

Similarity Effects in Visuospatial Working Memory

Kowialiewski, B.,¹ Remouchamps, R.,² Oberauer, K.,¹ Majerus, S.²
¹Cognitive Psychology Unit, University of Zurich, ²PsycNCog Unit, University of Liège

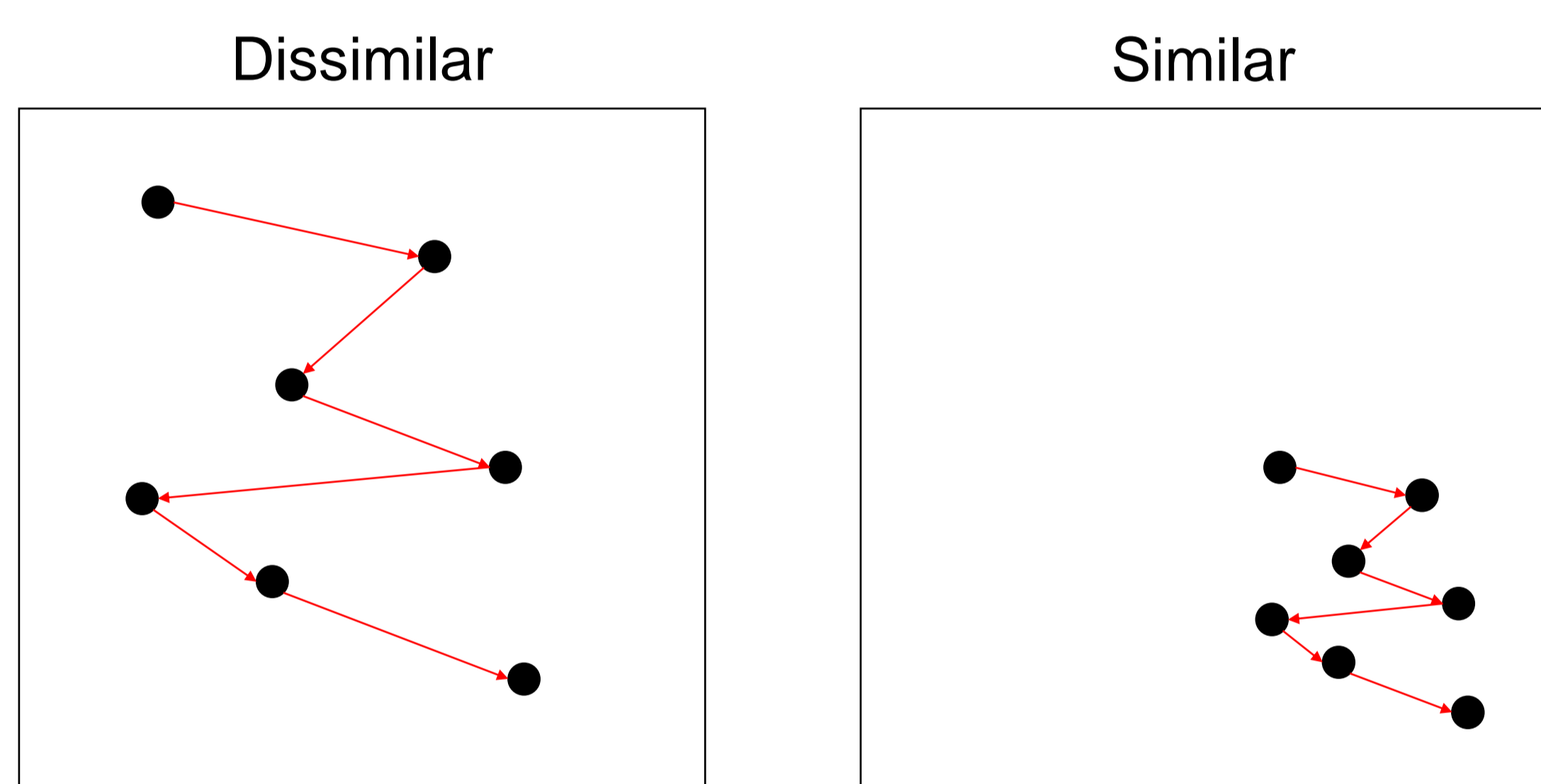
1. Introduction

Between-item similarity strongly impacts working memory (WM) performance. Similarity effects in verbal WM have largely been documented as increasing item memory (Gupta et al., 2005), while also decreasing memory for order (Baddeley, 1966). Despite the importance of stimulus similarity for theories of WM, the way similarity impacts WM performance in the visuospatial domain remains poorly understood. Furthermore, some uncertainty remains regarding the factors that have been controlled to manipulate similarity in visuo-spatial WM (Parmentier et al. 2005). In this study, we investigate the impact of visuospatial similarity on both memory for item and order information.

2. Methods

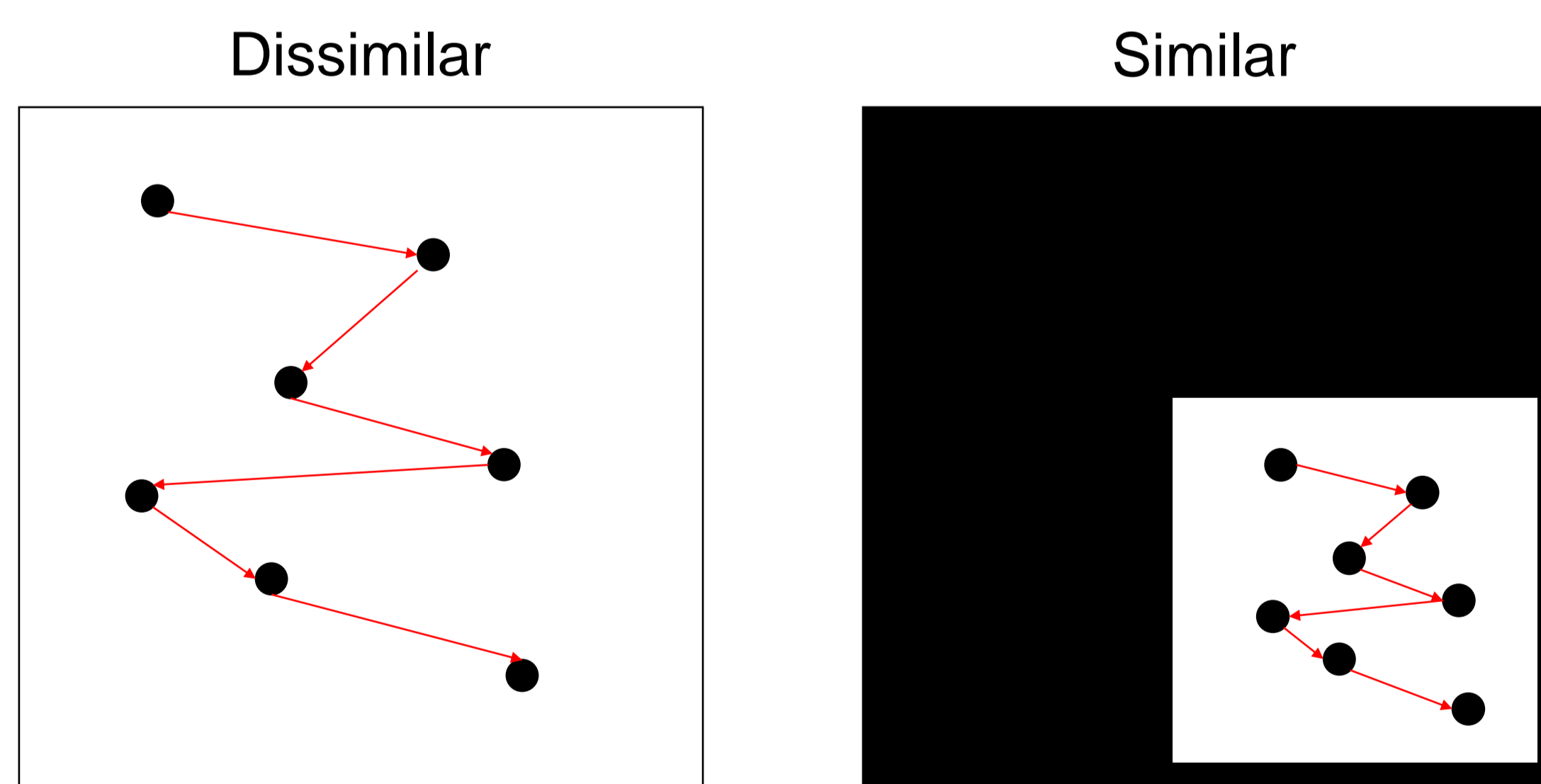
We asked thirty healthy adult participants to encode sequences of 7 dots presented at different spatial locations. At test, participants had to reproduce the sequences of locations (scored for item memory and order memory) or reconstruct the order of locations (pure order memory).

Encoding: Experiment 1



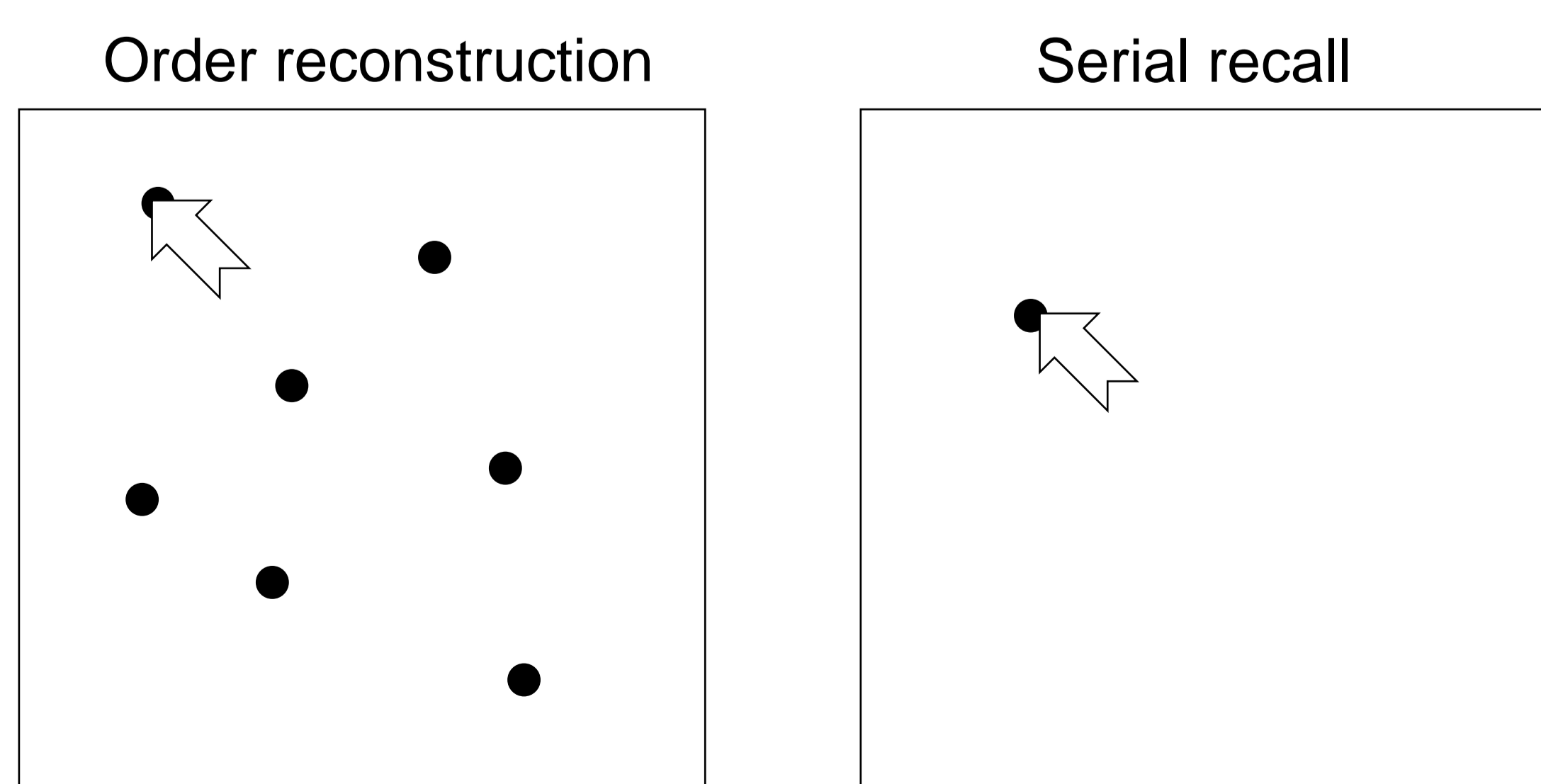
Shrunk by 2.5 + random xy translation

Encoding: Experiment 2



In Experiment 2, a black frame corresponding to the degree of shrinkage was added around similar sequences.

Retrieval: Experiments 1&2

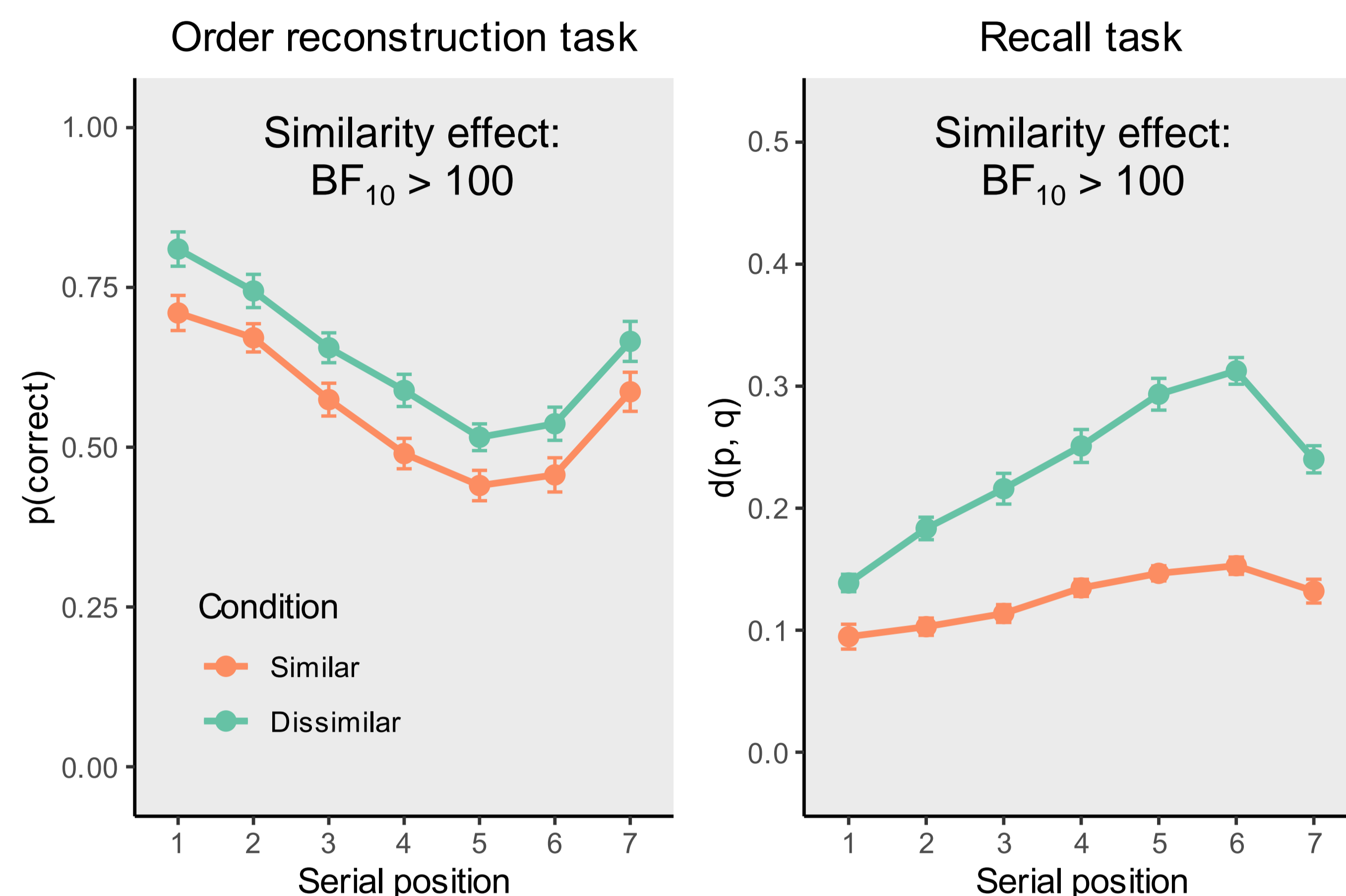


Order memory +++

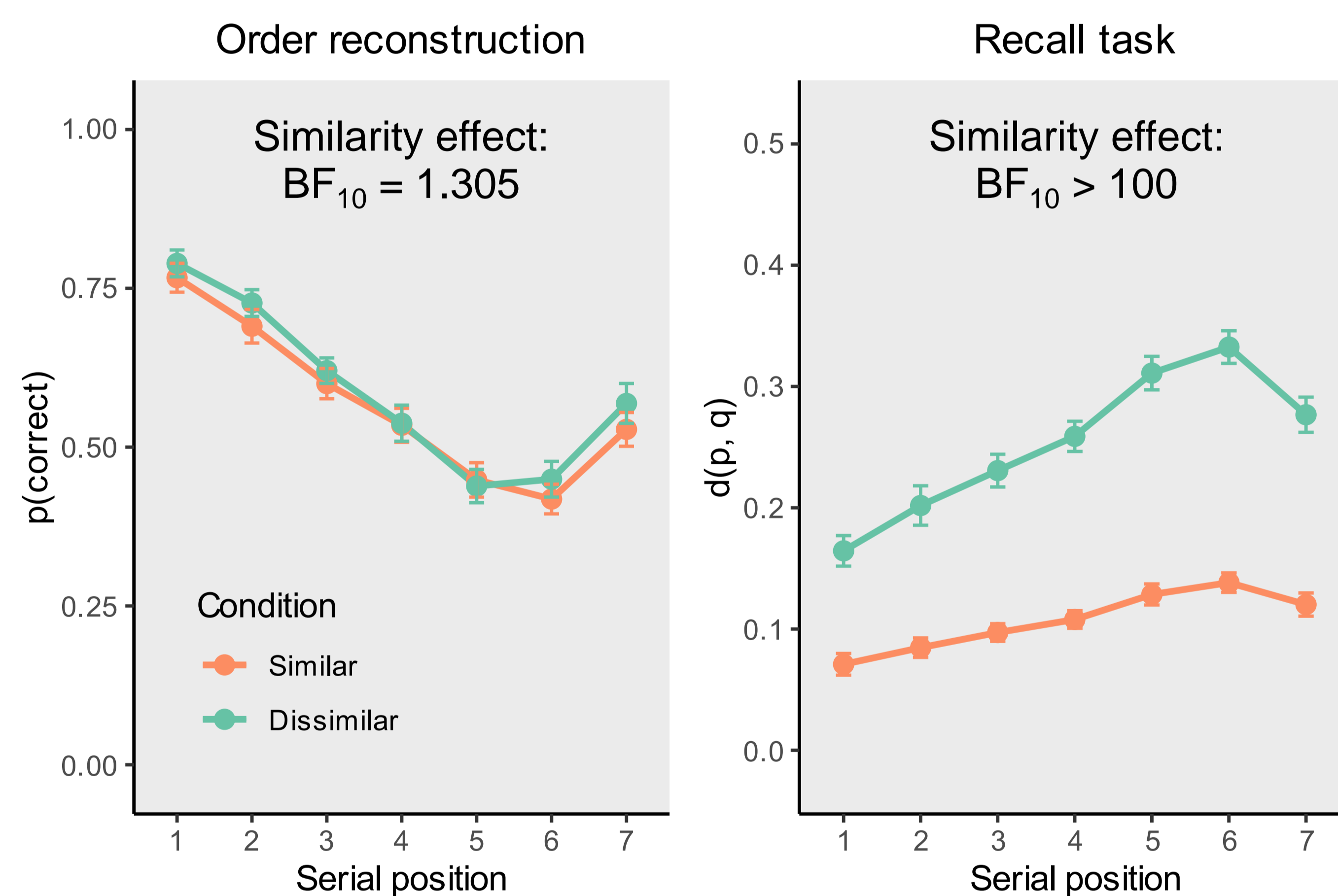
Item memory ++
Order memory +

3. Results

Experiment 1



Experiment 2



4. Discussion

The important results indicate a beneficial effect of visuospatial similarity on item memory, and a deleterious effect on order memory. Adding a black frame on the similar sequences to force participants shrinking their representation canceled the deleterious effect of similarity on order memory. These findings reproduce the typical similarity effect as observed in the verbal domain, and support theories considering that visuospatial and verbal WM are characterized by the same representational properties.

Contact

Benjamin Kowialiewski
benjamin.kowialiewski@uzh.ch; bkowialiewski@uliege.be

References

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- Parmentier, F. B. R., Elford, G., & Maybery, M. (2005). Transitional Information in Spatial Serial Memory: Path Characteristics Affect Recall Performance. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 31(3), 412-427. <https://doi.org/10.1037/0278-7393.31.3.412>