



Influences of Task-Demand and Strategy on the Focus of Attention

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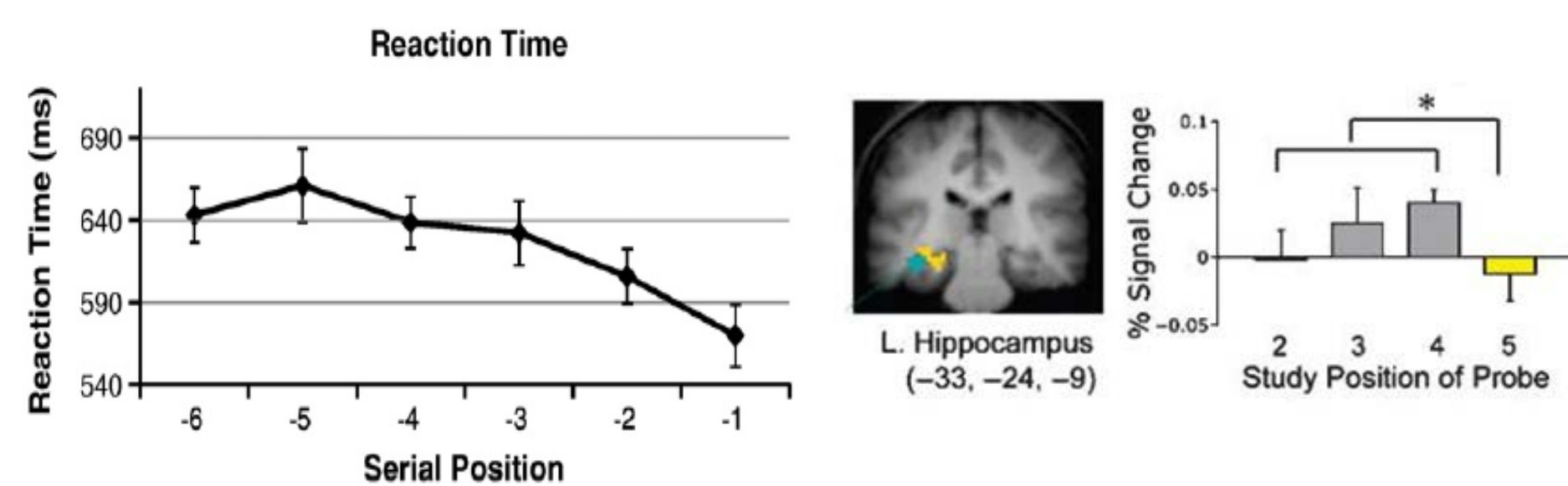
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Background & Aims

- Most current models of working memory assume that only a few items can be maintained in a readily accessible state at one moment in time.
- Cowan (2001) called this the focus of attention and presented strong converging evidence suggesting that it is limited to about 4 items.
- More recent work illustrates distinct characteristics for retrieval of the final item in a list, and suggests that the focus is limited to just one item.



Nee & Jonides, 2011

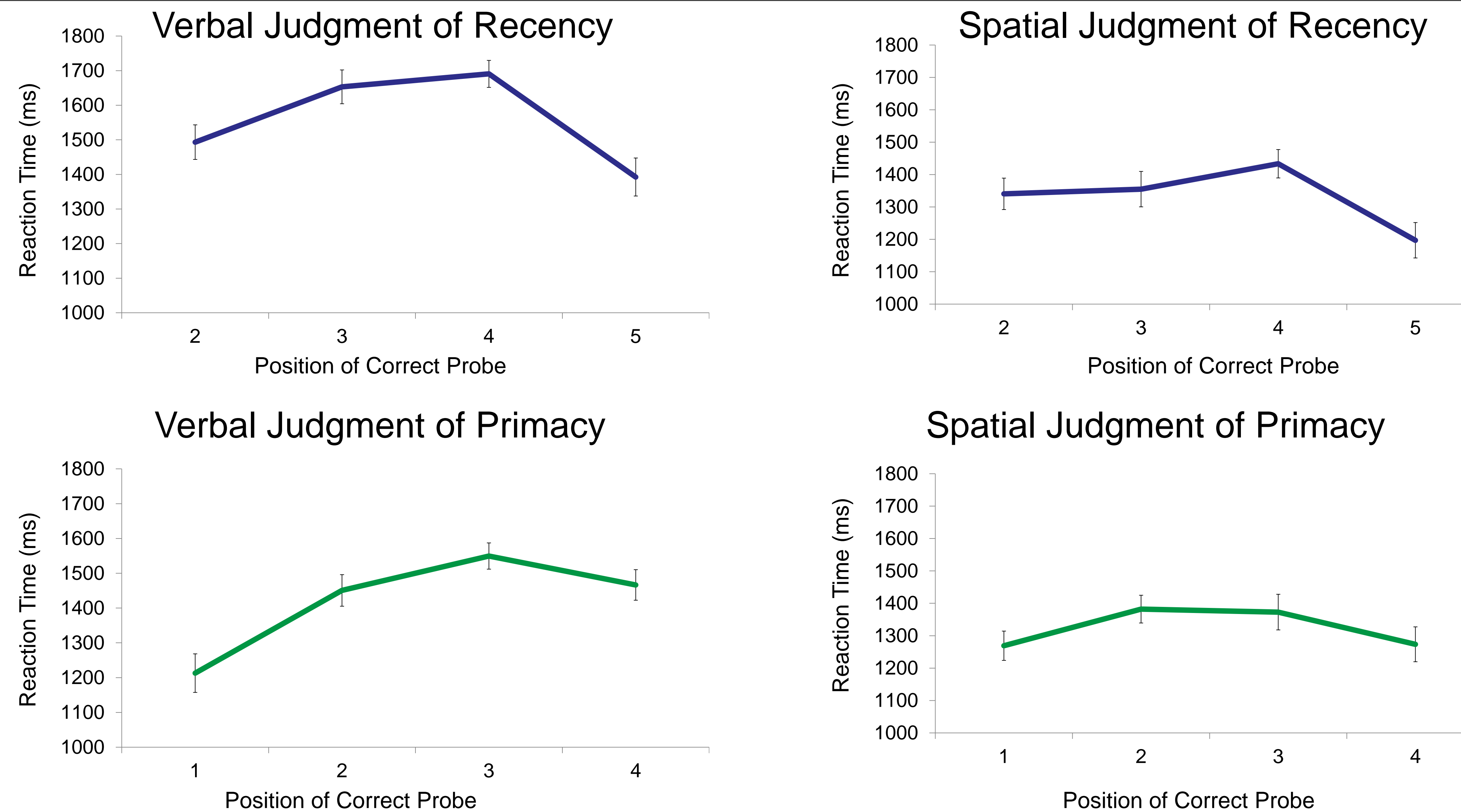
Öztekın, et al., 2008

- Others (e.g., Nairne, 2002) have argued that retrieval advantages derive entirely from interference phenomenon, not attention.

Here we ask:

- Might these effects be dependent upon specific task demands and subject specific strategies?
- How do task and strategy influence BOTH recency and primacy effects?

Does speed of retrieval vary by serial position of the correct probe?



When items are divided by the position of the correct probe, there is evidence of both primacy and recency effects. However, there also appear to be task dependent differences.

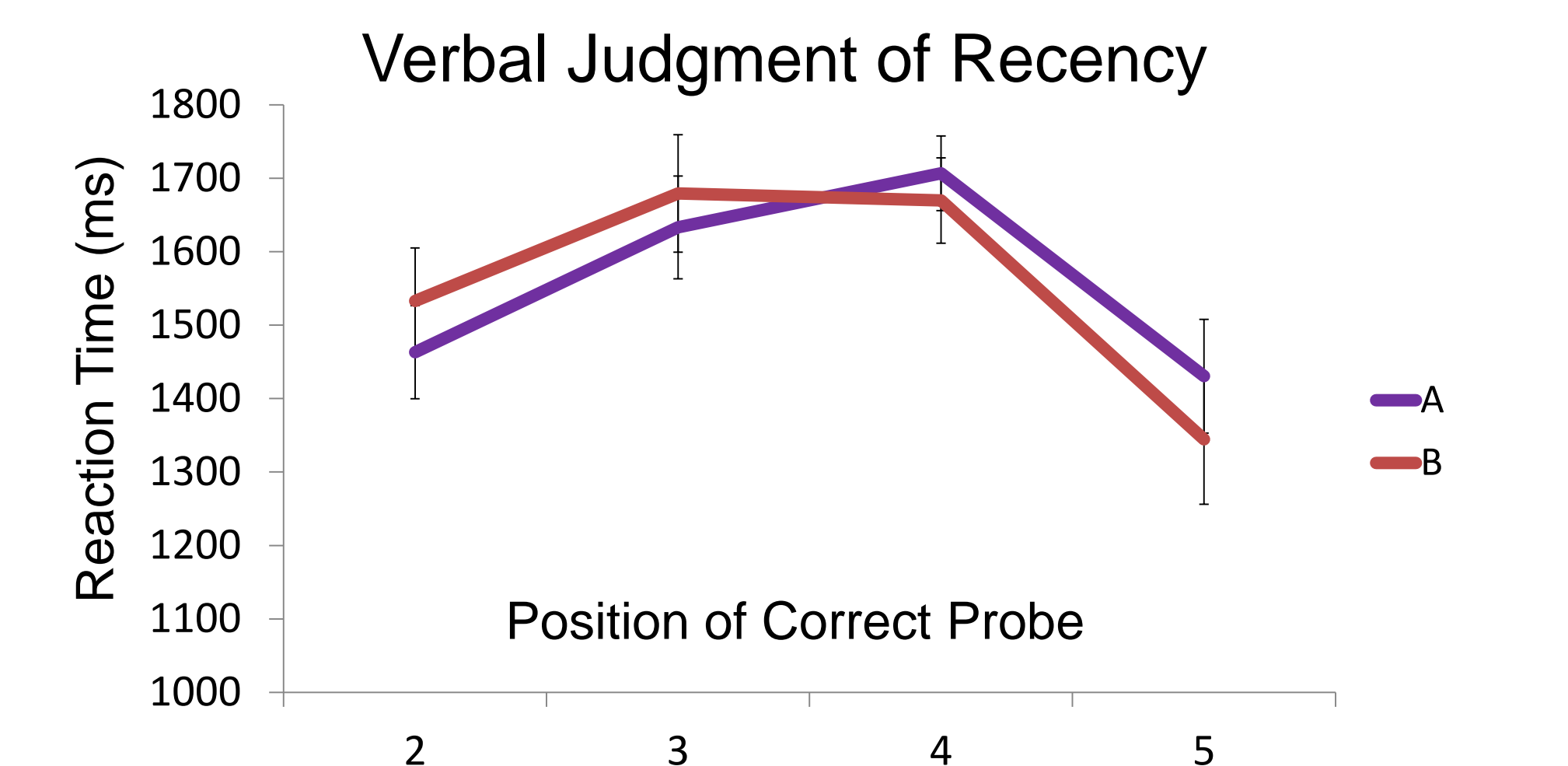
Role of Self-Report Strategy?

Probed participants on two broad types of strategy:

- Strategy A: Emphasized maintenance of items
- Strategy B: Emphasized retrieval at test

Most effects of strategy on performance were small and not significant.

However, two directional effects were observed in the Verbal Judgment of Recency Task :
Faster RT on the first item for those reporting maintenance
Faster RT on the last item for those reporting retrieval

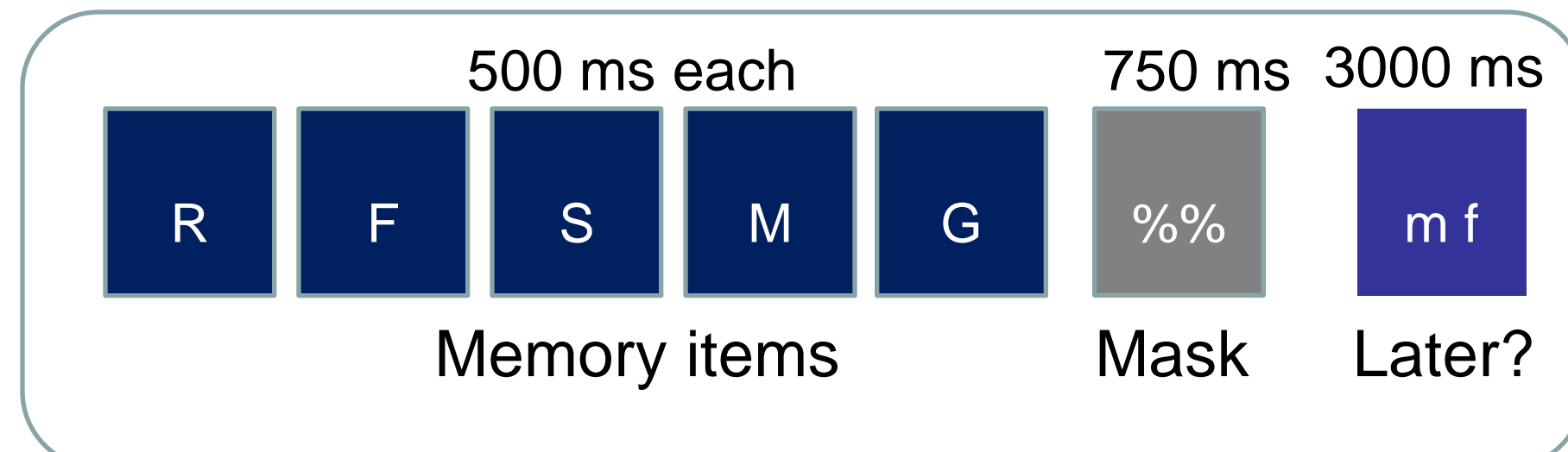


Approach

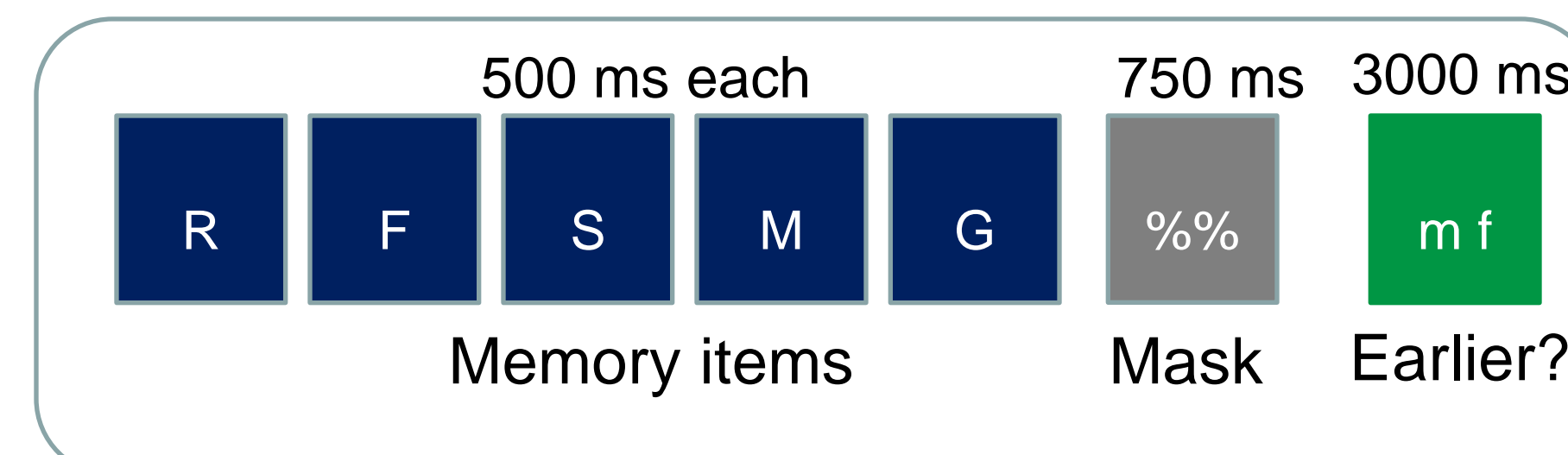
Participants (n=40) completed a one hour session and 3 of 4 conditions (order counterbalanced):

- Verbal Judgment of Recency
- Verbal Judgment of Primacy
- Spatial Judgment of Recency
- Spatial Judgment of Primacy

Verbal Judgment of Recency



Verbal Judgment of Primacy



Analysis: Reaction time and accuracy as a function of the serial position of the probed target.

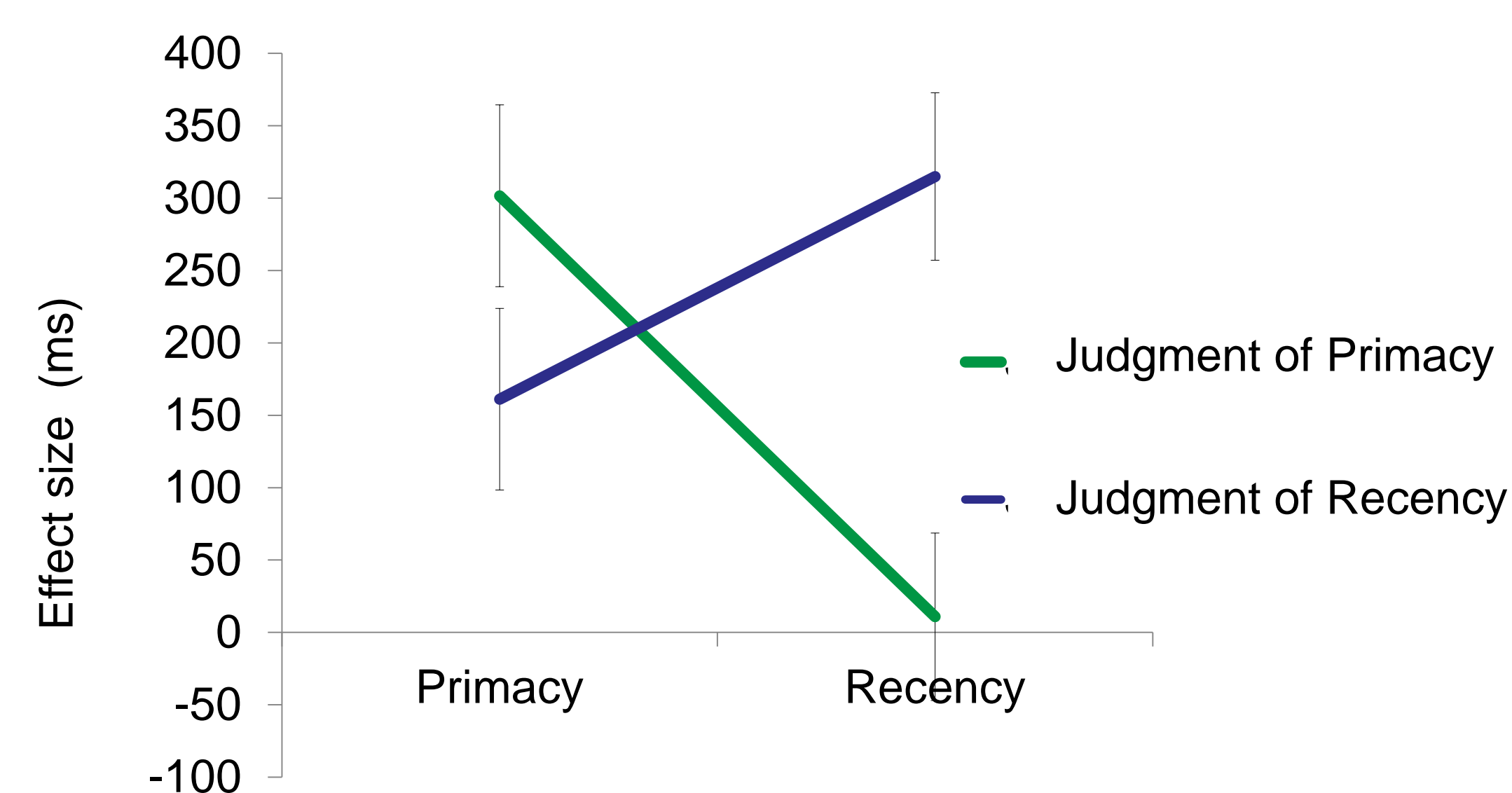
Prediction: The magnitude and relative size of recency/primacy effects will depend on task demands.

Does the size of the primacy and recency effect change by task?

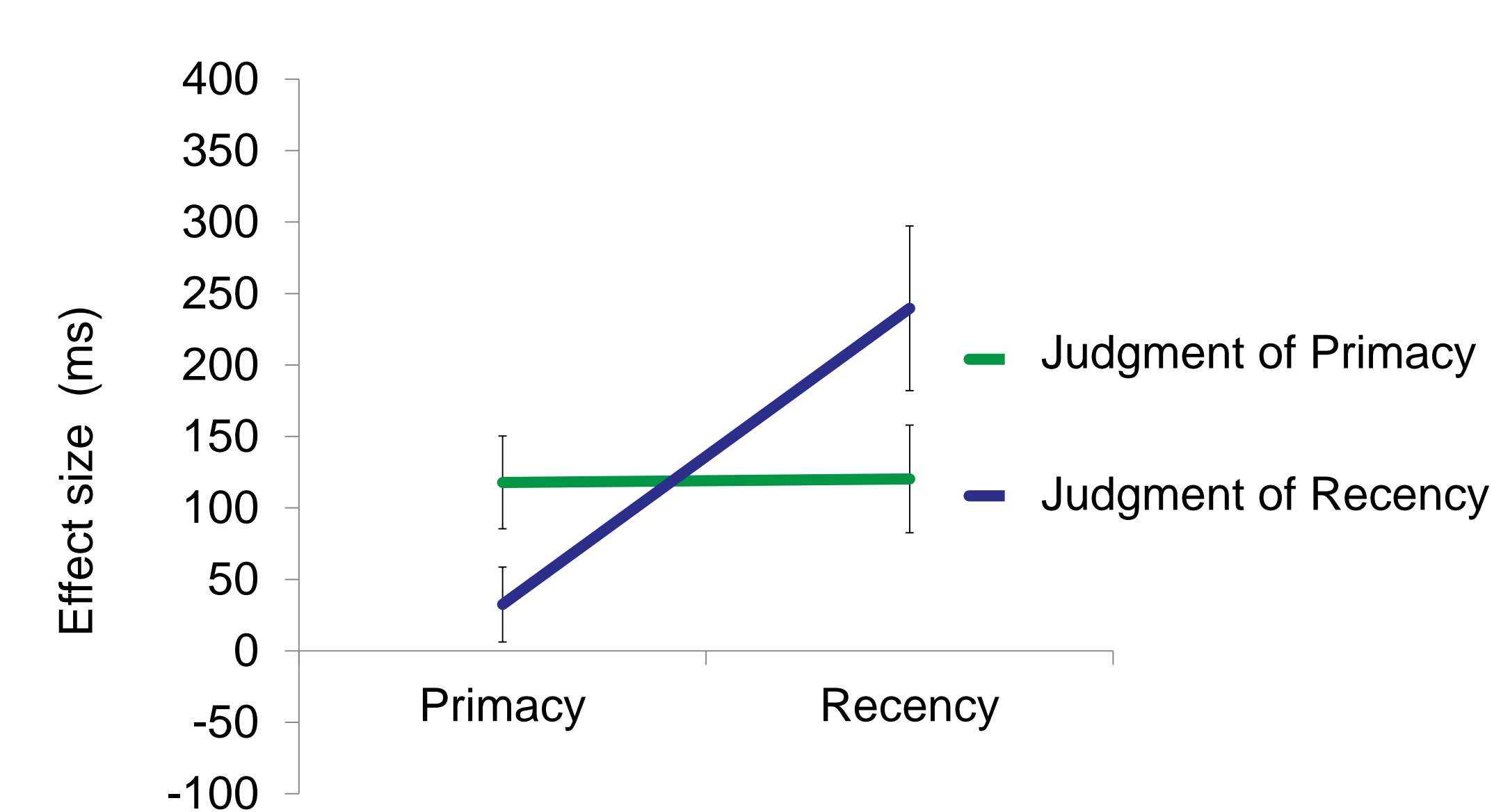
Primacy and recency effects estimated for each task.

- Recency effect = (Average RT of the two middle items) - (RT on the last possible item)
- Primacy effect = (Average RT of the two middle items) - (RT on the first possible item)

Serial Position Effects in Verbal Tasks



Serial Position Effects in Spatial Tasks



Interaction of task and serial position effect. Specifically, larger primacy in judgment of primacy and recency in judgment of recency.

Conclusions & Current Directions

In sum:

- Evidence of primacy and recency effects
- Interaction of serial position effects and task
- Task-dependence not readily explained by interference

Two interpretations:

One mechanism: The retrieval advantage afforded to primacy and recency items reflects the flexible allocation of the focus of attention to early versus late items, dependent on task demands.

Two mechanisms: The differential engagement of separate strategic (e.g. rehearsal) and attentional processes explain task-dependent variation in the primacy and recency effects.

Follow-up fMRI study:

- Comparison of the neural correlates of retrieval for items in different serial positions across task and strategy

- Differentiate between one and two mechanism accounts



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