Working memory computerised task and cognitive abilities

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Working Memory span task = memorising items + processing stimuli

Lepine, Barrouillet, & Camos (2005):
WM span is much more predictive of cognitive abilities with Computer-paced than with Participant-paced processing.
(stimuli presented at predetermined rate) (participant control the presentation rate of stimuli)

St Clair-Thompson (2007):
WM span is much more predictive of cognitive abilities with Experimenter-paced than with Participant-paced processing.
(experimenter launch stimuli when participant ended processing)

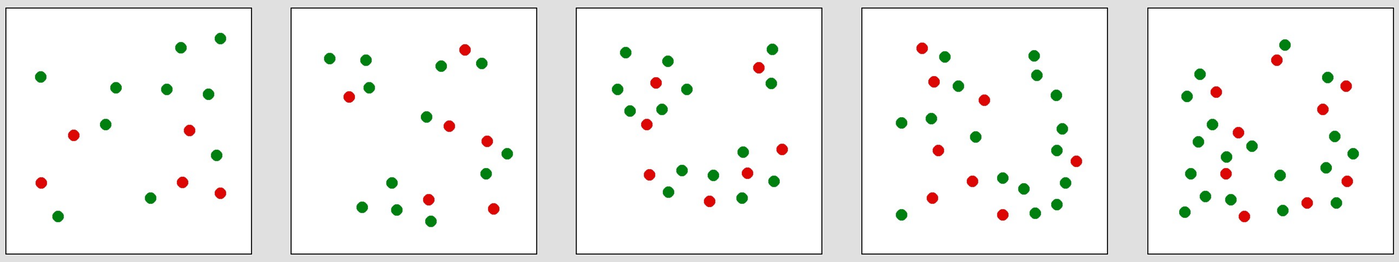
Conclusion: As Participant-paced leaves additional time to implement strategies, strategies do not contribute to relation between WM and cognitive abilities.

Does a Computer-paced task adjusted to participants capacities reduce strategies and increase prediction of cognitive abilities?

Material & procedure

Counting Task: Report the number of red dots using keyboard.

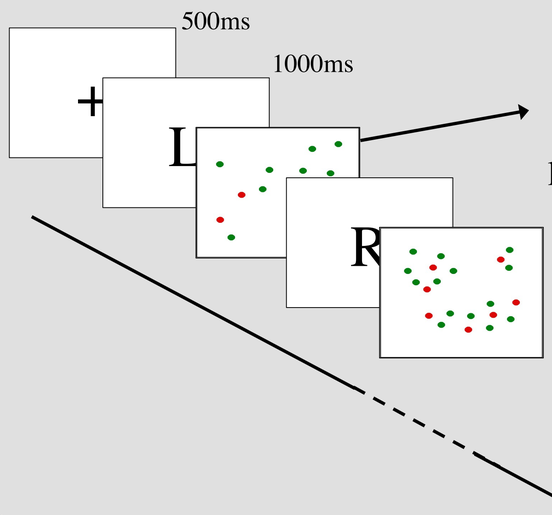
Sample of the 60 slides



5 red, 10 green | *6 red, 12 green* | *7 red, 14 green* | *8 red, 16 green* | *9 red, 18 green*

For each participant, the average time to count red dots on slides of a kind were calculated.

Counting span Task:
- Remember consonants (increasing length from 2 to 9 letters)
- Count red dots on each slide, 2 conditions (within subject)



Participant-paced
Slides were displayed as long as participant gave the response on keyboard.

Adjusted computer-paced
Slides were displayed for the specific time previously measured.

Cognitive abilities: French version of the DAT© (Differential Aptitude Tests)

Verbal

… is to right what Est is to …
① Left ……... North
② Direction …… Est
③ Right ……...South
④ Sloping ……direction
⑤ Left …… Est

Numerical

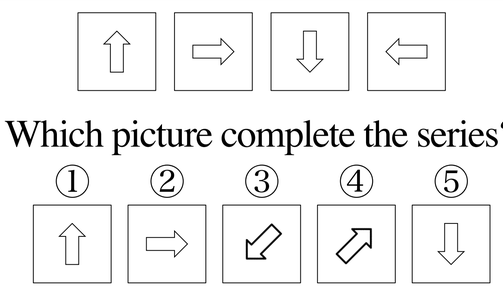
Which digit replace the ? in this addition?

	5 ?
+	2
	5 8

① 3
② 4
③ 7
④ 9
⑤ None

Abstract

Which picture complete the series?



- 25 problems for each cognitive ability
- 10 minutes to solve as much as possible

Results

Participants: 38 undergraduate students

Cognitive abilities (mean number of problems solved in 10 min)		Memory score*	
		Participant-paced	*Adjusted Computer-paced*
		4.82 (*1.07*)	4.45 (*1.21*)
Verbal	14.39 (*4.92*)	.43*	.24
Numerical	8.95 (*3.69*)	.40*	.29
Abstract	9.58 (*4.25*)	.38*	.25

* <.05

Conclusion

Participant-paced seems to be a stronger predictor of cognitive abilities …

… inconsistent with data from:
- Lepine et al. (2005)
- St Clair-Thompson (2007)

Oral processing → **Rehearsal –** → Computer-paced predicted cognitive abilities

Silent processing → **Rehearsal +** → Participant-paced predicted cognitive abilities

Are cognitive abilities predicted by Computer-paced WM or by prevention of rehearsal?

Lepine, R., Barrouillet, P., & Camos, V. (2005). What makes working memory spans so predictive of high-level cognition? *Psychon Bull Rev, 12(1), 165-170*.
St Clair-Thompson, H. (2007). The influence of strategies upon relationships between working memory and cognitive skills. *Memory, 15(4), 353-365*.

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