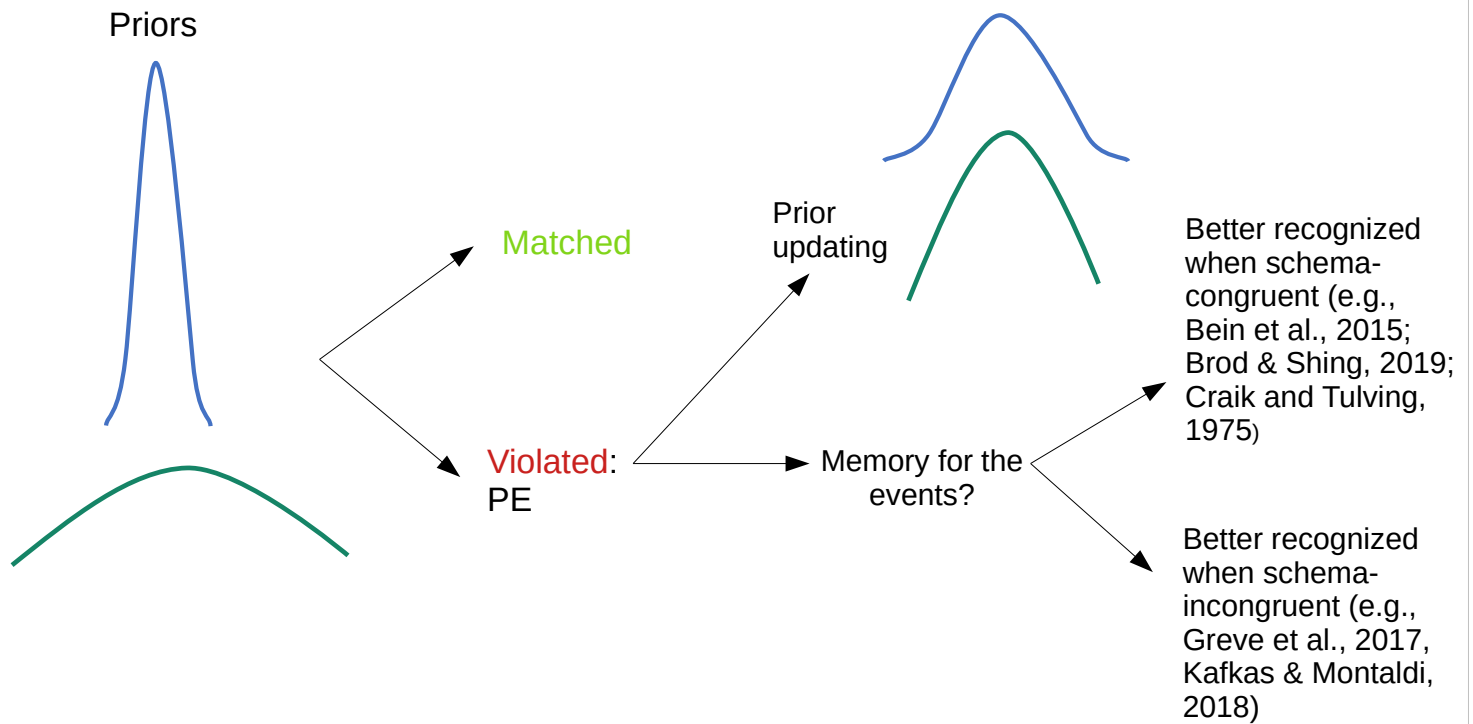
Insights from computational models

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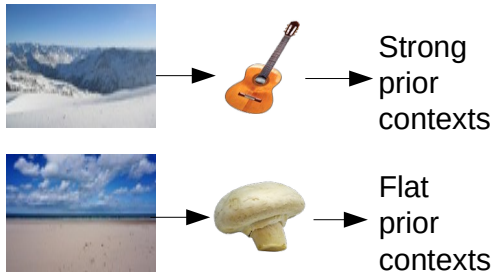
FLUX 2021



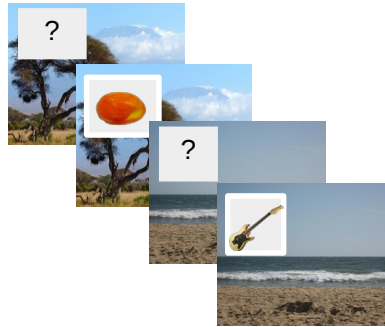
Introduction



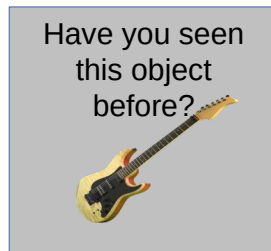
Methods



Prediction Task



Surprise recognition test



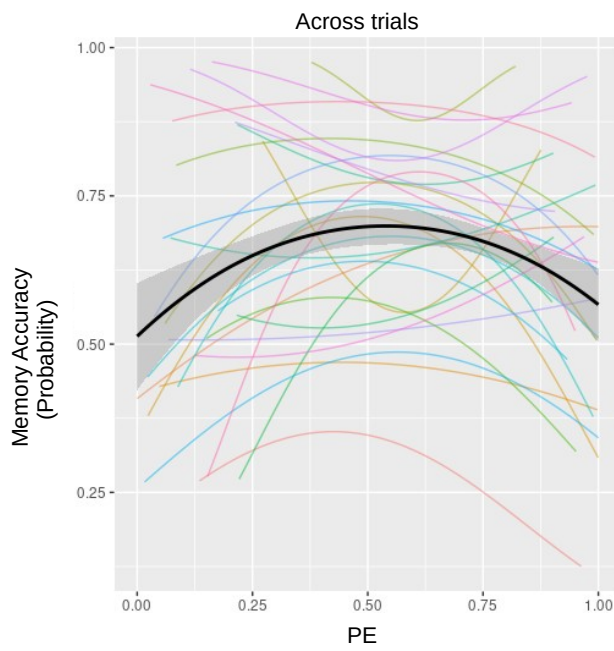
Reinforcement learning model

$$Q_{t+1}^{(c,j)} = Q_t^{(c,j)} + \alpha \cdot PE_t$$

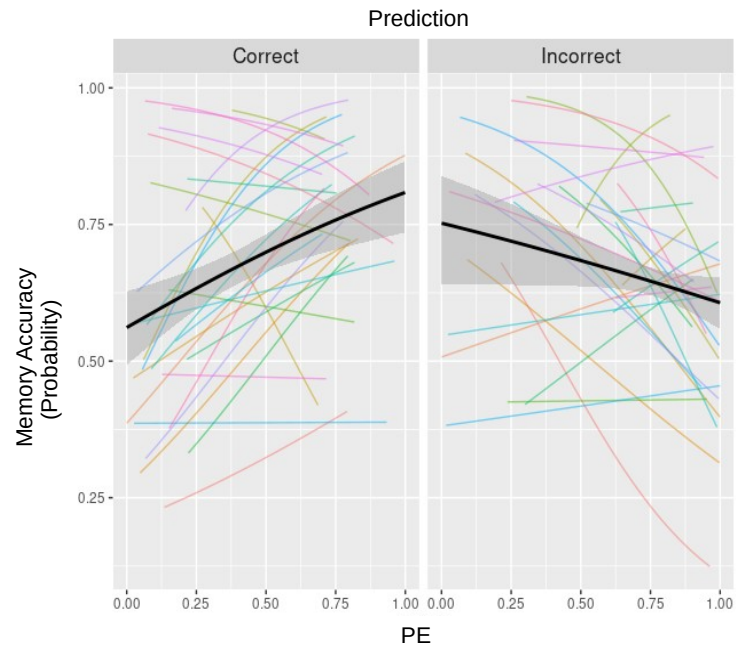
$$PE_t = r_t - Q_t$$

$$r_t = 1, 0$$

Results



Quadratic effect: $\beta = -6.43, p = .006$



Interaction: $\beta = -1.94, p = .001$

Conclusions

- Important moderating role of prediction outcome and of considering PE in relation to the task participants are doing.
- Results are in line with studies finding worse memory for unexpected events (Bein et al., 2015; van Kesteren et al., 2013), and with studies finding on reward PE showing enhanced memory for better than expected outcomes (De Loof et al., 2017; Jang et al., 2019).
- Strong prediction error in the context of positive feedback might indicate the utility of that item for future predictions.
- Strong prediction error in the context of negative feedback in a task where contingencies are stable may signal participants that that choice is not informative.

OUTLOOK: Relationship between PE and memory in children.