A Developmental Test of Cognitive Transfer

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**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.

**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, p2 = .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, p2 = .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, p2 = .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.