A DEVELOPMENTAL TEST OF COGNITIVE TRANSFER

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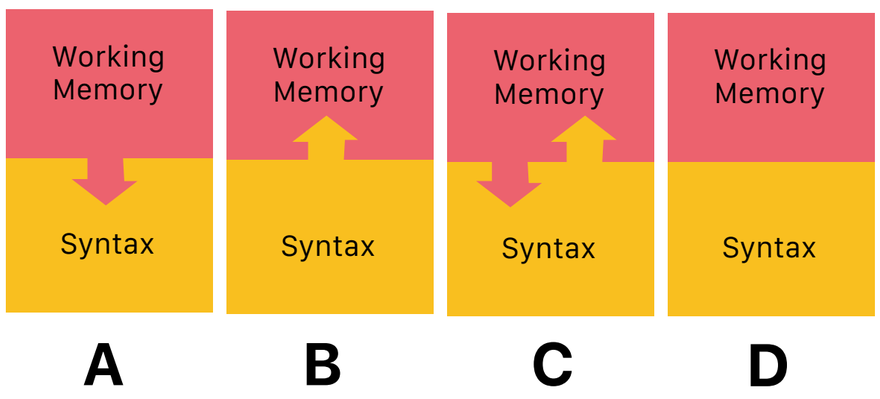
WM - working memory
SVA - subject-verb agreement
SgV - subject-gap-verb

L1 - Spanish
L2 - English

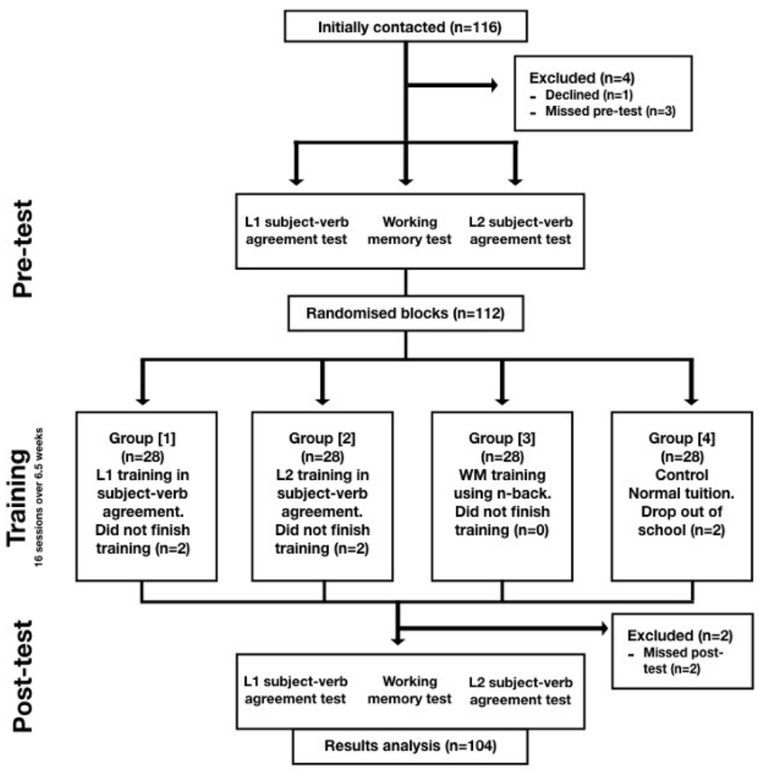
INTRODUCTION

Research question - *Can non-linguistic WM training lead 7-year-old children to perform SVA in L1 and L2 SgV sentences more accurately and vice versa?*

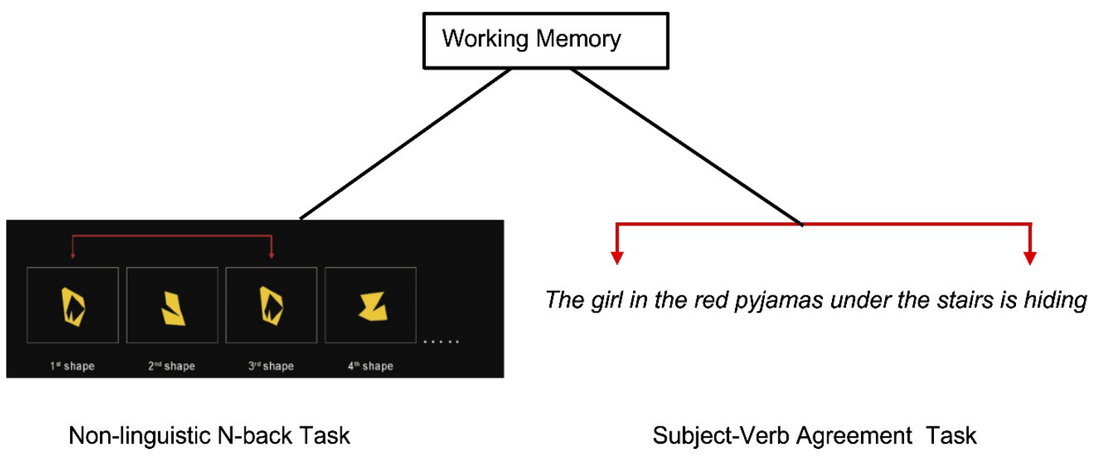


These are the four hypotheses tested: **[A]** Improved working memory performance will transfer into improved syntactic ability, but not the other way around; **[B]** improved syntactic ability will transfer into working memory performance, but not the other way around; **[C]** interactions between working memory and syntax will run in both directions; **[D]** interactions will run in neither direction.

METHODS

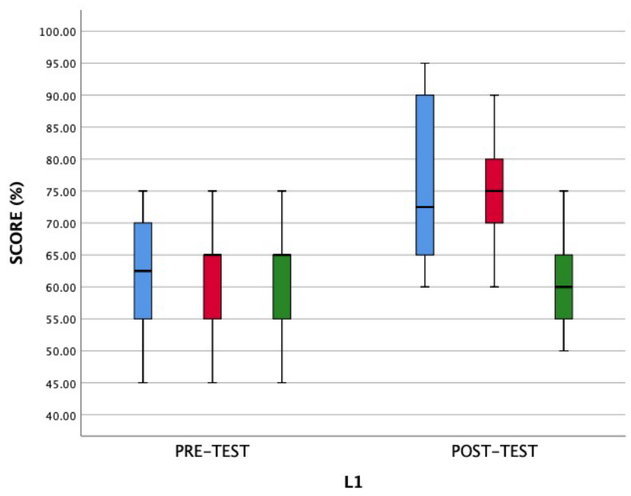


Proposed relationship between our main measures. Both the non-linguistic and linguistic components engage WM in order to succeed at the task. Our main research question concerns the potential 'spillover' that results from training one arm of this hierarchy into the untrained arm.



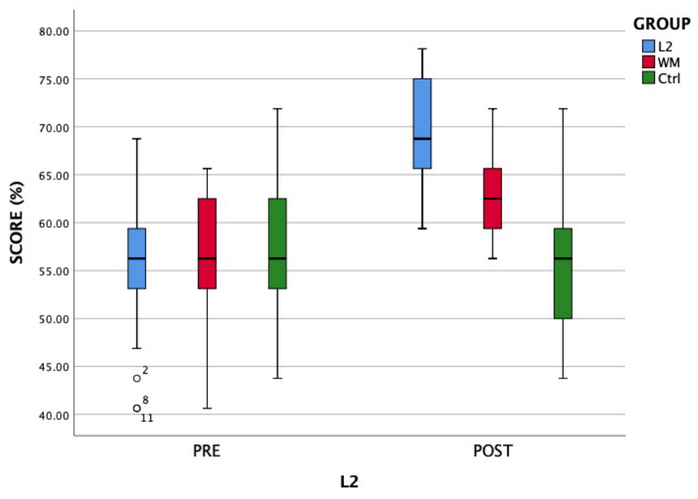
RESULTS

Two 3-way independent ANCOVAs (top for L1 and middle for L2) and one 4-way ANCOVA (bottom for WM) were implemented with age, gender and L2 exposure as covariates.



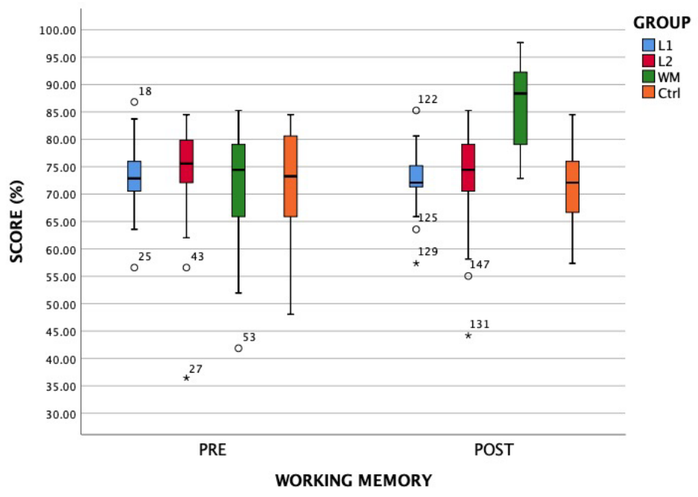
Significant main effect of Group ($F(2, 72) = 17.67$, $p<.001$ $\eta p\ 2 = .329$).

Pair comparison (Sidak): **WM training** and **Control** ($p < .001$, 95% CI [5.35, 17.24]).
No differences between **L1 training** and **WM training.**



Significant main effect of Group ($F(2, 72) = 40.11$, $p<.001$ $\eta p\ 2 = .527$).

Pair comparison (Sidak): **WM training** and **Control** ($p < .001$, 95% CI [3.27, 9.87]).



Significant main effect of Group ($F(3, 97) = 23.07$, $p<.001$ $\eta p\ 2 = .416$).

Pair comparison (Sidak): **WM training** and **Control** ($p<.001$, 95% CI [8.59, 19.75]).
No differences among the remaining groups.

Dark horizontal bars represent median scores, boxes contain scores <75% and >25% quartiles. Small circles are outliers between 1.5 and 3 times greater than the middle 50% quartile range and asterisks are those greater than 3.

DISCUSSION

- Training a strictly non-linguistic measure of WM led to transfer to a strictly syntactic one, which suggests that the involvement of domain-general cognition in prompting syntax is more decisive than thought.

- For L1, WM training boosted syntactic performance as much as language training. The difference in effect size between languages might be attributed to proficiency levels and other experimental conditions.

- Training children in L1 and L2 had no bearing on their WMs, confirming the unidirectionality of the effect.

- Altogether, the results reject the singularity and distinctiveness of the language-as-module view and instead suggest that language and the rest of cognition are more deeply integrated.

*Full title: Working memory training improves children's syntactic ability but not vice versa. A test of the directionality of cognitive transfer.