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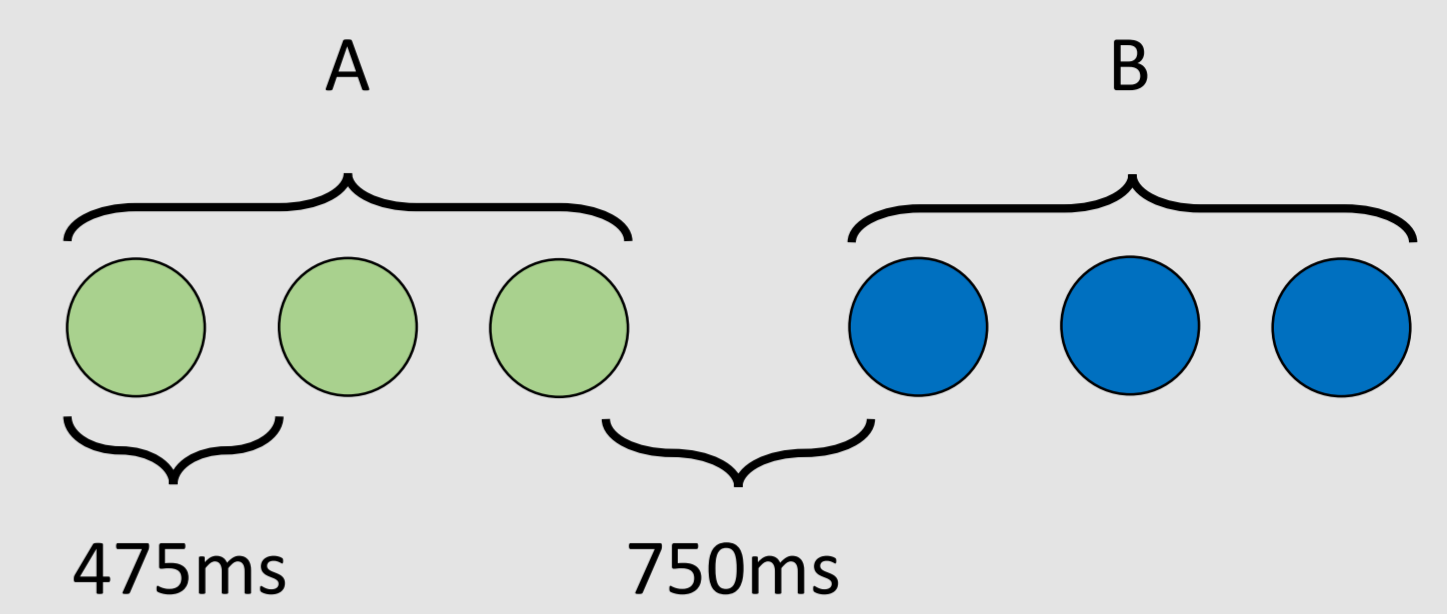
## Introduction & aim

**Short-term memory (STM) for item information**, i.e. the ability to recall memoranda independently of their serial position within a list, is typically enhanced by semantic knowledge. How linguistic information interacts with serial order, i.e. the ability to recall items in their correct serial position, remains however poorly understood. Yet, some theoretical models postulate **interactions between serial order STM and linguistic knowledge** (e.g. Acheson & Macdonald, 2009; Burgess & Hitch, 2006; Majerus, 2009, 2013). This study aimed at assessing whether and how linguistic knowledge and serial order STM interact, by examining the impact of semantic relatedness on serial order recall errors (**transposition errors**) in immediate serial recall and order reconstruction tasks.

## Method

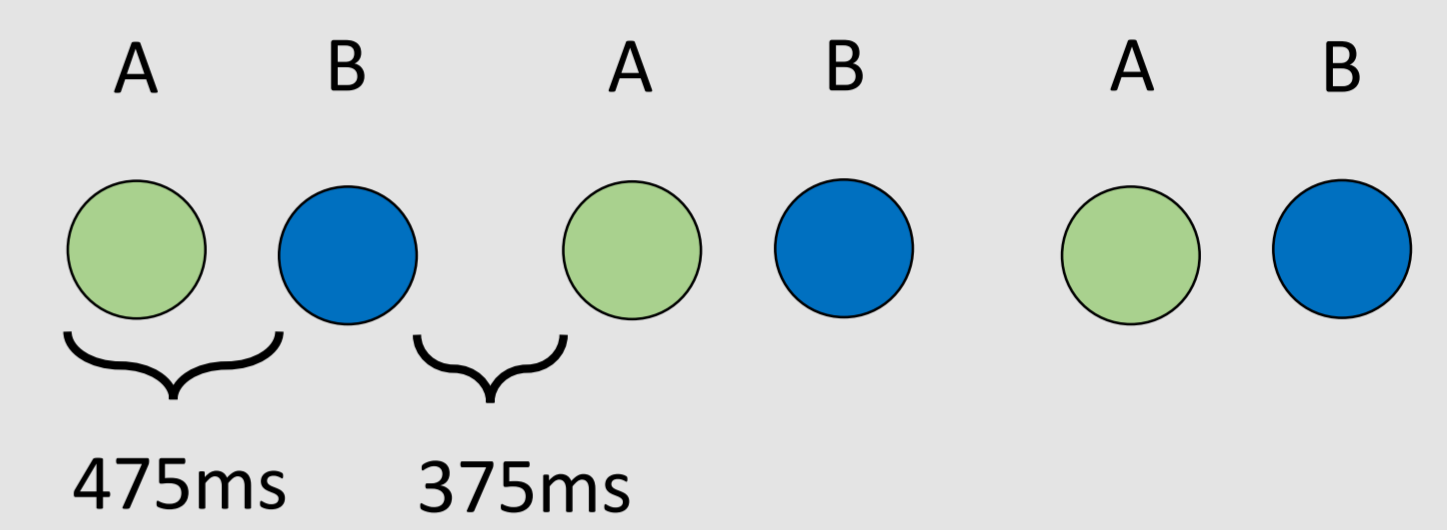
### Experiment 1 – Immediate serial recall task (N = 39)

The words in the **6-items** lists were semantically related by **groups of 3** (e.g. **three, leaf, branch, cloud, sky, rain**) in the related condition, or they were unrelated. In addition, in half of the lists, words were **temporally grouped by groups of 3** by inserting a temporal pause between groups.



### Experiment 2 – Immediate serial recall task (N = 40)

The semantically related words were presented in an **interleaved format** (e.g. **three, cloud, leaf, sky, branch, rain**). In half of the trials, the words were **temporally grouped by groups of 2** by inserting a pause after two successive items.

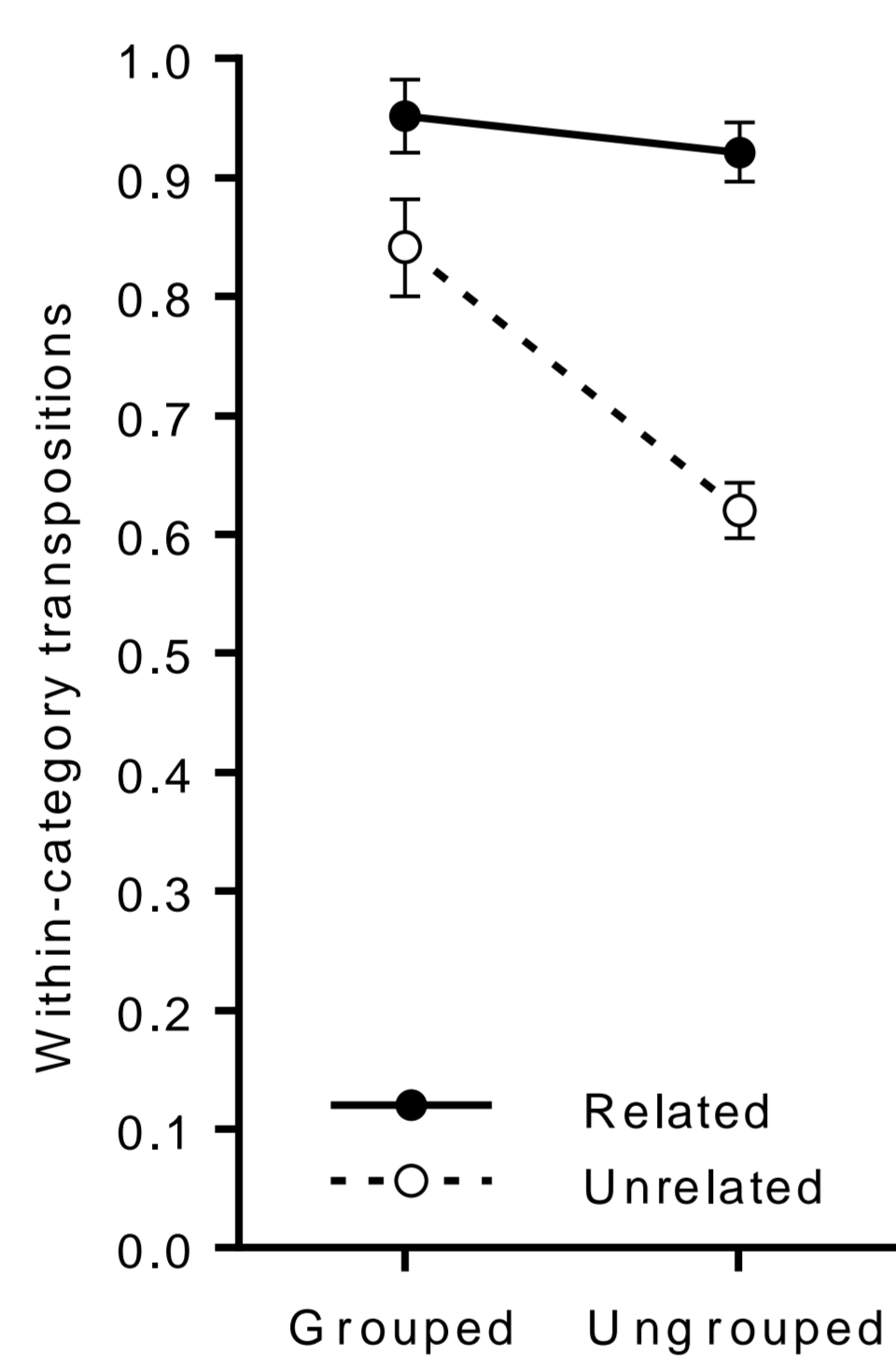
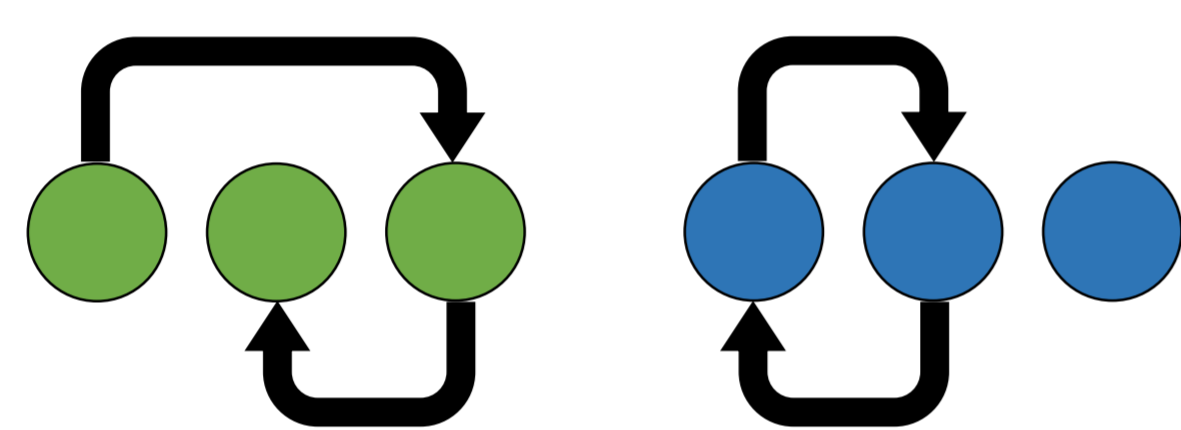


**Experiment 3 – Order reconstruction task (N = 13)** Same setup as Experiments 2 (interleaved semantic format), except that we presented lists of **8 written words** and used an **order reconstruction task**.

## Results

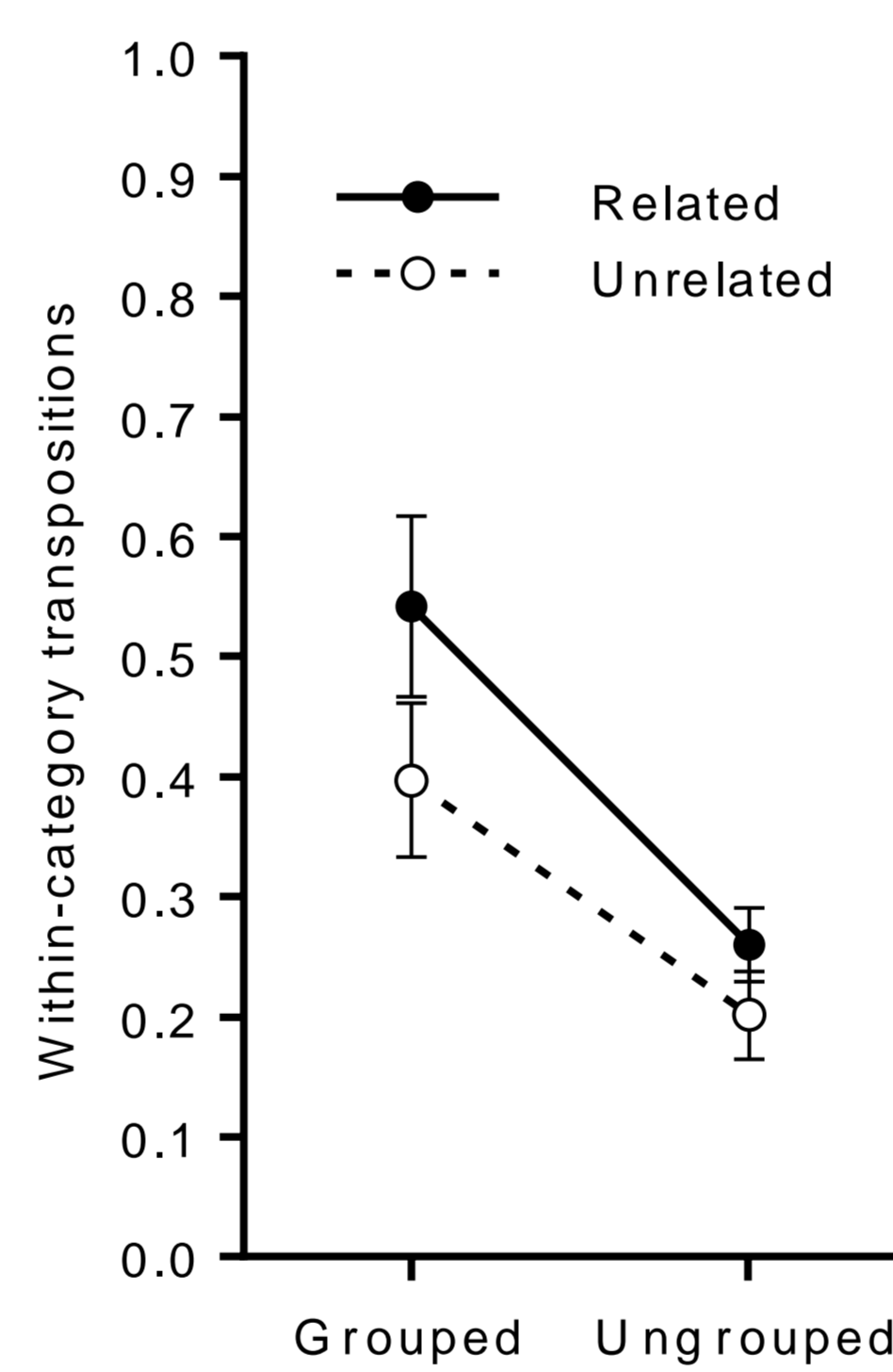
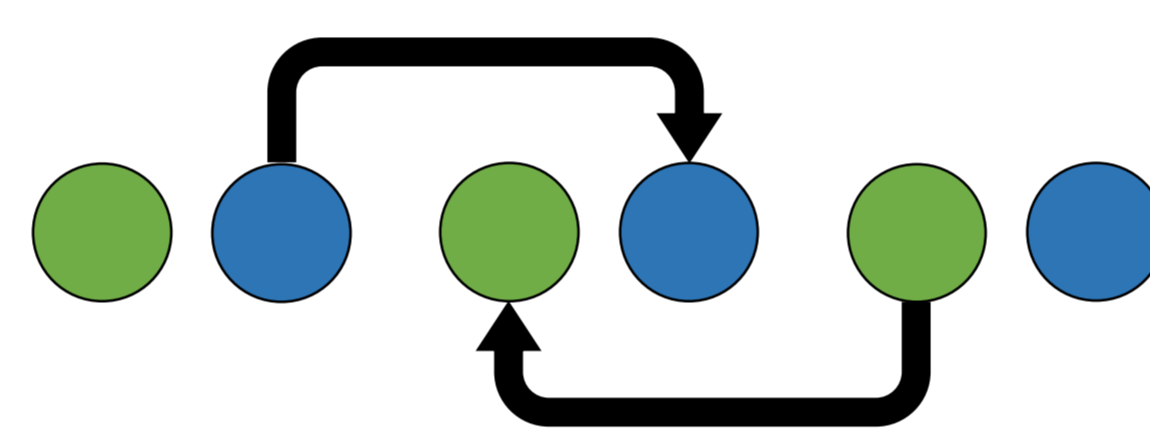
### Transposition error analysis

#### Experiment 1 – Immediate serial recall



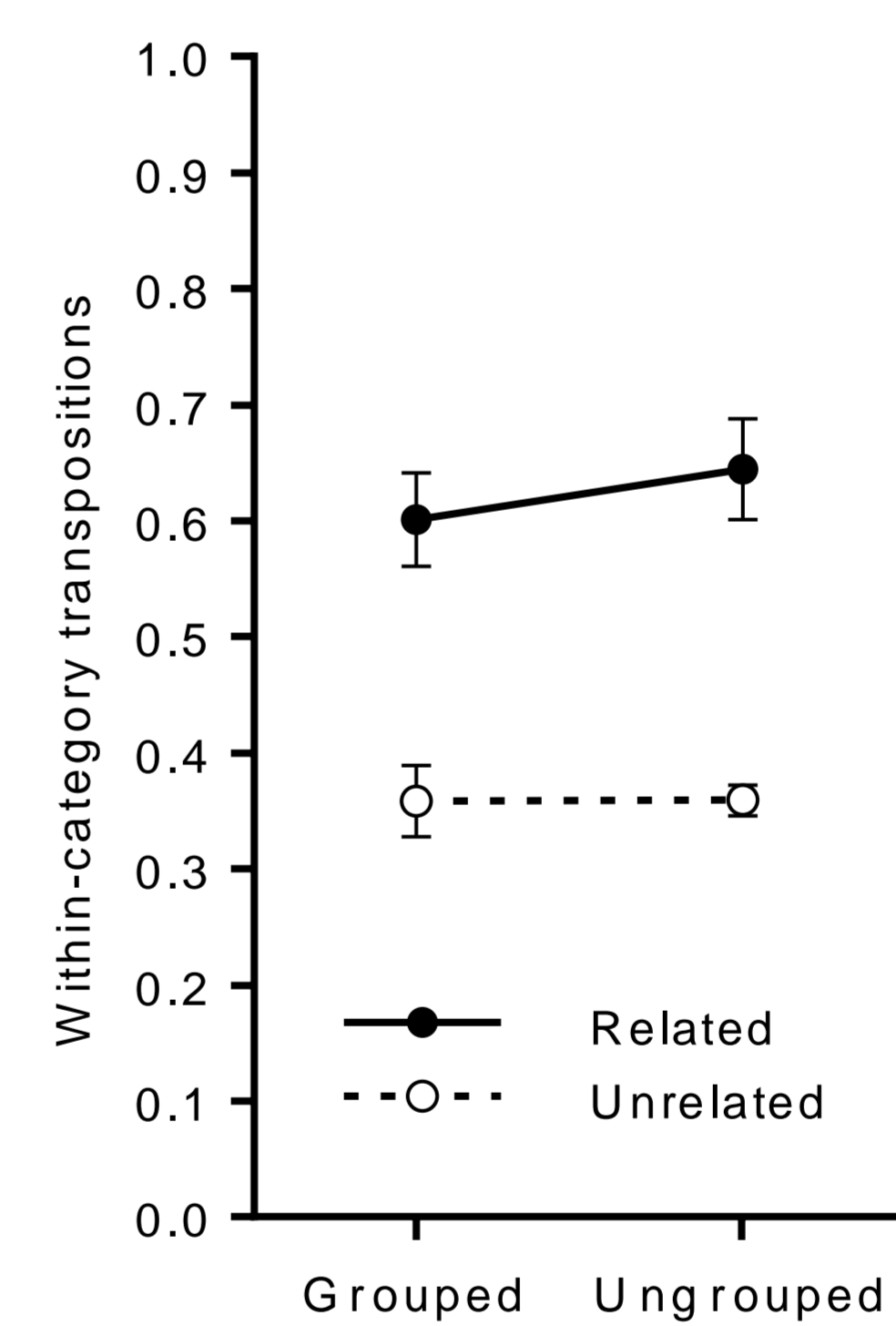
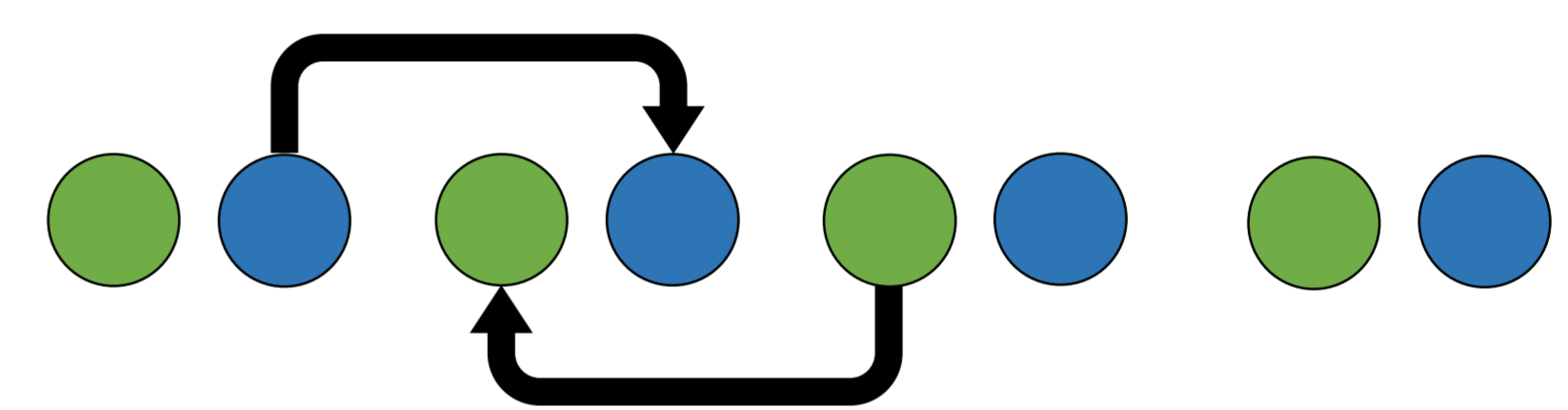
Semantic relatedness:  $BF_{10} > 100$   
Temporal grouping:  $BF_{10} > 100$   
Interaction:  $BF_{10} > 87.43$

#### Experiment 2 – Immediate serial recall



Semantic relatedness :  $BF_{10} = 1.25$   
Temporal grouping:  $BF_{10} > 100$   
Interaction:  $BF_{10} = 0.876$

#### Experiment 3 – Order reconstruction task



Semantic relatedness:  $BF_{10} > 100$   
Temporal grouping :  $BF_{10} = 0.363$   
Interaction:  $BF_{10} = 0.564$

## Discussion & Conclusion

- **Semantic relatedness** led to increased serial order confusions errors between items related at the semantic level, but only in the **direct semantic grouping** condition (Experiment 1), in which both semantic and serial position codes were similar and confusable.
- In the **interleaved semantic** condition, more serial order confusion errors were observed only in the reconstruction task (Experiment 3), but not in the immediate serial recall task (Experiment 2).

- These results highlight direct interactions between the coding of verbal item information and the coding of serial position information
- Available STM frameworks allowing for these interactions need further specification, especially at the semantic level (e.g. Burgess & Hitch, 2006; Majerus, 2009).
- Linguistic models (e.g. Acheson & MacDonald, 2009; Dell et al., 1997) need to integrate serial order coding mechanisms.

## References

Acheson, D. J., & Macdonald, M. C. (2009) *Psychological Bulletin*, 135(1), 50–68.  
Burgess, N., & Hitch, G. J. (2006) *Journal of Memory and Language*, 55(4), 627–652.  
Dell, G. S., Schwartz, M. F., Martin, N., Saffran, E. M., & Gagnon, D. A. (1997). Lexical Access in Aphasic and Nonaphasic Speakers. *Psychological Review*, 104(4), 801–838.  
Majerus, S. (2009) In *Interactions between short-term and long-term memory in the verbal domain* (p. 244).

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