



Domain-specific intervention for children with specific or mixed impairment in language and working memory

Laura Pauls¹ & Lisa Archibald²

¹Faculty of Health and Rehabilitation Sciences, Western University; ²School of Communication Sciences and Disorder, Western University
lpauls@uwo.ca, larchiba@uwo.ca

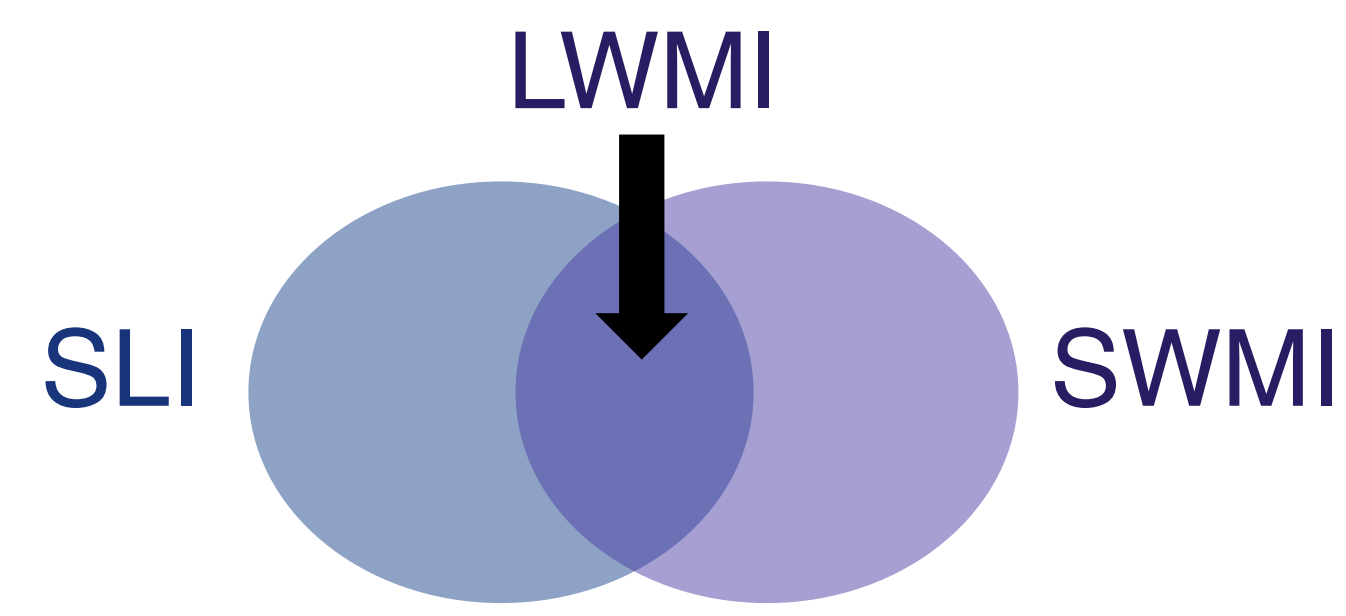


Western

Introduction

SLI, SWMI, & LWMI

- Impairment in language and working memory can occur in isolation (SLI, SWMI) or in combination (LWMI; Archibald & Joanisse, 2009)



Domain-Specific Intervention

- Intervention in language or working memory revealed domain-specific treatment effects (Wener & Archibald, 2011)

Working Memory	Language
<ul style="list-style-type: none"> • Commercially available computer program • Visuospatial and verbal WM • Discrete trials • Level of difficulty adjusted to match performance 	<ul style="list-style-type: none"> • Narrative-based • Promoted use of complex sentences through scaffolding • Vocabulary development • Phonological knowledge • Story reformulation

Purpose of the Study

- To examine efficacy of domain-specific intervention on specific or mixed impairment in language and working memory
- To examine effects of intervention on related domains

Methods

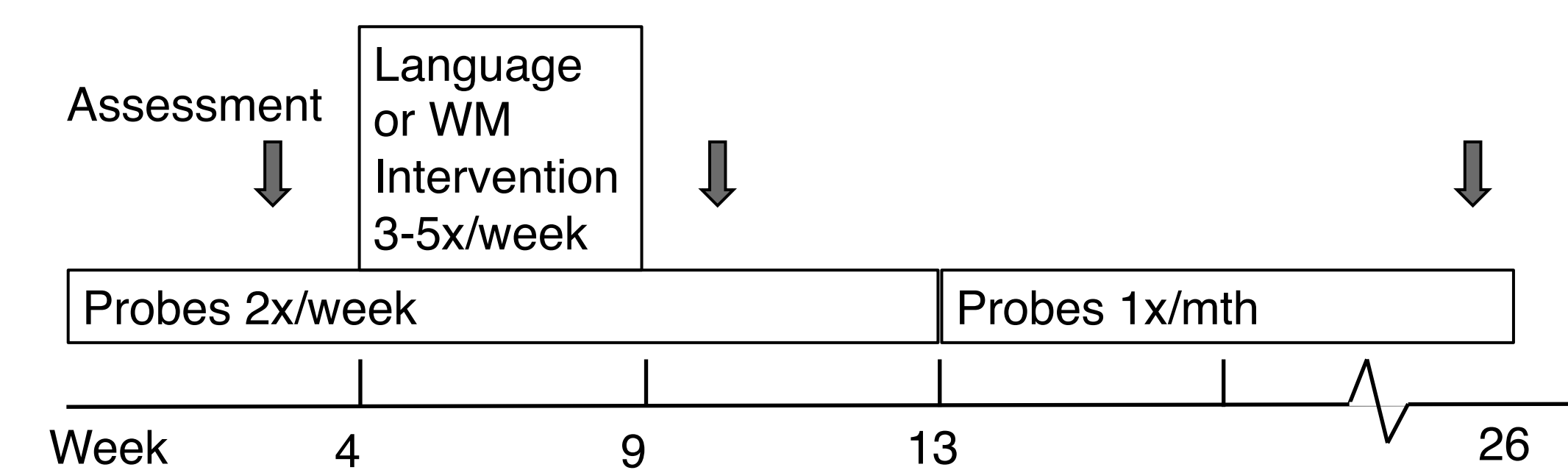
Participants

- 10 children (6 boys)
- 8;3–12;6 years
- 3 SLI, 3 SWMI, 4 LWMI

	SLI	SWMI	LWMI
age	9;3-9;10	8;3-10;1	8;10-12;6
Language (CELF-4)	79-81	94-106	75-79
WM (AWMA)	100.3-109.3	85-87.33	66.7-86.7
IQ (WASI)	103-126	98-110	89-118

Methods

Single Subject Design



Assessment battery: CELF-IV (concepts & following directions, recalling sentences), AWMA (digit recall, counting recall, spatial span), grammaticality judgment, expository language sample, story retell, TOWRE (sight word reading, nonword reading), WJ III (reading fluency, calculations, math fluency)

Probes

- Designed to be sensitive to effects of domain-specific intervention

Probe	Task	Targeted Domain
Sentence Combining	Combine ideas from 2 sentences into 1 sentence e.g., Selena flies her kite. It is not very windy.	Language
Puzzle Completion	Use 3-4 shapes to recreate design viewed for 5 sec	WM
Nonword Repetition	Presented with four 3-syllable nonwords Recall nonwords spoken by target voice e.g., da-moy-cho, tay-chee-dow , tow-doy-foo , voo-ta-yee	Language & WM
Number Comparison	Identify which of 2 dot arrays contains more dots	Control probe

Results

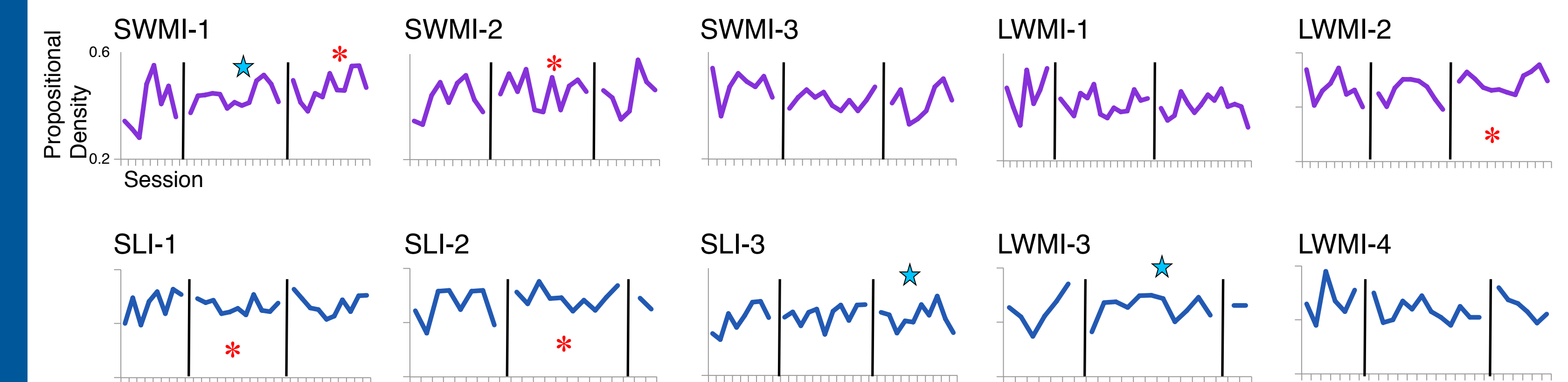
Assessment Tasks

	Language	WM	Reading	Math
WM Intervention	SWMI-1	VSTM, VSpWM		
	SWMI-2	CFD		
	SWMI-3	VSTM, VSpWM	Sight word	
	LWMI-1			
Language Intervention	LWMI-2	VSTM, VSpWM	Nonword, Reading fluency	
	SLI-1	VWM, VSpWM	Nonword	
	SLI-2	VSpWM		
	SLI-3	RS	VWM, VSpWM	Math fluency
	LWMI-3		VSpWM	
LWMI-4	RS			

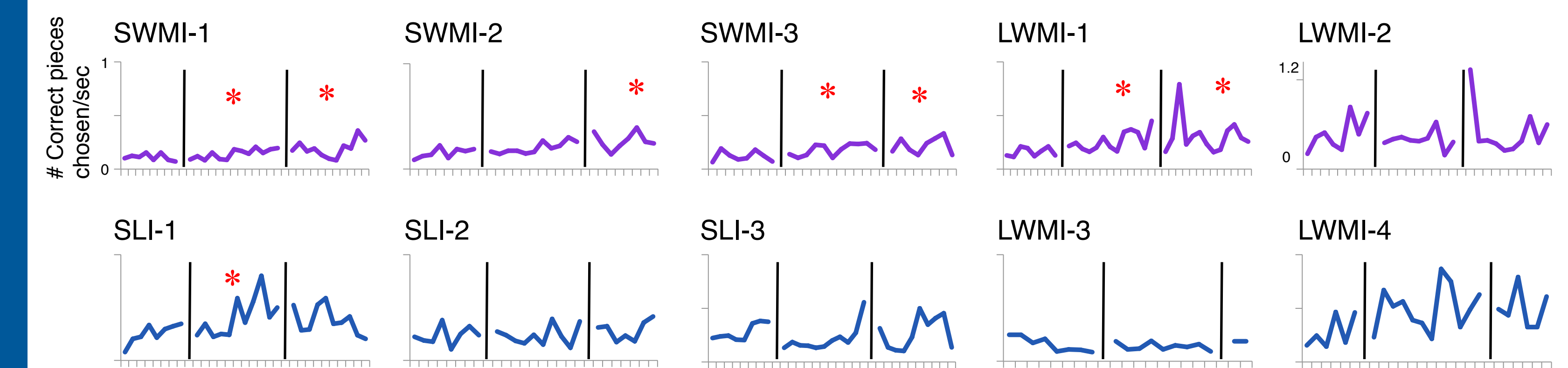
Note: Clinically significant improvement considered to be 10+ increase in standard score or 2+ increase in scaled score. CFD = Concepts & Following Directions from CELF-4; RS = Recalling Sentences from CELF-4; VSTM = verbal short term memory task from AWMA; VSpWM = visuospatial working memory task from AWMA; VWM = verbal working memory task from AWMA.

Results

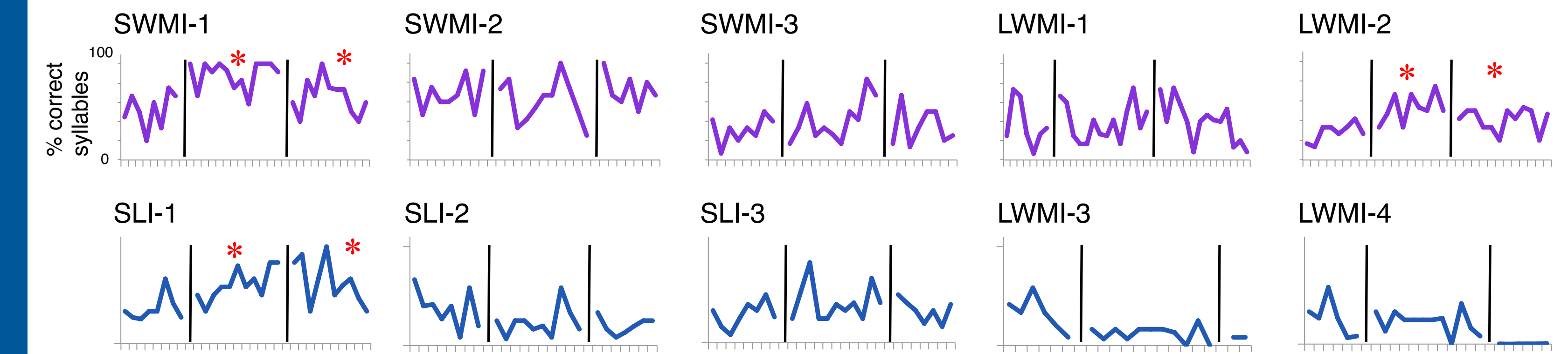
Sentence Combining Probe



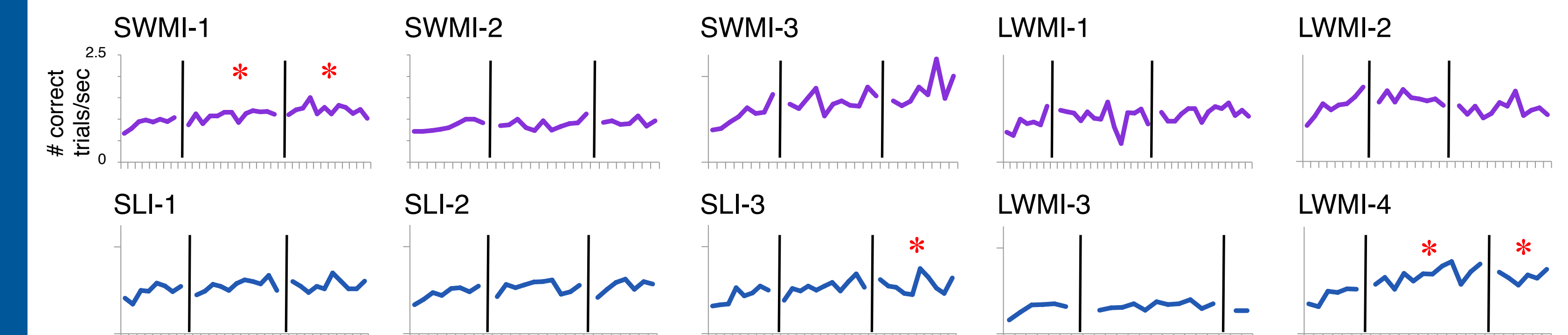
Puzzle Completion Probe



Nonword Repetition Probe



Number Comparison Probe



Note: First row received WM intervention and second received language intervention in each case.

* $p < .05$

★ No change in propositional density, but increases in sentence length and number of propositions per sentence.

Conclusions

- Both interventions led to domain-specific and cross-domain gains
- WM intervention led to improvements in verbal short term memory, whereas language intervention was more likely to increase verbal working memory skills
- Improvements in WM skills support performance on language tasks

References

Archibald & Joanisse (2009) *JSLHR*, 52(4), 899-914; Wener & Archibald (2011) *Child Language Teaching and Therapy*, 27(3), 313-330.