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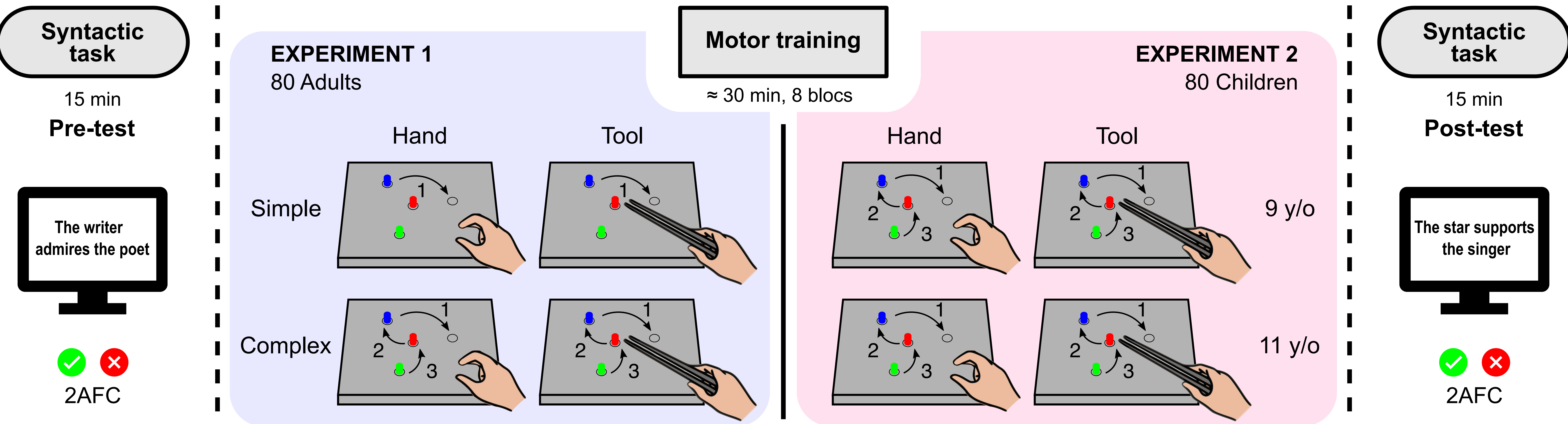
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Domain-general syntax

The crucial role of tool-use motor training to improve syntactic comprehension in language, in adults and children

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A domain-general syntax may support language and motor skills:

- The syntactic components of the two domains share **common brain substrate**.
- Processing of **language syntax improves after motor training** with a tool.

We aimed to qualify more precisely what aspects of this motor training can promote such **learning transfer**:

- Experiment 1** was designed to disentangle the role of the Effector from the role of the Action Complexity.
- Experiment 2** aimed to investigate whether this learning is present in children before or after syntactic skills reach maturity, namely at 9 vs 11 years of age.

Syntactic task

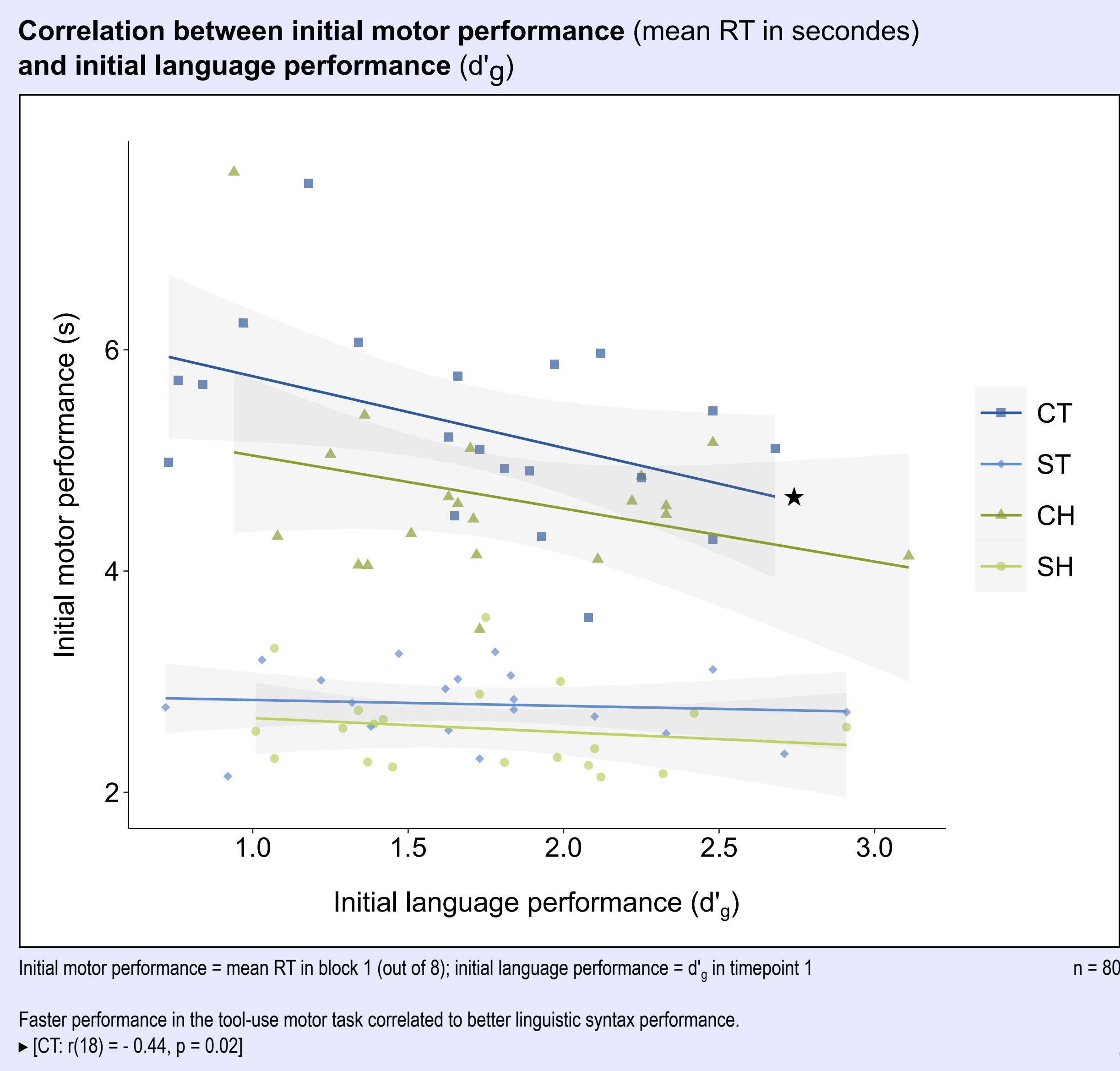
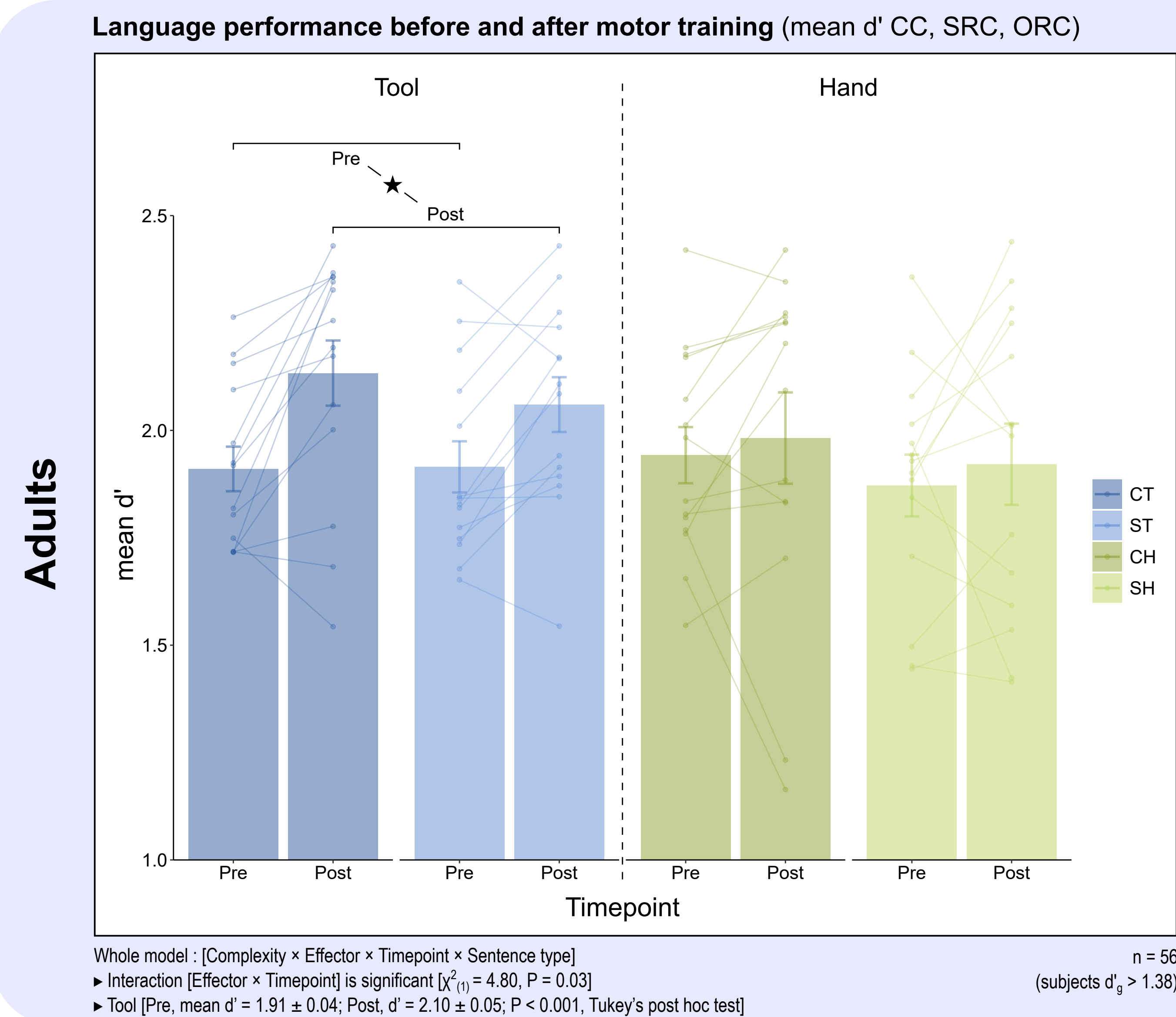
The participant reads a sentence declined in one of the three types (A), then she/he reads one of the four corresponding affirmations (B) and responds true or false.

(A) Sentence type

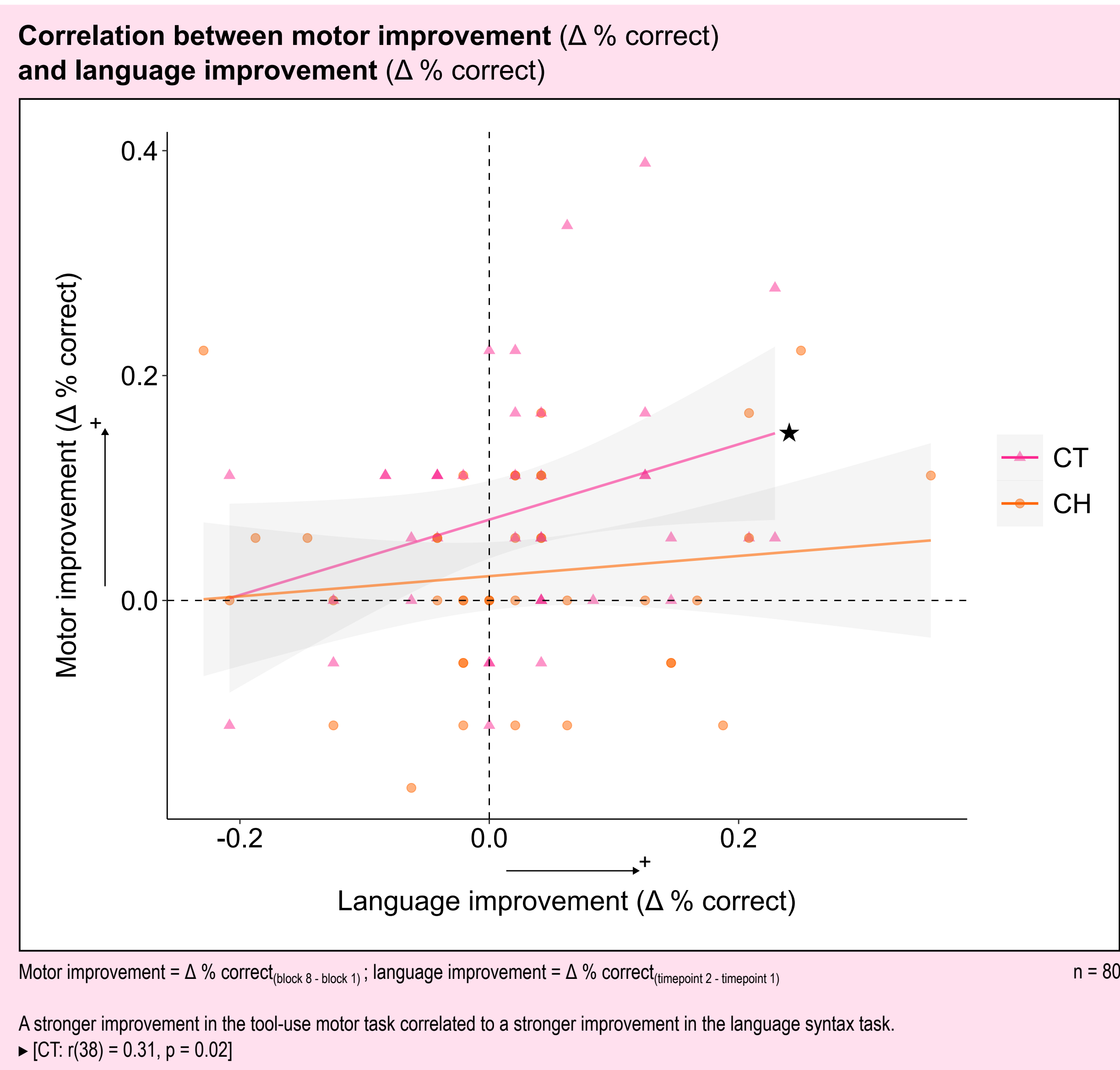
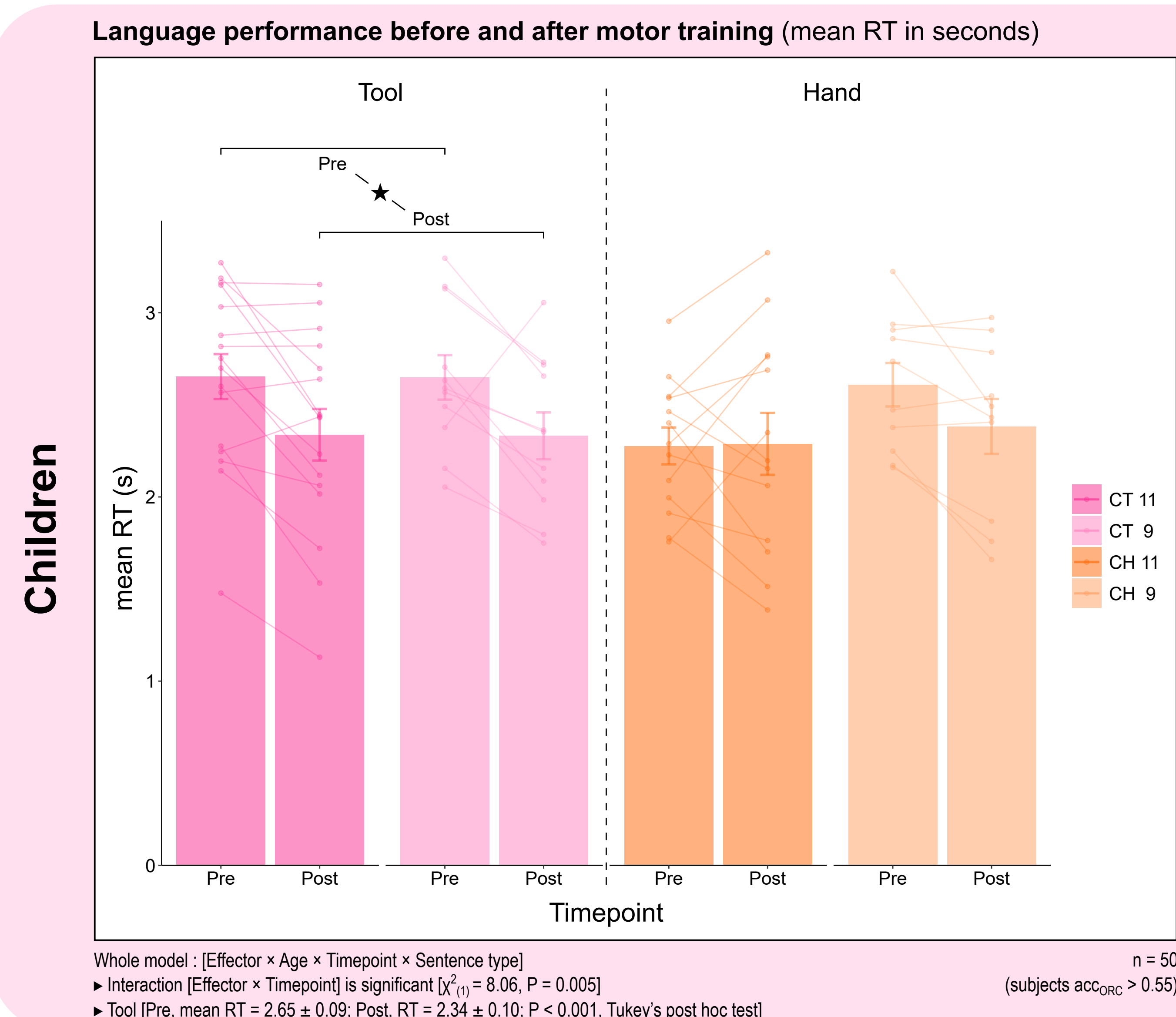
Agent 1	A ₁	The writer	CC	SRC	ORC
Agent 2	A ₂	The poet	The writer admires the poet and takes the paper	The writer that admires the poet takes the paper	The writer that the poet admires takes the paper
Object	O	The paper			

(B) Affirmation type (Two-Alternative Forced Choice)

[A ₁ A ₂]	[A ₁ O]	[A ₂ A ₁]	[A ₂ O]
The writer admires the poet	The writer takes the paper	The poet admires the writer	The poet takes the paper
CC SRC ORC	CC SRC ORC	CC SRC ORC	CC SRC ORC
✓ ✓ ✗	✓ ✓ ✓	✗ ✗ ✓	✗ ✗ ✗



- Language syntax performance was improved after tool use training, regardless of the level of Action Complexity.
- No effect was observed after bare-hand training.
- Before any training, syntactic abilities in language can be predicted by initial motor dexterity for performing complex actions with a tool.



- Language syntax performance was improved after complex tool use training, regardless of the age.
- No effect was observed after bare-hand training.
- The participants' ability to progress in the complex motor task with a tool correlated with their ability to progress in the language task.

We obtained a learning transfer from the motor to the language task in the tool-use conditions. Children from 9 to 11 seemed to benefit from this learning transfer. Altogether, our results are in line with the idea of common domain-general syntactic processes.

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