

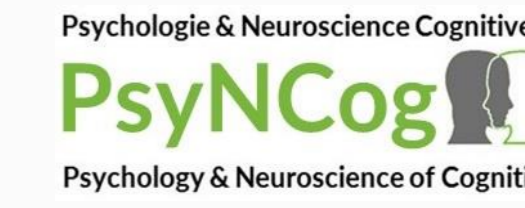


Effects of the organization of practice on a mirror-reading paradigm in Alzheimer's Disease

Vincent Marinelli, Sarah Merbah, Thierry Meulemans

University of Liège

Contact: vincent.marinelli@uliege.be



1. INTRODUCTION

Contextual Interference Effect (CIE, Shea & Morgan, 1979) in motor procedural learnings (PL):



- Poorer performance during acquisition
- But better retention and transfer

Why?

- Requires more cognitive investment
 - More elaborate encoding

CIE in Alzheimer's Disease (AD) in motor PL (Dick et al., 1996)



Why?

- Requires less controlled processing (Haaland et al., 1997)

- Merbah, Salmon, Meulemans (2011) – Impaired performance on **mirror reading paradigm** in AD

Goal of this study

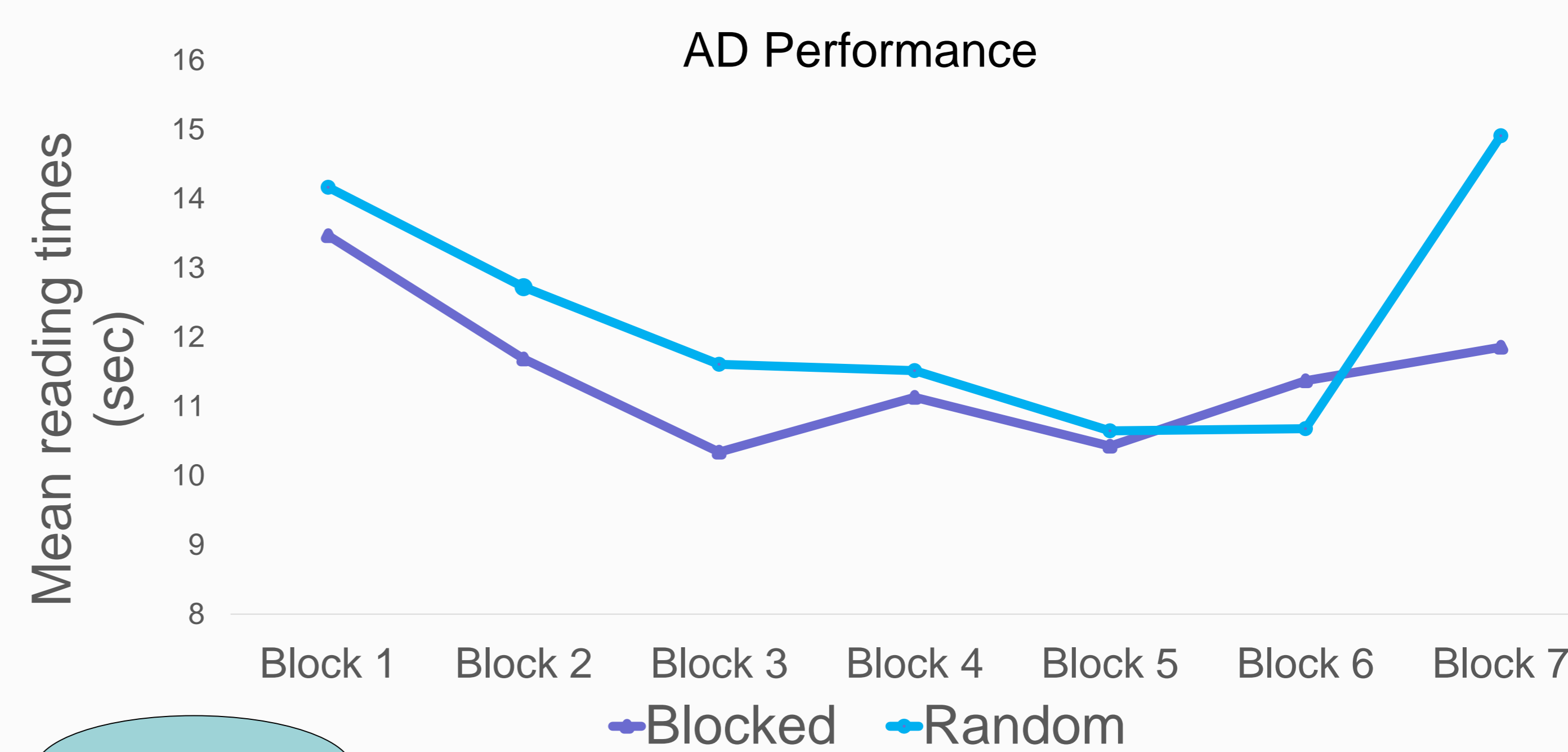
- Could CIE explain impaired performance in **procedural perceptual learnings** in AD?
- **Hypothesis:** Better transfer and retention in blocked than in random condition in AD

2. METHODOLOGY

- **Mirror reading task:** to read pseudowords (PW) sheets as fast as possible
- 24 AD – 21 controls matched on age (mean age = 76)
- Organization of the task: **varying letters constituting PW**

	Letters A		Letters B		Letters C		
	A1	A2	B1	B2	C		
	V-A-H-I-T	M-O-U-W-X	B-C-D-L	J-P-R-y	F-E-G-K-N-Q-S-Z		
	Pre-Test Phase	Acquisition Phase				Test Phase	
		Day 1				Day 2 (24h later)	
		Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Blocked	A1+B	A1+B1		A1+B2		A1+B	A2+C
Random	A1+B	A1+B				A1+B	A2+C

3. RESULTS



ANOVA

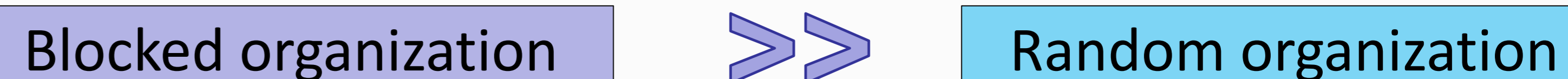
- Main learning effect (blocks 1, 6 & 7) – $F(2,44) = 24.7, p < .00001$
- No effect of Organization (Blocked or Random) – $F(1,22) = 0.4, p = .52$
- Significant Learning*Organization interaction – $F(2,44) = 9.82, p < .0001$

Planned contrasts	Blocked condition	Random condition
Block 6 < 1	$F(1,11) = 6.61, p < .03$	$F(1,11) = 49.15, p < .0001$
Block 7 < 1	$F(1,11) = 13.59, p < .01$	$F(1,11) = 2.35, p = .15$
Block 6 < 7	$F(1,11) = 0.47, p = .51$	$F(1,11) = 51.00, p < .0001$

- Controls show expected effects:
 - PL (Block 7 < 1) in the random condition ($F(1,9) = 9.37, p = .01$)
 - Not in the blocked condition ($F(1,10) = 2.96, p = 0.12$).

4. CONCLUSION

- Repetition priming in both conditions
- **Procedural learning only in Blocked condition**



Why?

Any PL is first characterized by the need to involve controlled processes (Anderson, 1997)

➔ Random condition would exceed AD working memory capacity because of the greater number of letters to process in the same block

5. REFERENCES

- Anderson, J. R., Fincham, J. M., & Douglass, S. (1997). The role of examples and rules in the acquisition of a cognitive skill. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 23(4), 932-945. <http://dx.doi.org/10.1037/0278-7393.23.4.932>
- Dick, M. B., Shankle, R. W., Beth, R. E., Dick-Muehlke, C., Cotman, C. W., & Kean, M.-L. (1996). Acquisition and Long-Term Retention of a Gross Motor Skill in Alzheimer's Disease Patients Under Constant and Varied Practice Conditions. *The Journals of Gerontology: Series B*, 51B(2), P103-P111. <https://doi.org/10.1093/geronb/51B.2.P103>
- Haaland, K. Y., Harrington, D. L., O'Brien, S., & Hermanowicz, N. (1997). Cognitive-motor learning in Parkinson's disease. *Neuropsychology*, 11(2), 180-186. <http://dx.doi.org/10.1037/0894-4105.11.2.180>
- Merbah, S., & Meulemans, T. (2011). Learning a Motor Skill: Effects of Blocked Versus Random Practice a Review. *Psychologica Belgica*, 51(1), 15-48. <https://doi.org/10.5334/pb-51-1-15>
- Shea, J. B., & Morgan, R. L. (1979). Contextual Interference Effects on the Acquisition, Retention, and Transfer of a Motor Skill. *Journal of Experimental Psychology: Human Learning and Memory*, 5(2), 179-187.