Expanding the scope of memory search: Modeling intralist and interlist effects in free recall

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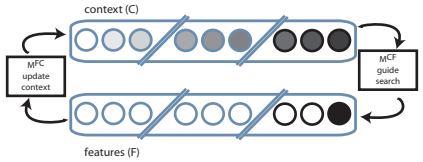
① Introduction

Most memory models address only within-trial phenomena

In a single model, we attempt to explain both intralist and interlist effects in three free recall paradigms

② Continuous-memory version of the context maintenance and retrieval model (CMR2)



Item and context representations accrue across all lists in a session

Input to context is driven by studying or recalling an item or by a pause between lists

$$c_i^{IN} = M^{FC} f_i$$

Update context and context-item associations

$$c_i = \rho_i c_{i-1} + \beta c_i^{IN} \qquad \Delta M^{FC}_{exp} = (\Delta M^{CF}_{exp})^{\top} = c_{i-1} f_i^{\top}$$

Recall process

$$x_n = (1 - \tau\kappa - \tau\lambda N) x_{n-1} + \tau f_r^{IN} + \varepsilon, \text{ where } f_r^{IN} = M^{CF} c_r$$

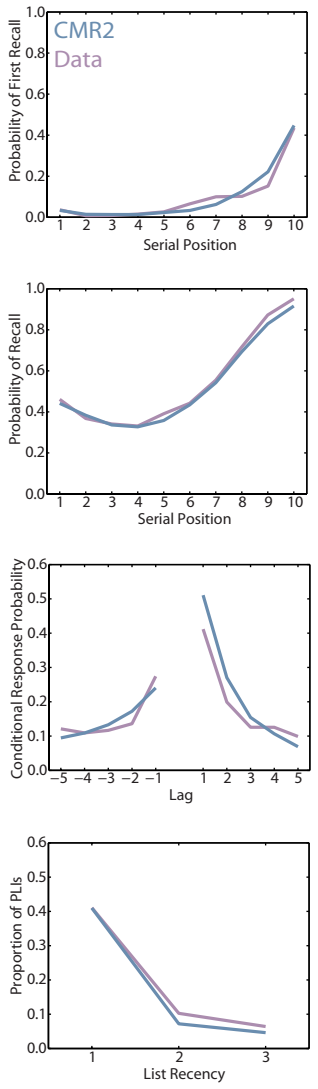
Each item has a dynamic threshold

$$\Theta_i = 1 + \omega\alpha^j$$

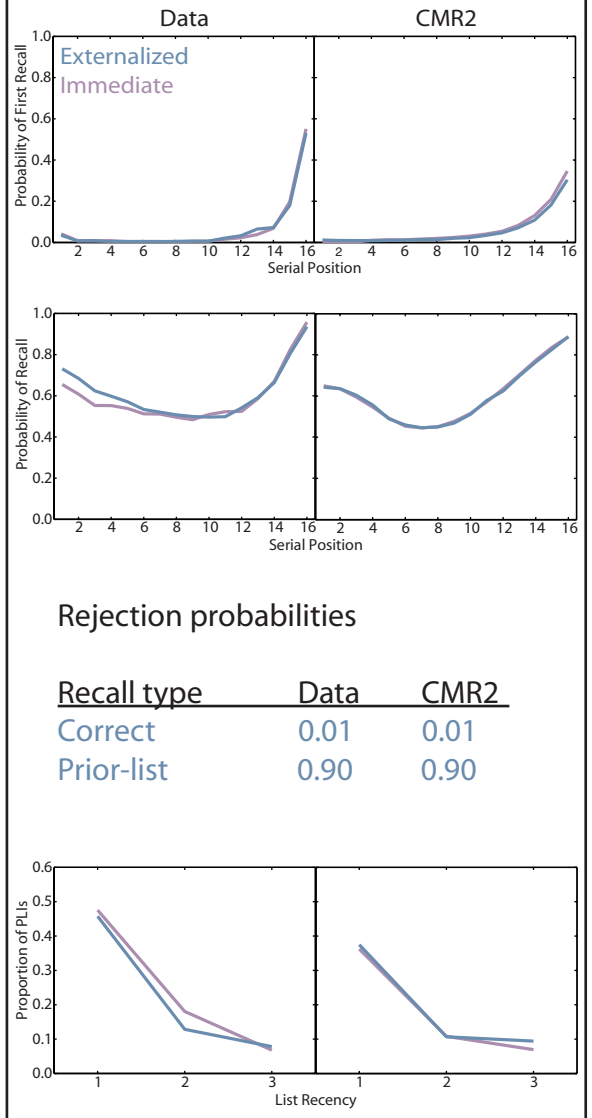
Determine if the retrieved item is from the correct list

$$c_{t+1}^{IN} \cdot c_t$$

③ Immediate free recall



④ Externalized free recall



Rejection probabilities

Recall type	Data	CMR2
Correct	0.01	0.01
Prior-list	0.90	0.90

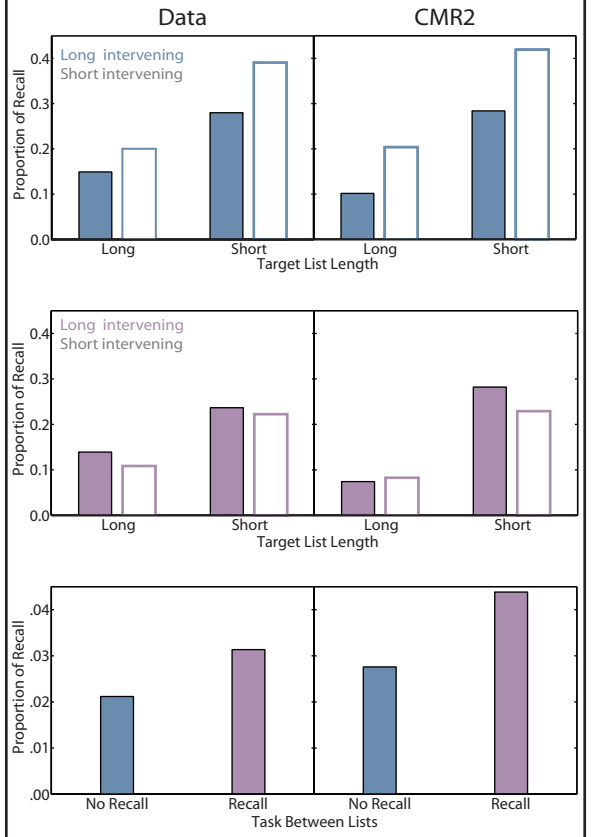
⑤ List-before-last recall

Pause between lists

study n | pause | study n+1 | recall n

Recall between lists

study n | recall n-1 | study n+1 | recall n



⑥ Conclusions

CMR2 accounts for interlist and intralist effects

Slowly evolving temporal context, semantic context, and noisiness in the recall process control interlist recalls

Jang, Y., Huber, D. E. (2008). Context retrieval and context change in free recall: Recalling from long-term memory drives list isolation. *JEP: LMC, 34*(1), 112-127.

Kahana, M.J., Howard, M.W., Zaromb, F., Kahana, M.J. (2002). Age dissociates recency and lag recency effects in free recall. *JEP: LMC, 28*(3), 530-540.

Polyn, S.M., Norman, K.A., Kahana, M.J. (2009). A context maintenance and retrieval model of organizational processes in free recall. *Psychological Review, 116*(1) 129-156.