

The Validity and Reliability of the Repetition-Detection Task

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What is Working Memory?

- + Definition
 - + Simultaneous storage and processing of information
- + WM research
 - + Baddeley & Hitch (1974)
 - + Cowan (1988; 2001)
- + Real world applications of working memory

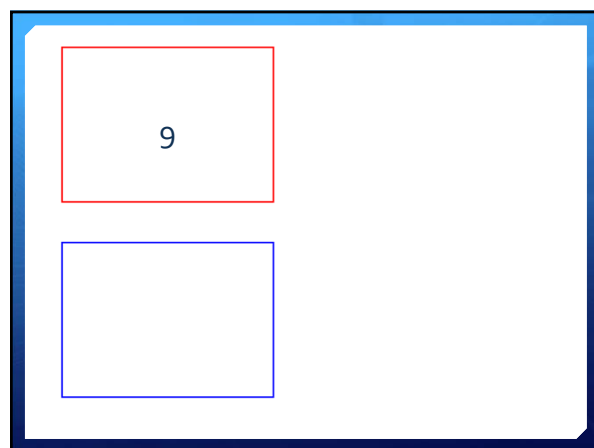
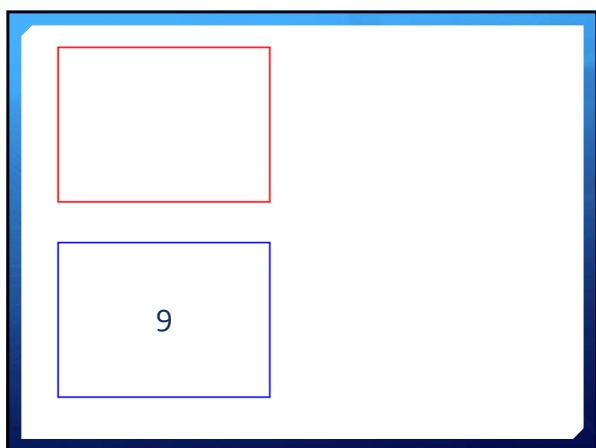
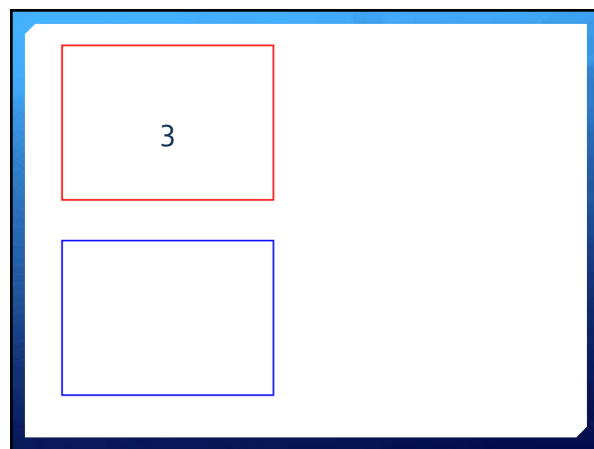
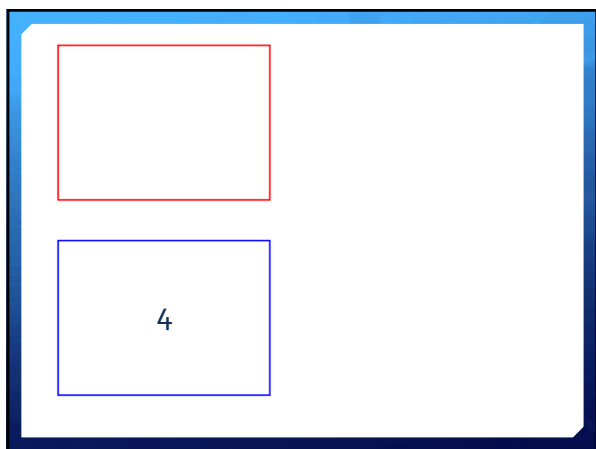
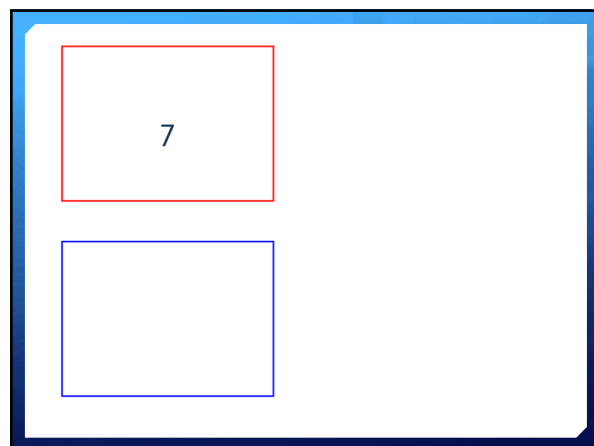
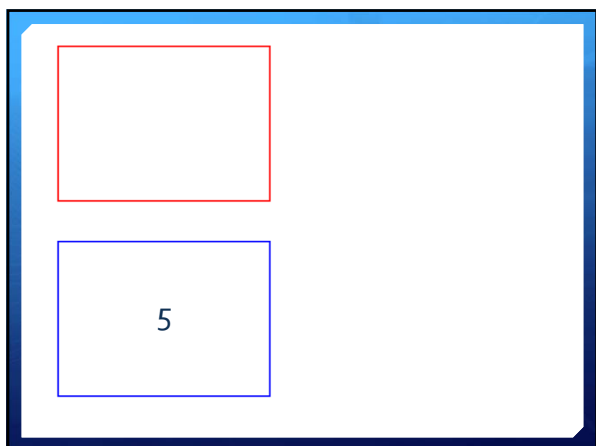
Repetition-Detection (RD) Task

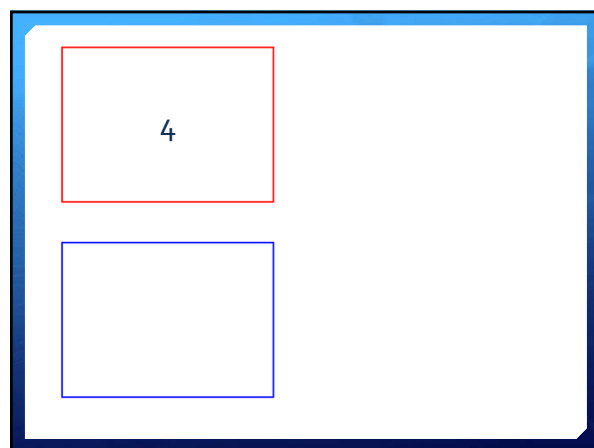
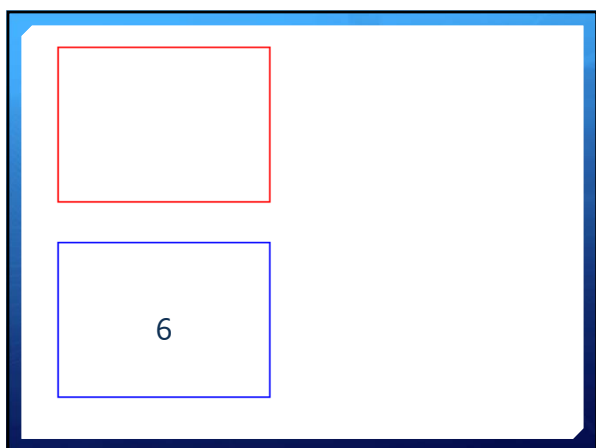
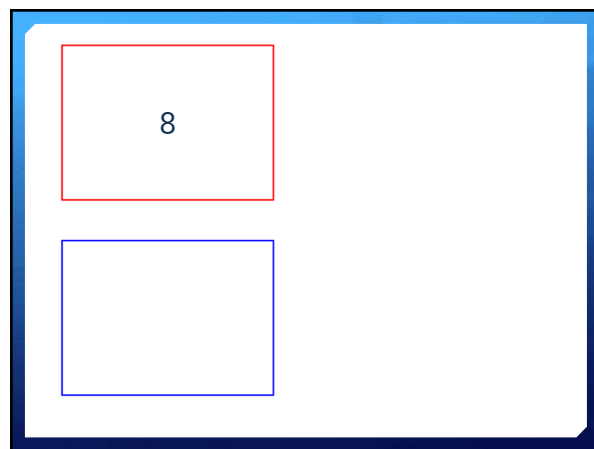
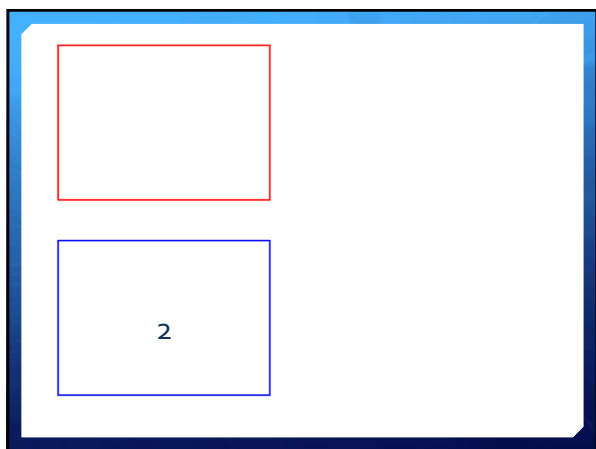
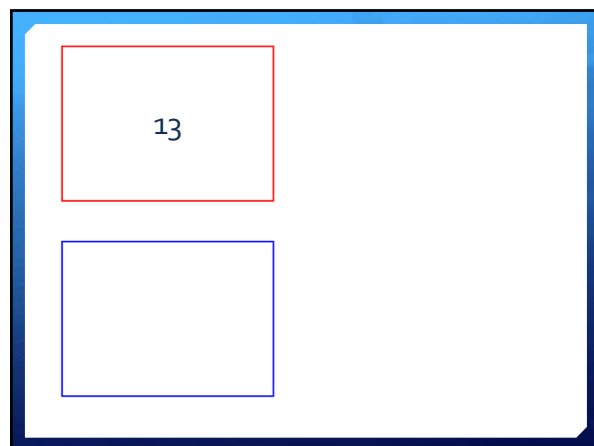
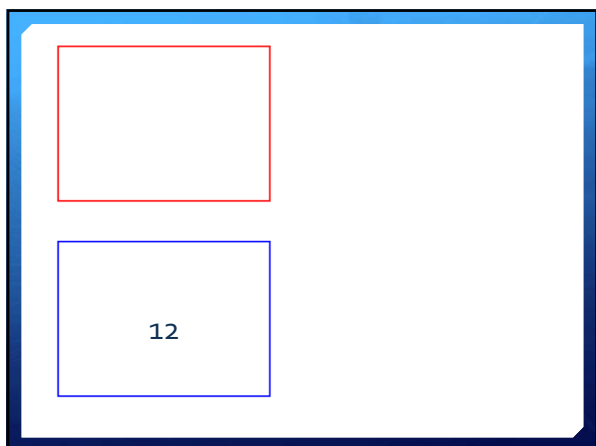
- + Designed by Dr. Kara Bopp
 - + Bopp & Verhaeghen (2007; 2009)
- + Task: identify the repeated stimulus in a series of stimuli
- + Single-series or dual-series task
 - + Single: Find the repeat
 - + Dual: Find repeat in top and bottom series
- + Demonstration
 - + Dual-series

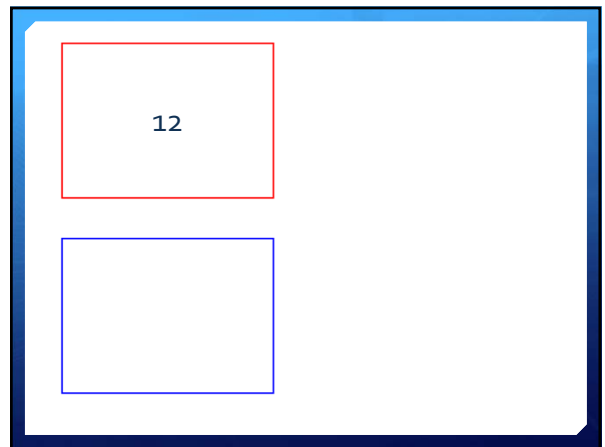
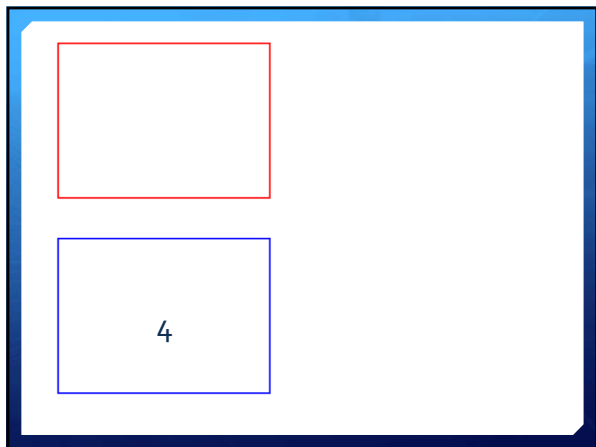
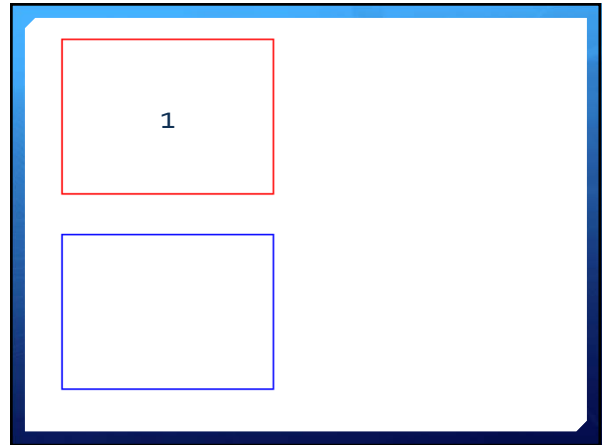
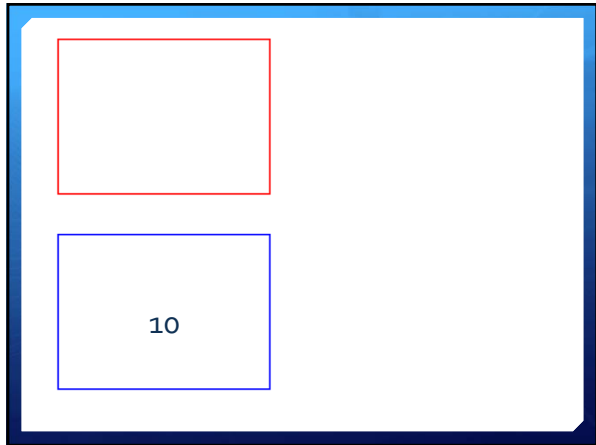
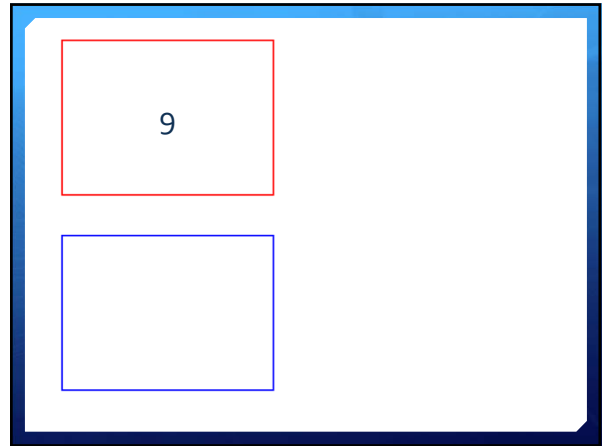
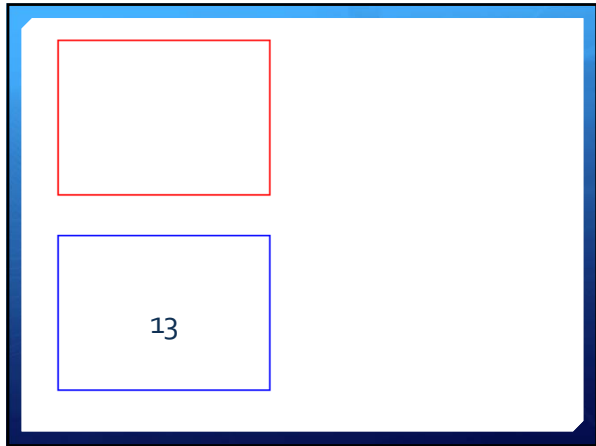
Welcome to the experiment.

Please press the spacebar to begin.

Please press the spacebar to begin the next trial.







A blue-bordered box containing a red square and a blue square. The blue square contains the number 7.

A blue-bordered box containing a red square with the number 14 and a blue square.

A blue-bordered box containing a red square and a blue square with the number 15.

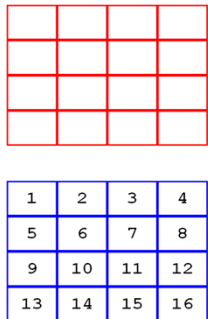
A blue-bordered box containing a red square with the number 10 and a blue square.

A blue-bordered box containing a red square and a blue square with the number 8.

A blue-bordered box containing a 4x4 red grid numbered 1-16, a 4x4 blue grid, and text: "Please click your response for the top red grid."

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

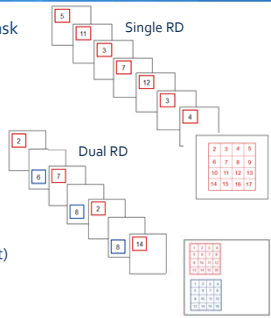
Please click your response for the top red grid.



Please click your answer for the bottom blue grid.

Repetition-Detection (RD) Task

- + Processing components of the task
 - + Storage
 - + Processing
- + Independent Variables
 - + Memory Load
 - + Lag
- + Dependent Variables
 - + Accuracy
 - + Presentation time (before repeat)
- + Advantages of the task



Our Study

- + Purpose
- + Reliability
- + Validity
 - + Convergent
 - + Discriminant
 - + Predictive

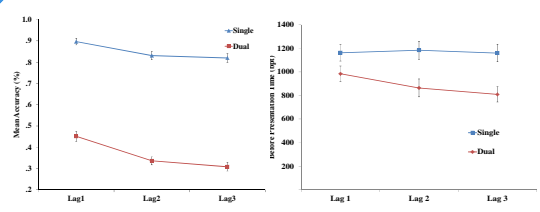
Methods and Procedure

- + Participants: N=60
- + Participants completed a battery of tasks across 2 sessions
 - + Working Memory
 - + Span tasks (O-span, digit span)
 - + General (N-back)
 - + Non-working memory
 - + Processing speed (symbol digit, FAS)
 - + Intelligence (Ravens Progressive Matrices)
 - + Vocabulary (Mill Hill)
- + Demographics Form
- + Counterbalancing and procedure

What We Expected

- + Hypotheses
 - + RD is a working memory task therefore...
 - + RD will correlate with other measures of working memory
 - + RD will not correlate with non-working memory tasks
 - + RD is a predictive measure of intelligence

Results



- + Consistent with prior findings
 - + Single easier than dual RD (in accuracy and processing time)
 - + As lag increases, accuracy decreases, but does not change processing time

Results

- + How were results analyzed?
 - + Pearson correlation coefficients
- + Reliability of RD task
 - + Processing time: Single $r = 0.98$, Dual $r = 0.95$
 - + Accuracy: Single $r = 0.55$, Dual $r = 0.80$
- + Validity
 - + Convergent
 - + N-back, O-span, Digit Span
 - + Discriminant
 - + Symbol Digit, Verbal Fluency, Mill Hill
 - + Predictive
 - + Ravens, GPA

Correlation Matrix for Convergent Validity

Task	R-D Single	R-D Dual	N-Back	Ospan	DStot
R-D Single		0.29*	0.37**	0.18	0.32*
R-D Dual			0.54**	0.19	0.26*
N-Back				0.21	0.09
Ospan					0.39**
DStot					

Correlation Matrix for Discriminant Validity

Task	R-D Single	R-D Dual	Symbol Digit	FAS task	Mill Hill
R-D Single		0.292*	0.25	0.1	0.22
R-D Dual			0.32*	-0.02	0.23
Symbol Digit				0.21	-0.04
FAS task					0.33*
Mill Hill					

Correlation Matrix for Predictive Validity

Task	R-D Single	R-D Dual	Raven's	GPA
R-D Single		0.29*	0.13	0.12
R-D Dual			0.18	0.40**
Raven's				-0.02
GPA				

Discussion

- + Replication of previous WM findings
- + RD is a reliable measure of WM
- + RD is a valid measure of WM
 - + Are there different types of working memory?
- + Predictive validity findings
- + Future studies
 - + Widely-used measure of working memory
 - + Training studies

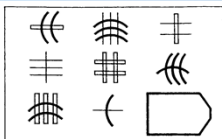
Thank you.

+ QUESTIONS?

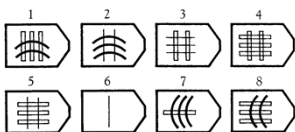


Forms of intelligence

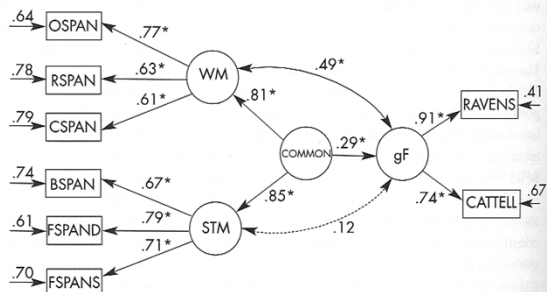
- + Cattell & Horn (1966)
- + Crystallized intelligence
- + Fluid intelligence



- + Raven's progressive matrices

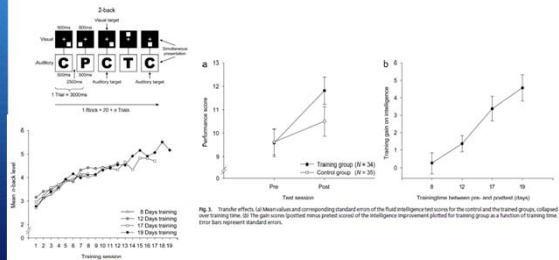


WM model: Engle (2001)



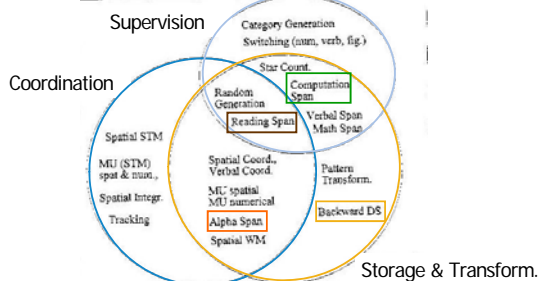
Jaeggi et al. (2008)

- + WM training study: <http://brainworkshop.sourceforge.net/>

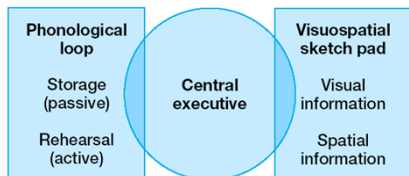


Fractionalization of WM

Oberauer, et al. (2000)



Baddeley & Hitch (1974)



Baddeley's working memory model