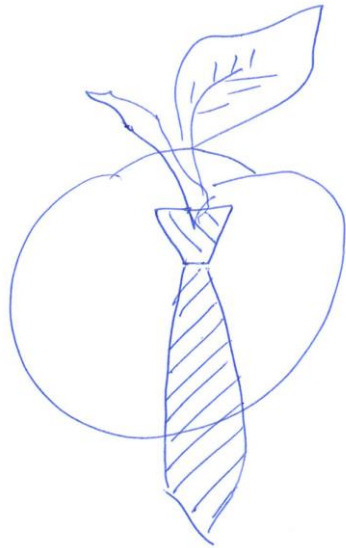


Drawing as an encoding tool enhances associative memory in younger but not in older adults



Rebecca Ovalle-Fresa
Corinna S. Martarelli

ESCoP Lille 2022

Benefit of drawing on associative memory?

Memory



Associative memory: ability to encode, store & retrieve associations (e.g., word-pairs)

Memory



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Item memory: ability to remember individual items (e.g., single words)

Memory



Associative memory: ability to encode, store & retrieve associations (e.g., word-pairs)

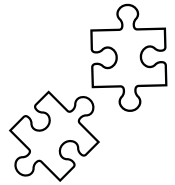


Item memory: ability to remember individual items (e.g., single words)



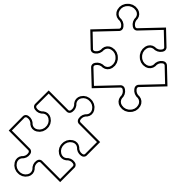
Episodic memory: ability to remember past events in context of time and space (Tulving, 1972)

Episodic Memory & Age

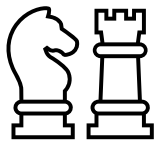


Associative deficit hypothesis: age related decline in episodic memory due to impaired associative memory, rather than item memory (Naveh-Benjamin, 2000)

Episodic Memory & Age



Associative deficit hypothesis: age related decline in episodic memory due to impaired associative memory, rather than item memory (Naveh-Benjamin, 2000)



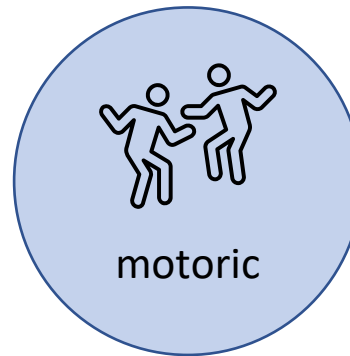
Strategy use deficit: difficulties in spontaneously using appropriate strategies without environmental support (Craig, 1983, Shing et. al, 2010)

Encoding Strategies



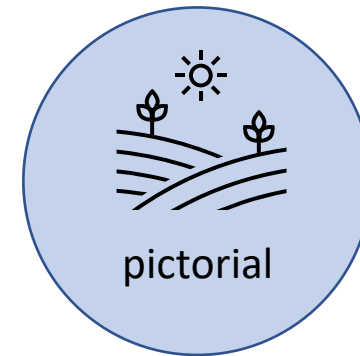
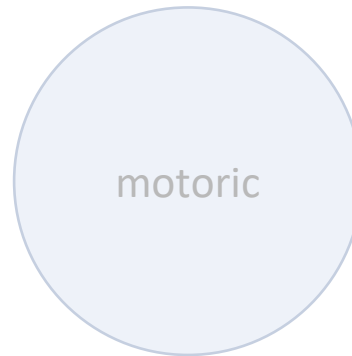
(e.g., Craik & Tulving, 1975;
O'Hanlon, Wilcox, & Kemper, 2001)

Encoding Strategies



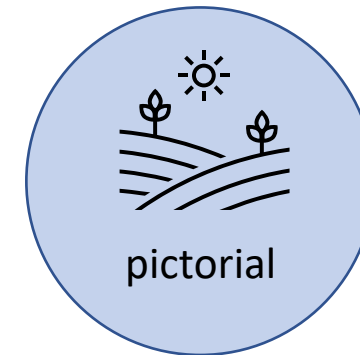
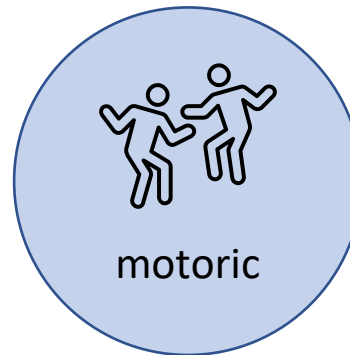
(e.g., Bäckman & Nilsson, 1984;
Feyereisen, 2009; Silva, Pinho, Souchay,
& Moulin, 2015)

Encoding Strategies



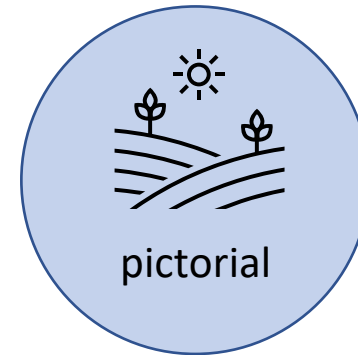
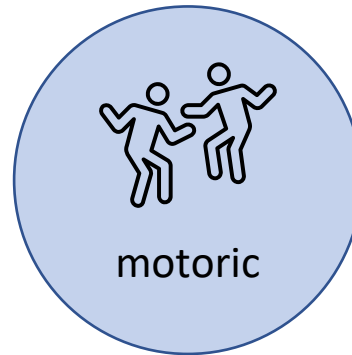
(e.g., Bower, 1970; Paivio, 1969, Dunklosky, Hertzog, & Powell-Moman, 2005; Naveh-Benjamin, Brav & Levy, 2007)

Encoding Strategies



-> Enhance **associative memory**, when studied in **isolation**

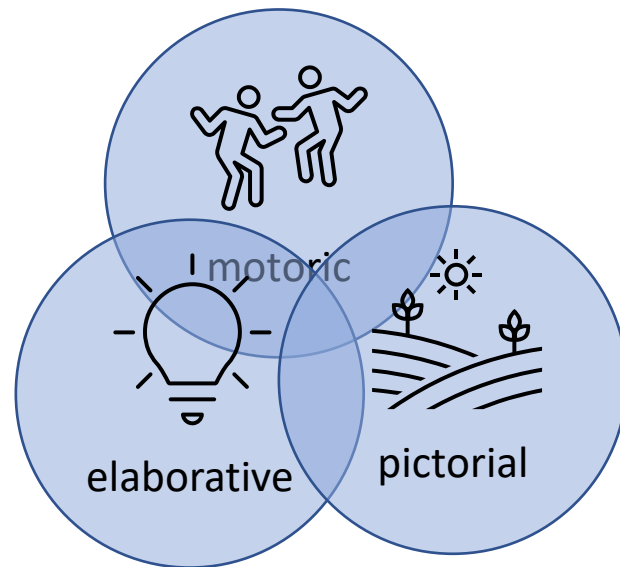
Drawing



Drawing

Combination of processes

(Fernandes, Wammes & Meade, 2018, Wammes, Jonker, Fernandes, 2019)



Drawing

Combination of processes

(Fernandes, Wammes & Meade, 2018, Wammes, Jonker, Fernandes, 2019)

Enhances item memory in younger and older adults (Paivio & Csapo, 1973, Meade, Wammes & Fernandes, 2018, Meade, Ahmad & Fernandes 2019)

Research Questions



Benefit in associative memory?



Research Questions



Benefit in associative memory?



Resolve associative deficit in older adults?



Research Questions



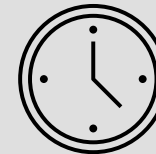
Benefit in associative memory?



Resolve associative deficit in older adults?



Benefit remains over time?



Experiment 1



Benefit in associative memory?



Resolve associative deficit in older adults?

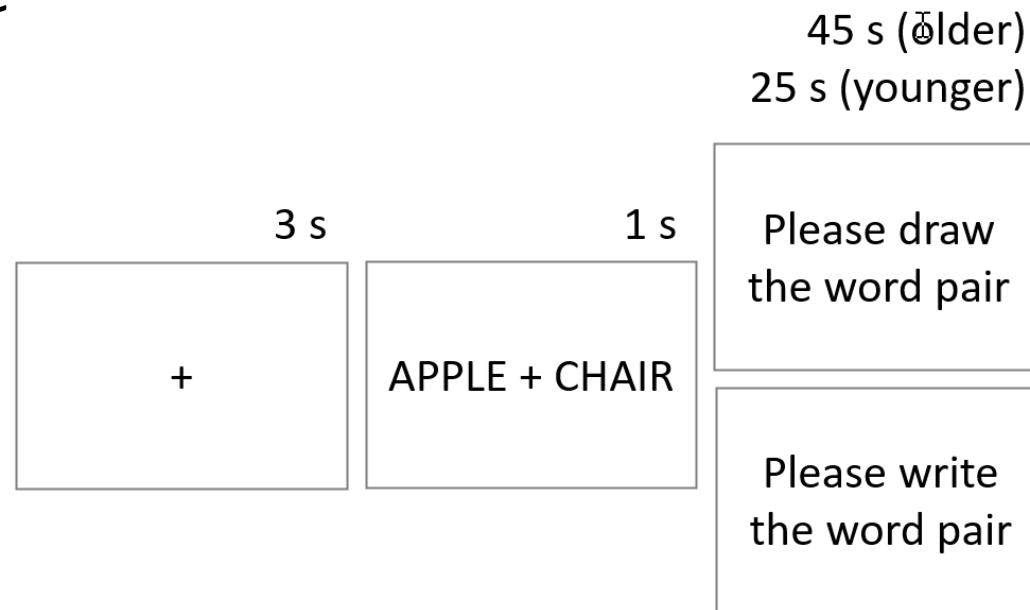


Participants

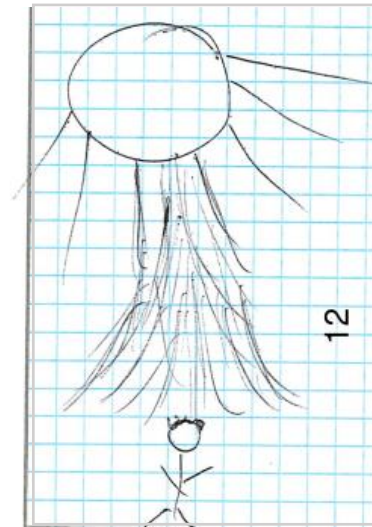
Older	Younger
$n = 29$	$n = 29$
age: $M = 70$ ($SD = 4$)	age: $M = 27$ ($SD = 5$)

Task

Encoding Phase



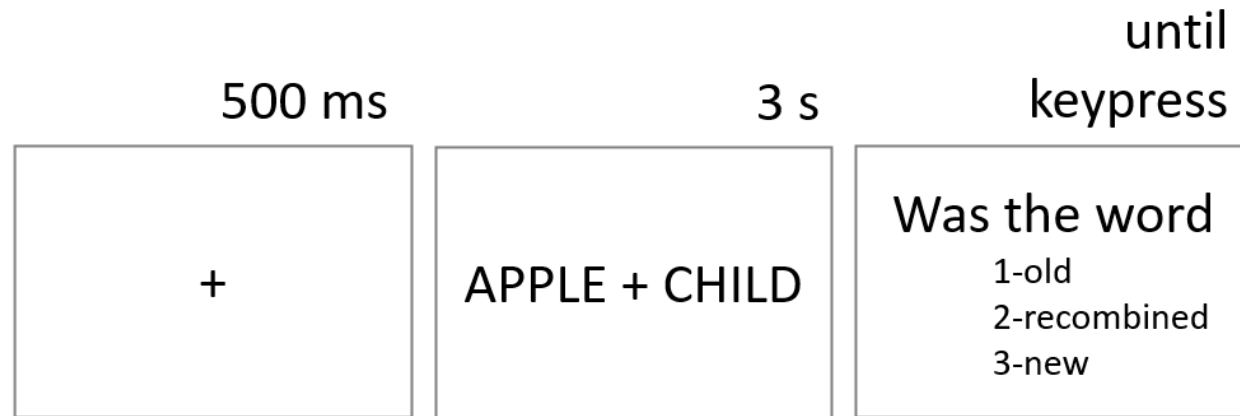
Drawings



Shower - Sun

Task

Recognition Phase



Measurement: Recognition Performance

Measurement: Recognition Performance

Proportion **Hits – False Alarms** (Kamp & Zimmer, 2015)

Item memory

(recognition of **one** word)

Response

		Presented		
		Old	Recombined	New
Response	Old	Hit	Hit	False Alarm
	Recombined	Hit	Hit	False Alarm
	New	--	--	--

Measurement: Recognition Performance

Proportion **Hits – False Alarms** (Kamp & Zimmer, 2015)

Item memory

(recognition of **one** word)

Response

		Presented		
		Old	Recombined	New
Response	Old	Hit	Hit	False Alarm
	Recombined	Hit	Hit	False Alarm
	New	--	--	--

Associative memory

(recognition of **both** words)

Response

		Presented		
		Old	Recombined	New
Response	Old	--	--	--
	Recombined	False Alarm	Hit	--
	New	--	--	--

Results

Pr score

drawing

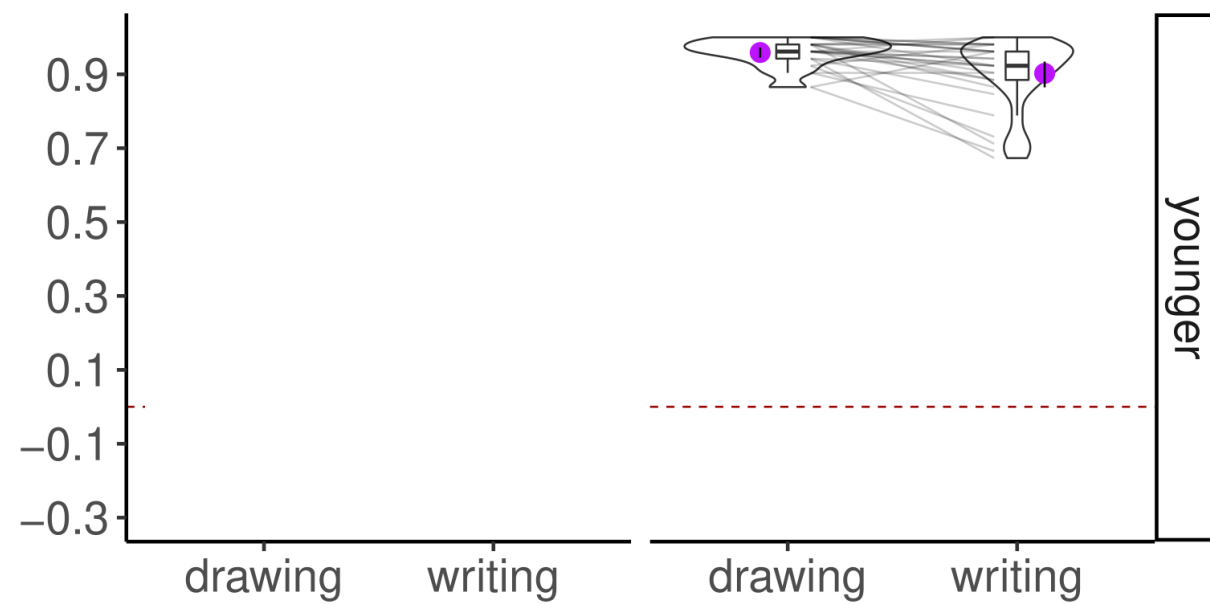
writing

drawing

writing

Encoding Tool

Pr score



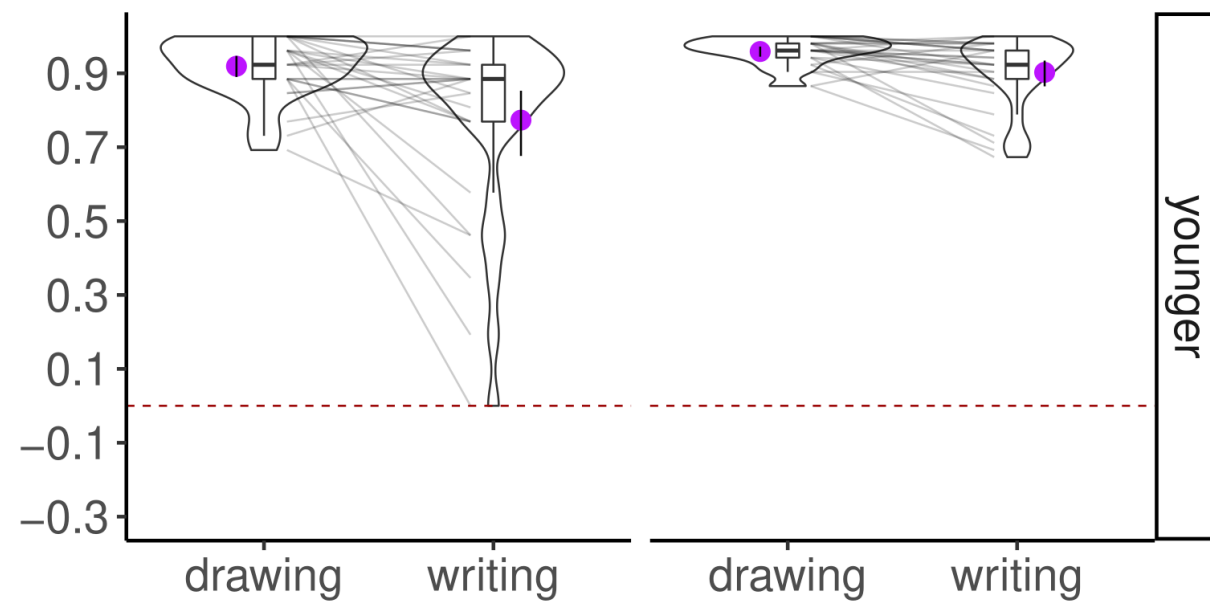
item

younger

Encoding Tool

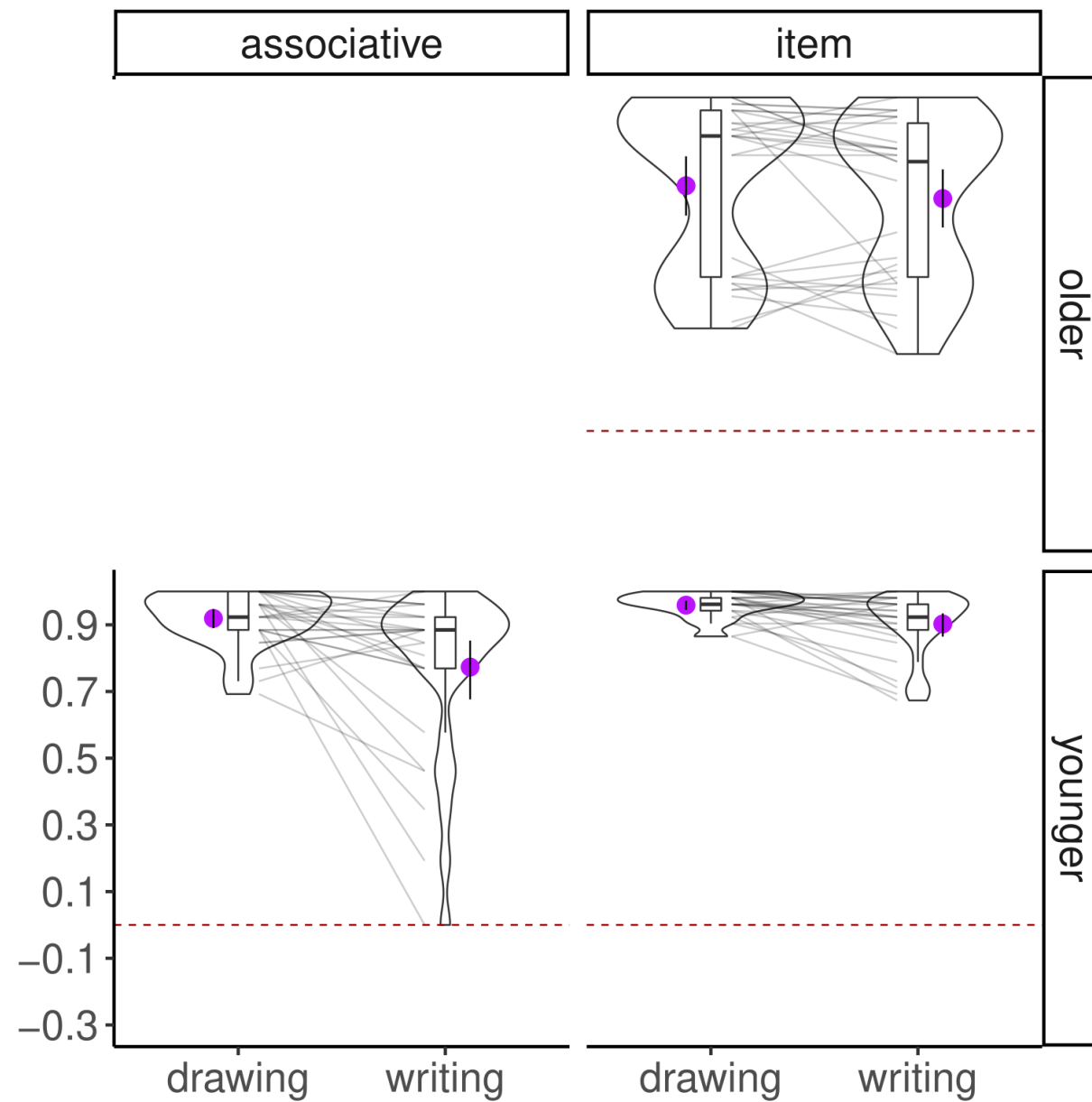
associative item

Pr score

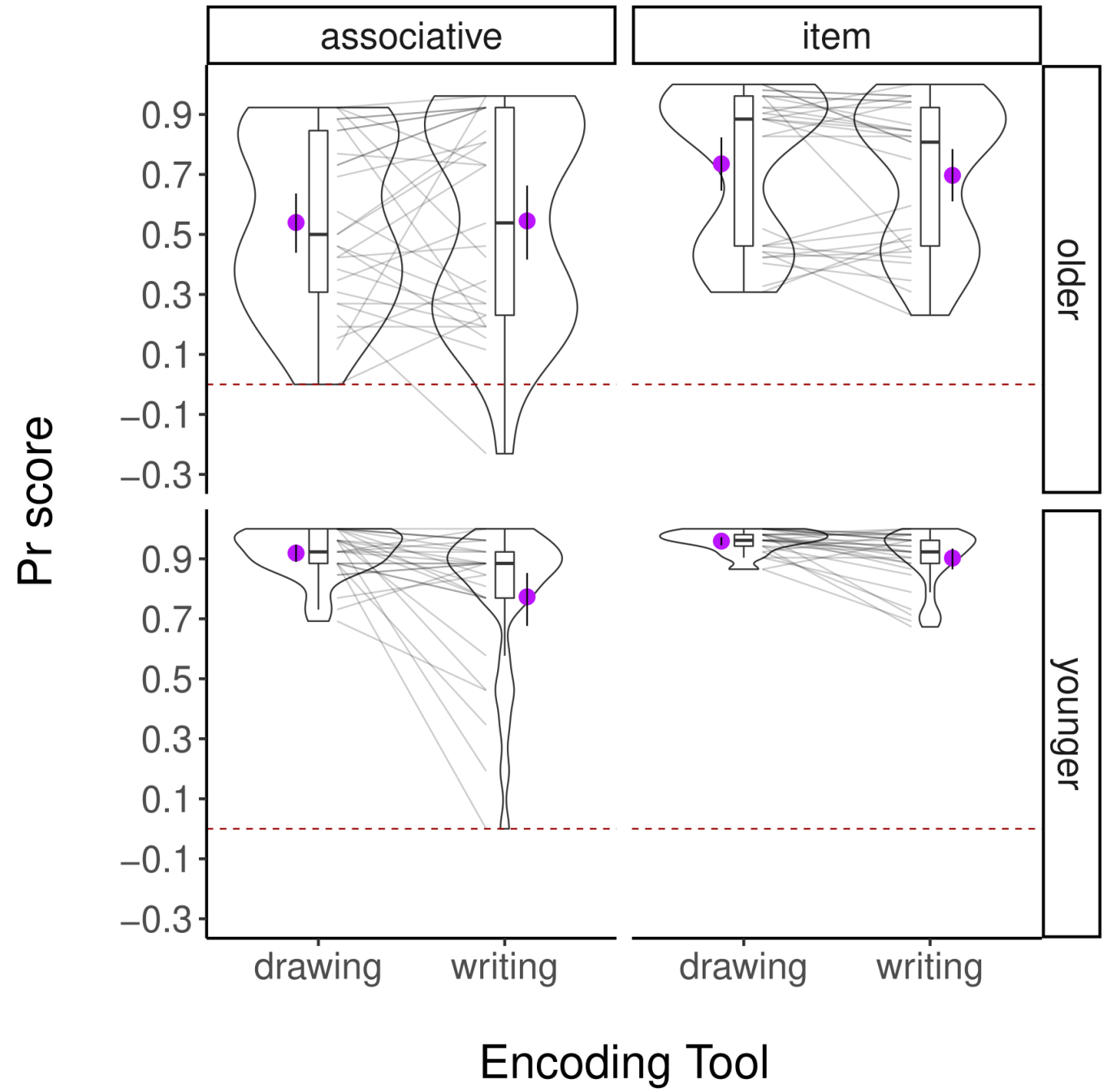


Encoding Tool

Pr score



Encoding Tool



Experiment 1



Benefit in associative memory in younger adults.



Experiment 1



Benefit in associative memory in younger adults.



No benefit in associative memory in older adults.



Experiment 2

Experiment 2



Benefit in associative memory?



Overcome associative deficit in older adults?



Experiment 2



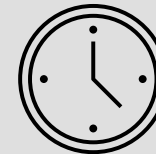
Benefit in associative memory?



Overcome associative deficit in older adults?



Benefit remains over time?



Participants

Older	Younger
$n = 41$	$n = 38$
age: $M = 72$ ($SD = 6$)	age: $M = 29$ ($SD = 5$)

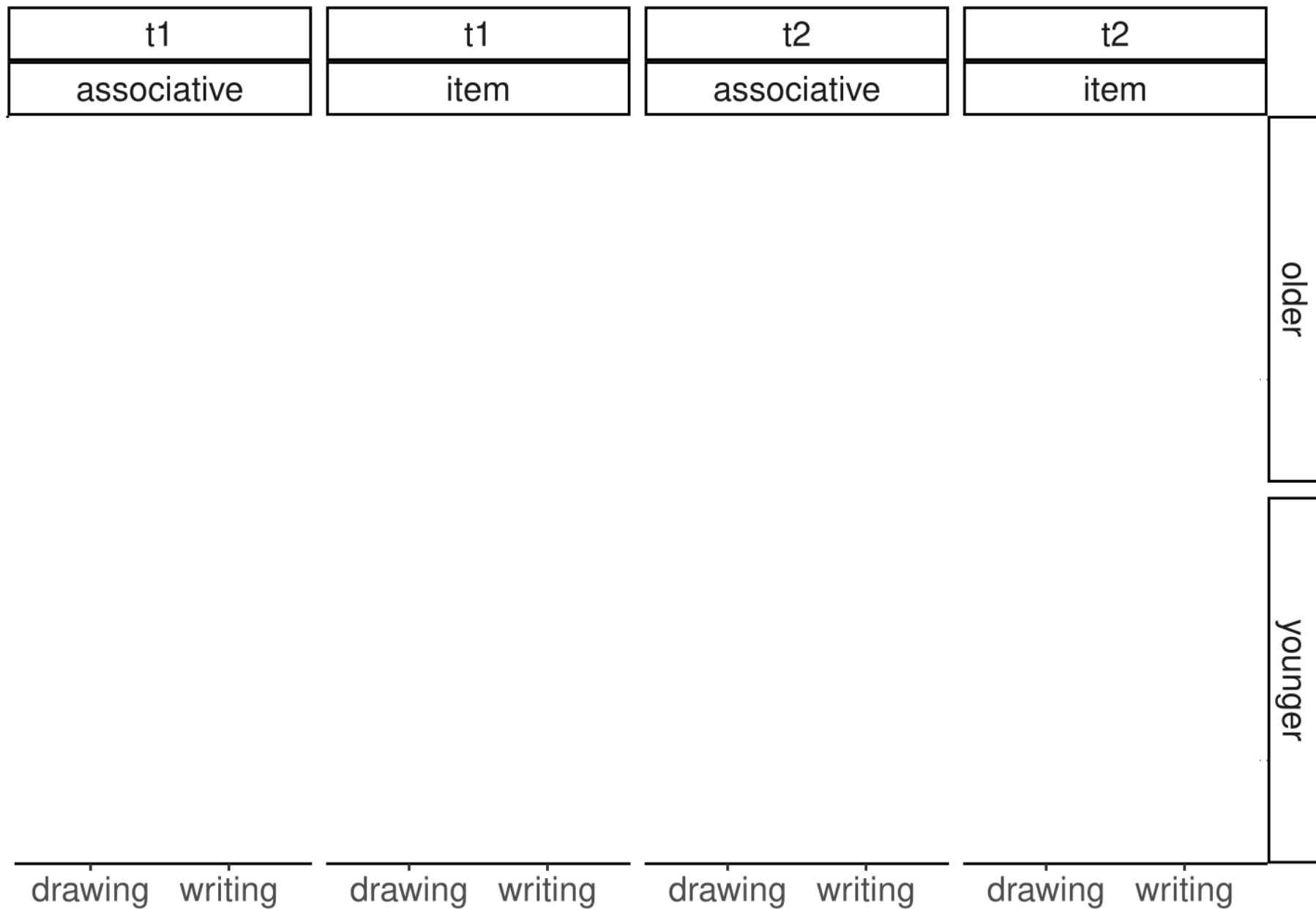
Results

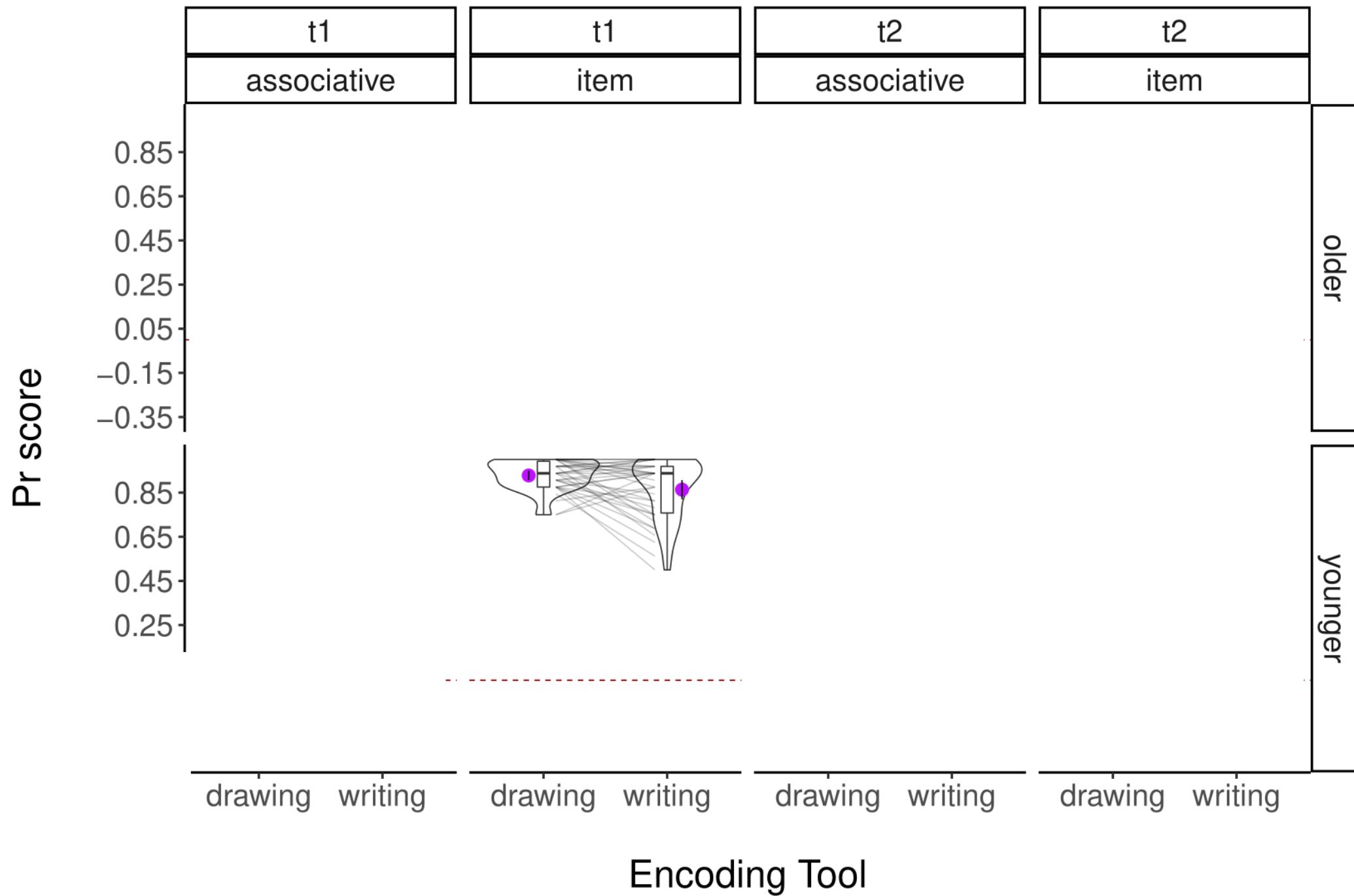
Pr score

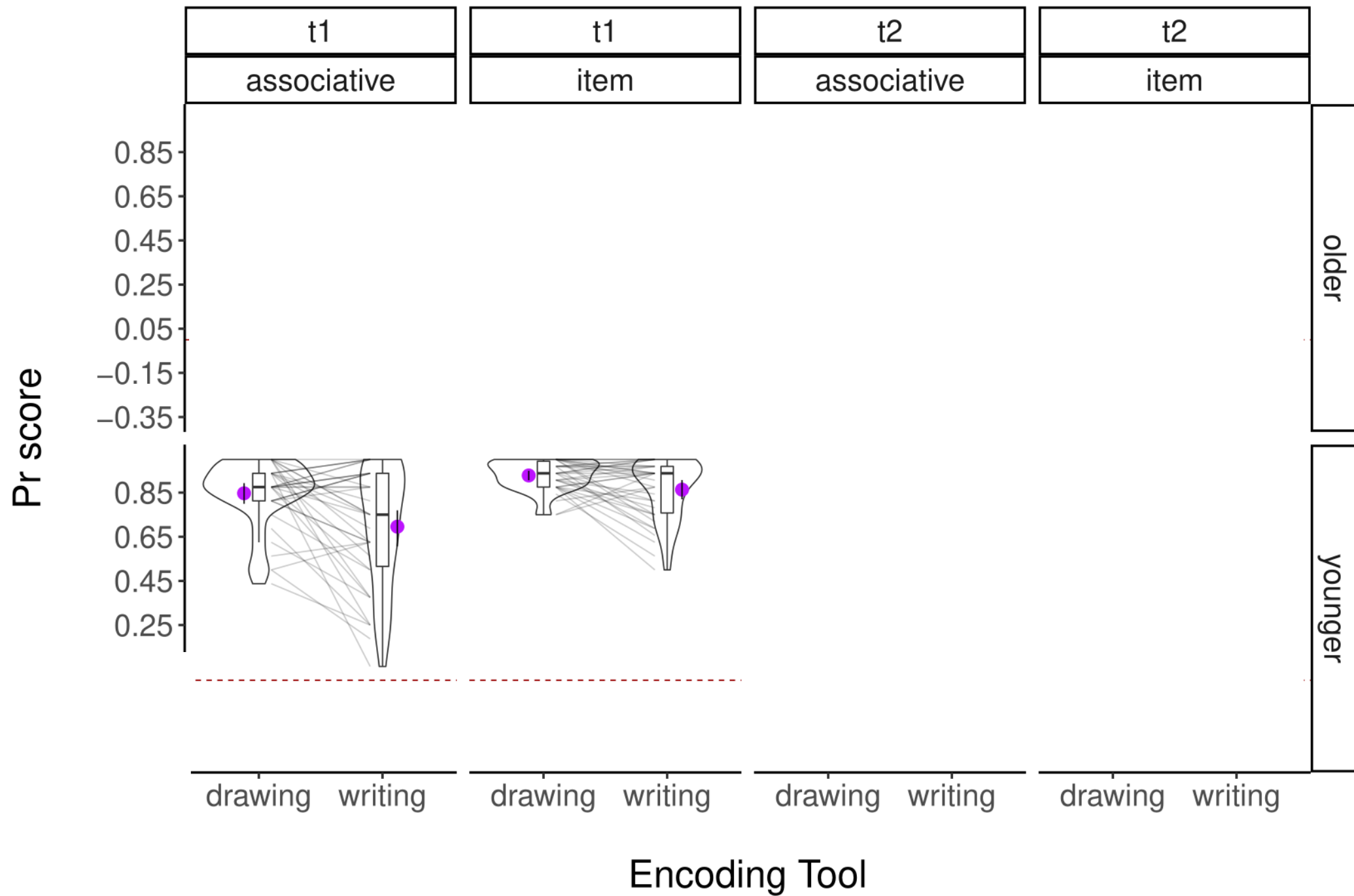
drawing writing drawing writing drawing writing drawing writing

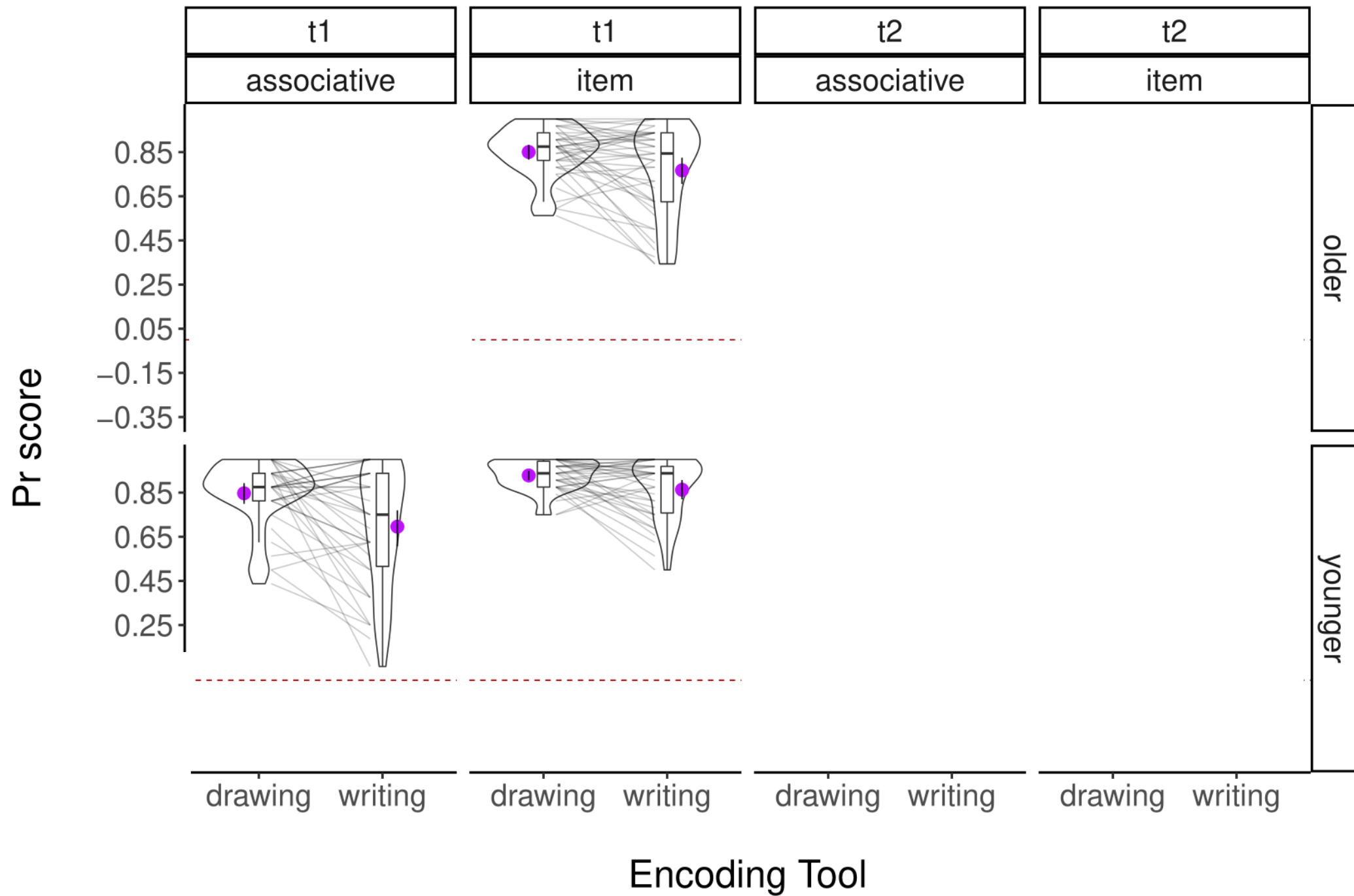
Encoding Tool

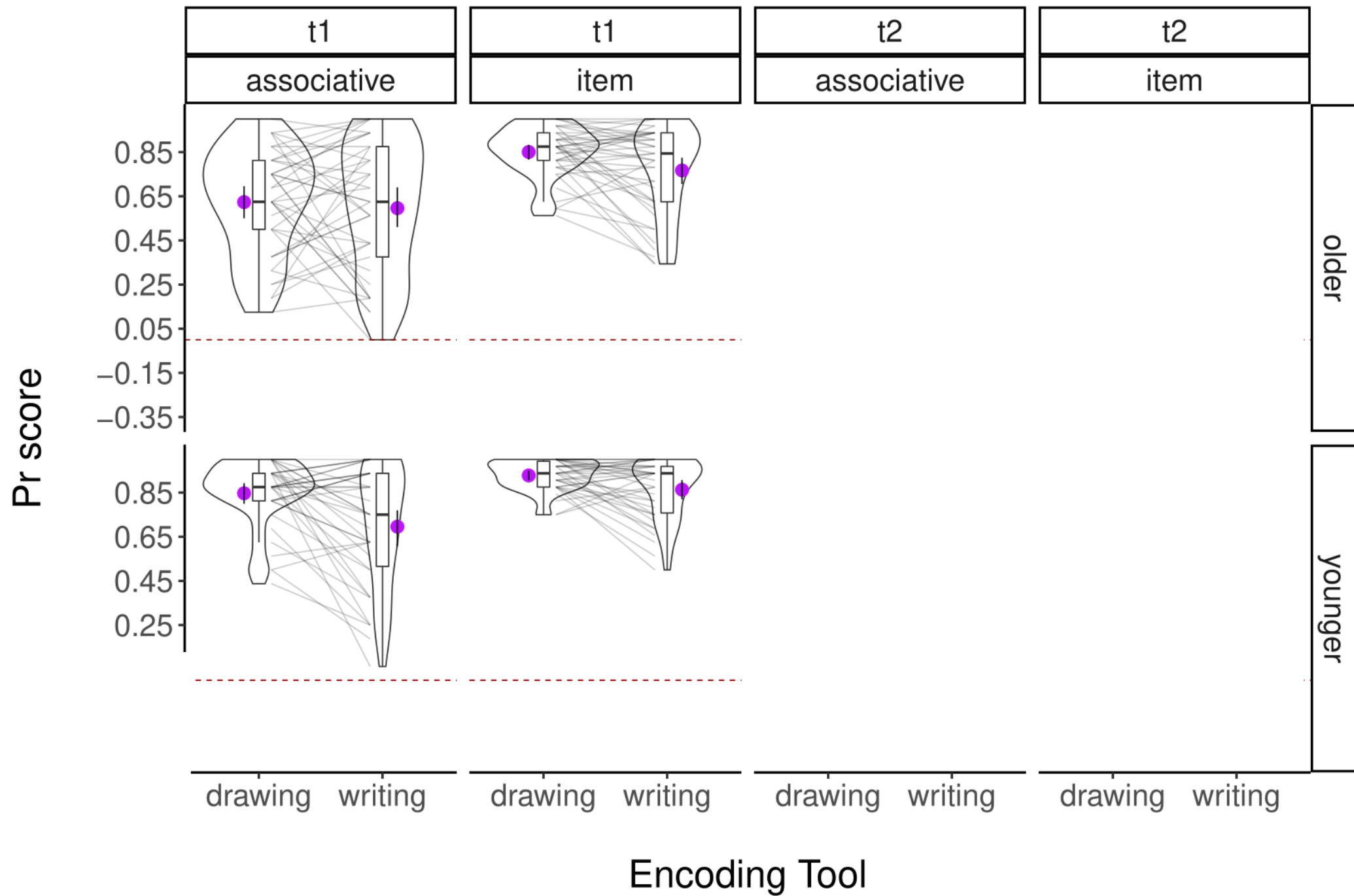
Pr score

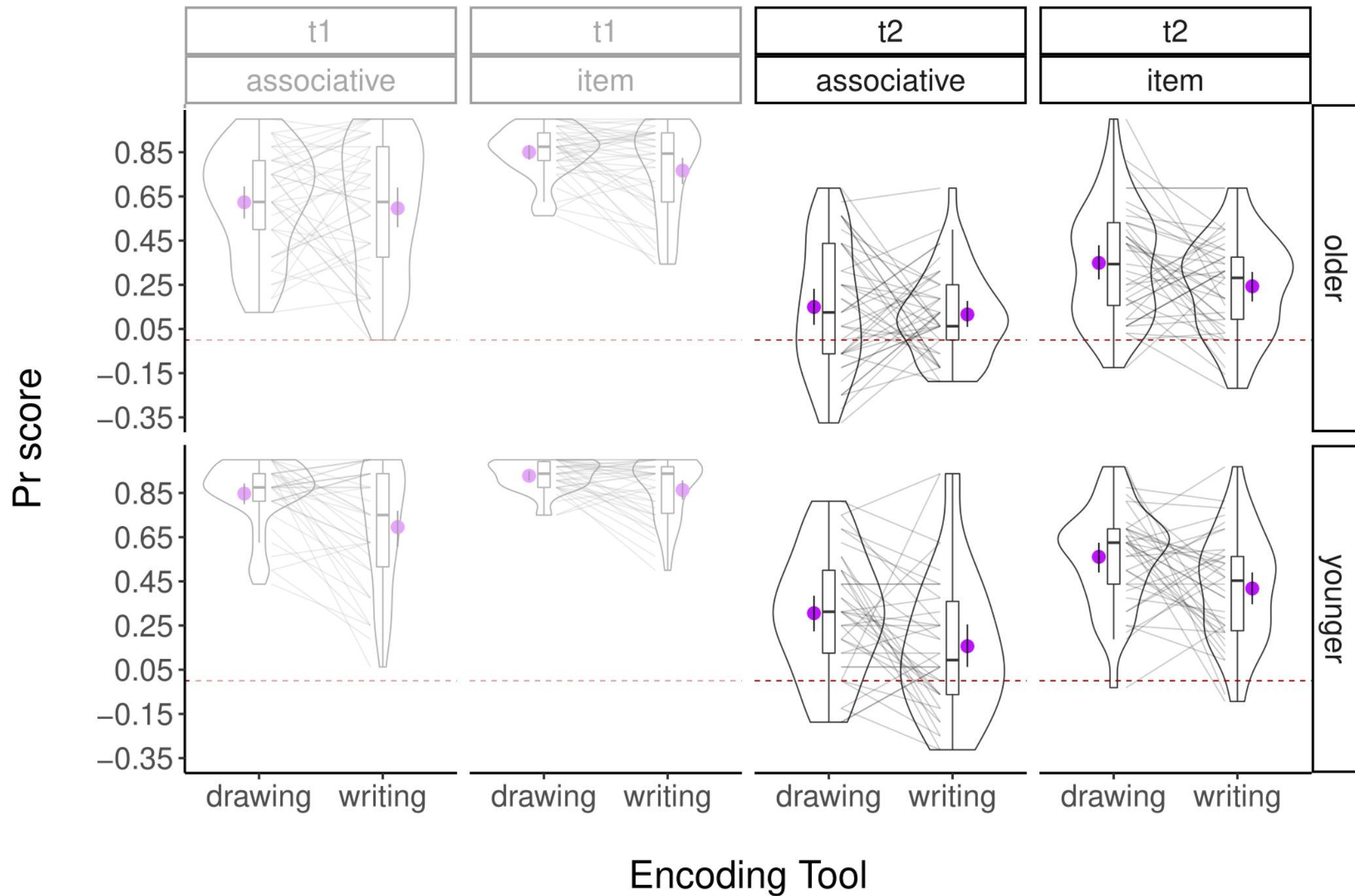












Experiment 2



Benefit in associative memory in younger



Experiment 2



Benefit in associative memory in younger



Associative deficit in older remains



Experiment 2



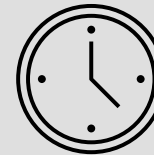
Benefit in associative memory in younger



Associative deficit in older remains



Benefits remain over 1 week



Summary & Conclusions



Replication of benefit in item memory



Benefit in associative memory in younger



Associative deficit in older remains



Benefits remain over 1 week



Summary & Conclusions



Benefit in associative memory in younger



Associative deficit in older remains



Summary & Conclusions



Mental imagery?



Strategy use?

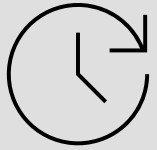


Dual task?

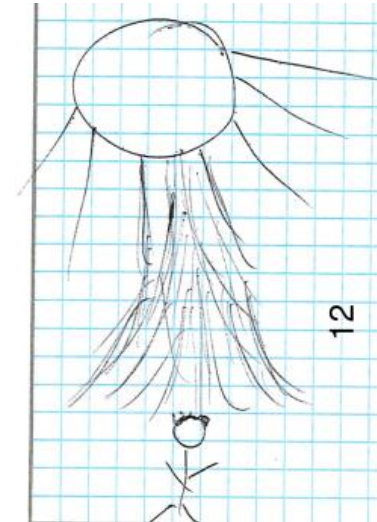
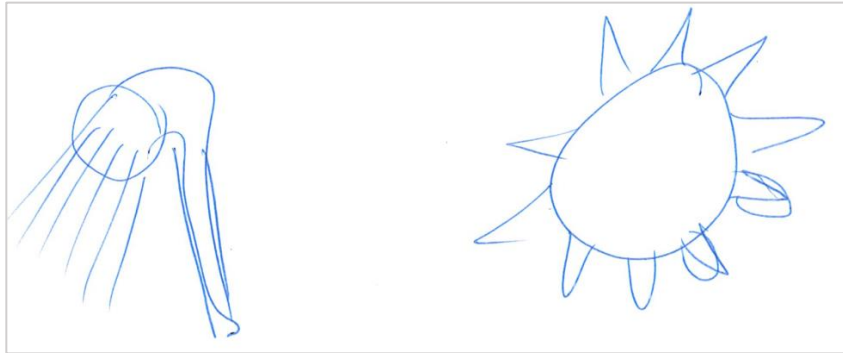


Create the association?

Future Research



Evaluate the drawings



Thank You!