

Working Memory Training: Evidence for Near, but Not Far Transfer.

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BACKGROUND

Working Memory Training

• Currently there is a great deal of research on the extent to which working memory can be trained and show transfer to new tasks.

Goals of the Current Study

- To attempt a replication of two different forms of working memory training.
- To test for possible effects of strategies learned during training.
- To test for transfer to measures of STM, WM and attentional control as well as measures of fluid intelligence.

METHOD

Participants: 87 College of Idaho students (58 Female). 31 assigned to N-back training, 32 to verbal span training and 24 to video game training. For the N-back and Verbal Training, we report the data from the strongest participants.

Training Groups:

Spatial N-back Training (n=23):

This group practiced the spatial n-back task as reported by Jaeggi et al. (2010) across 20 sessions of approximately 20 minutes.

Verbal Complex Span Training (n=25):

This group practiced the complex verbal span training procedure developed by Chein and Morrison (2010). Participants alternated between 4 seconds of a lexical decision task and remembering a series of letters for recall. Participants completed 20 sessions of 30 minutes.

Video Game (Real Time Strategy) Training (n=24):

This group practiced a real time strategy game, Starcraft: Brood War, for 1.5 hours/session, three times a week.

Transfer Tasks:

Verbal and Object Based N-back Tasks: Updating was assessed using a letter based (8 letters) and an object based (8 shapes) N-back tasks that included 3 blocks of 2-back judgments, 3 blocks of 3-back judgments and 3 blocks of 4-back judgments each.

Short Term Memory Transfer was assessed using Letter and Digit Spans and Circle and Arrow Spans.

Working Memory Transfer was assessed using Operation, Reading and Letter-Number Spans and Symmetry, Rotation, Alignment Spans.

Fluid Intelligence was assessed using Raven's Standard Progressive Matrices divided into two sets of even and odd items and the Cattell Culture Fair Test 3: Forms A & B

METHOD

Attentional control was assessed using the Attention Network Task (ANT) and Spatial Stroop (2 blocks of 120 trials with one block 25% incongruent trials, the other 75% incongruent trials)

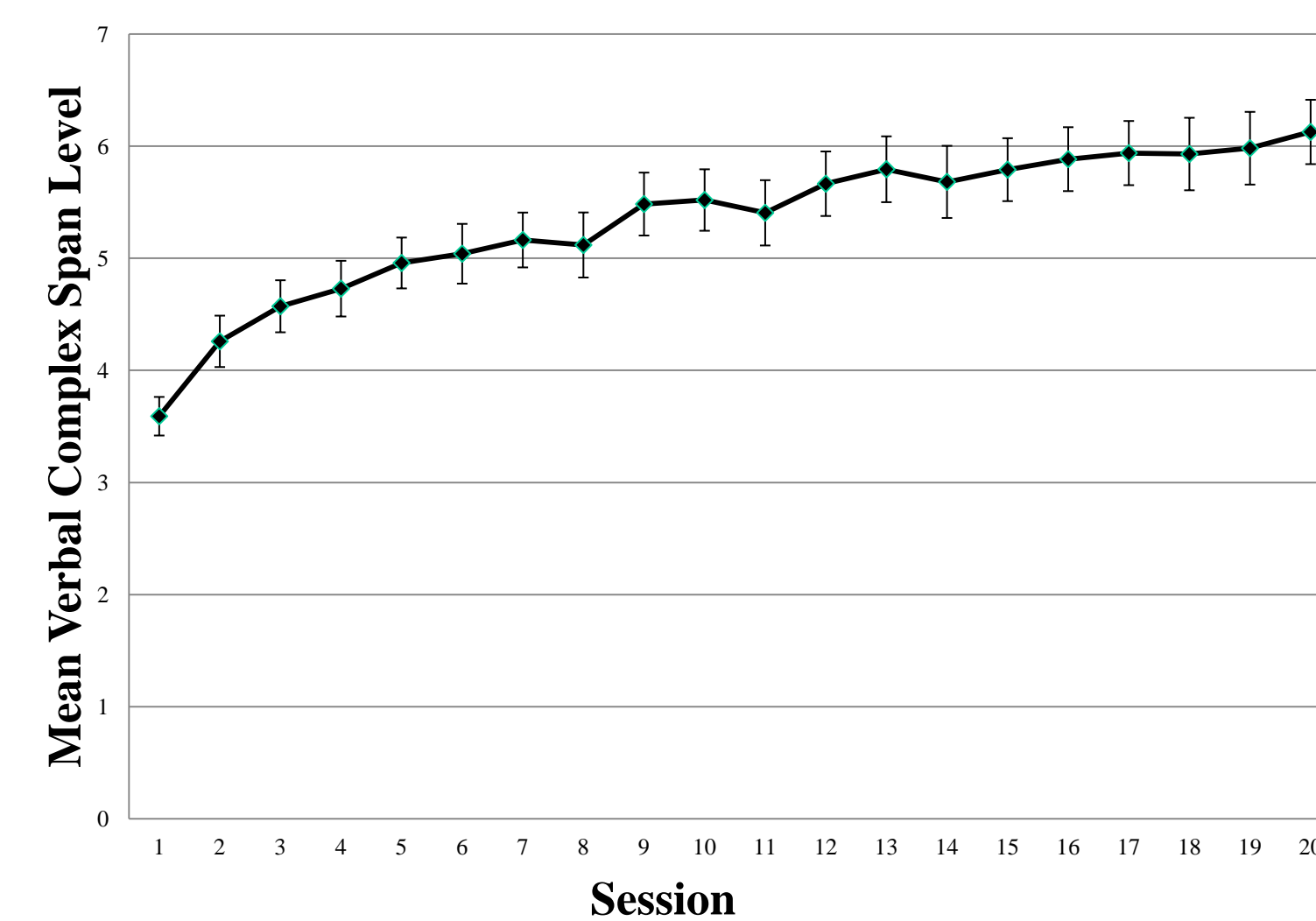
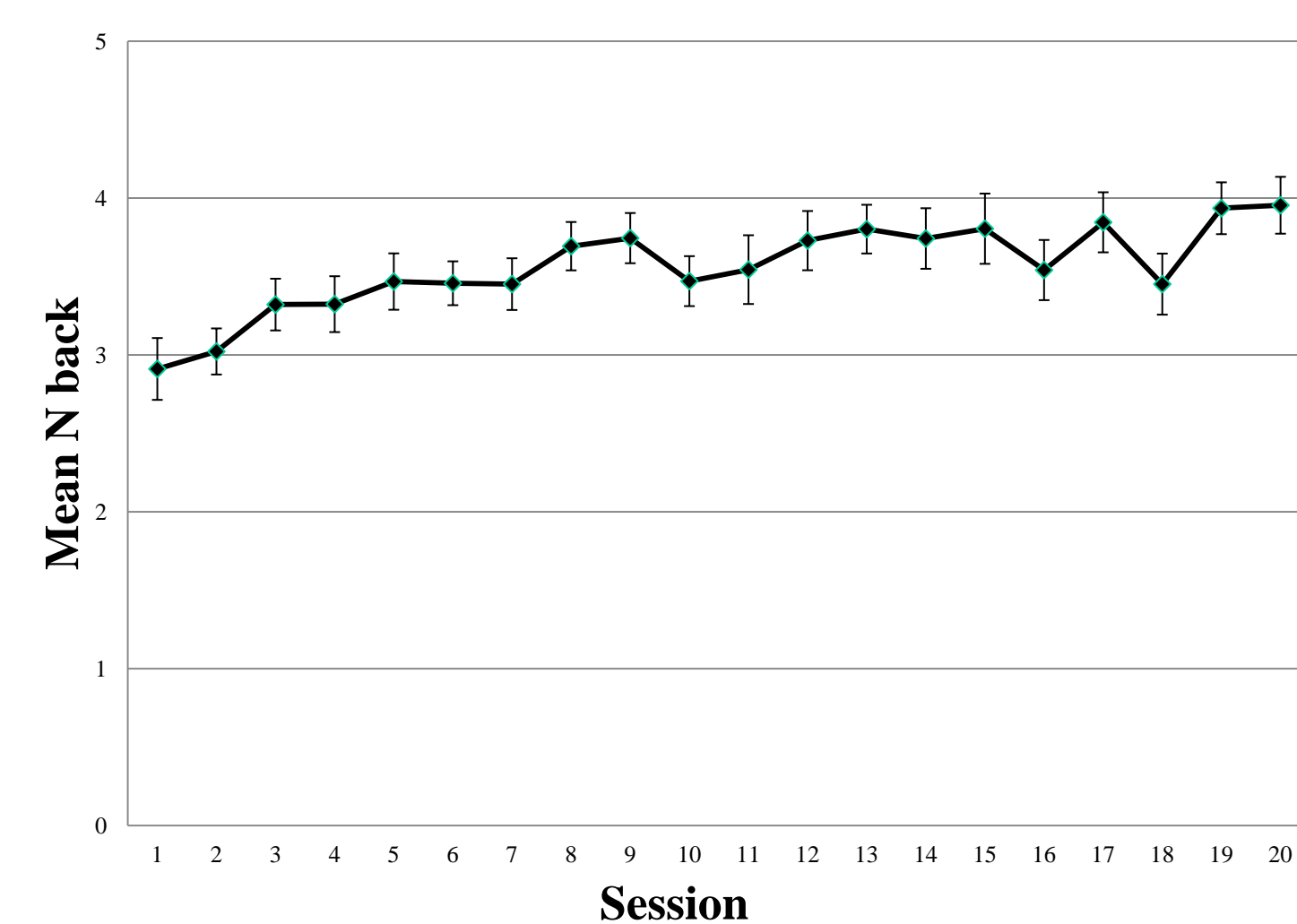
Additional Transfer Tasks Not Reported in this Poster: ETS Kit Inferences and Nonsense Syllogisms, 4 Choice RT tasks, Reading Comprehension

Procedure:

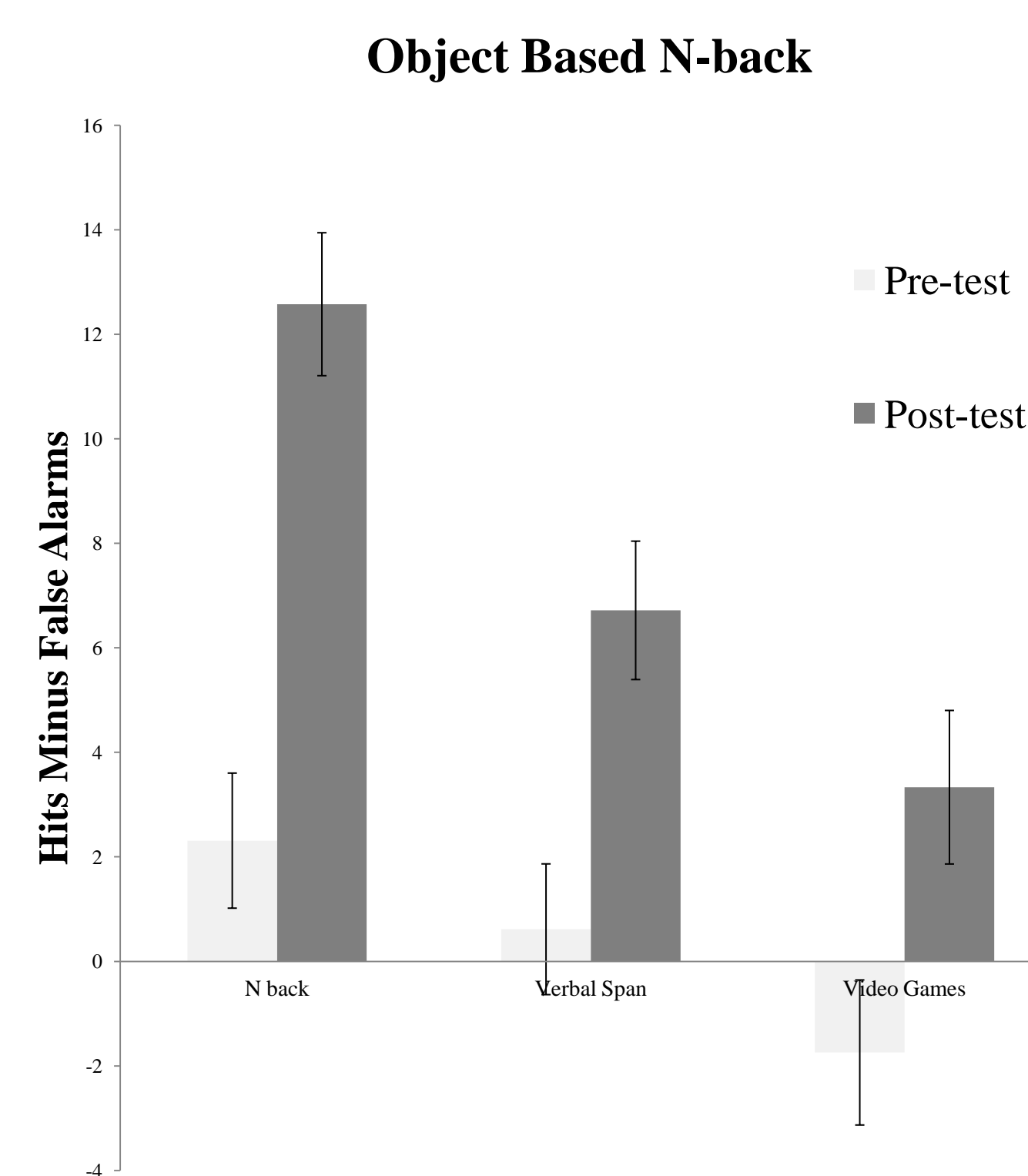
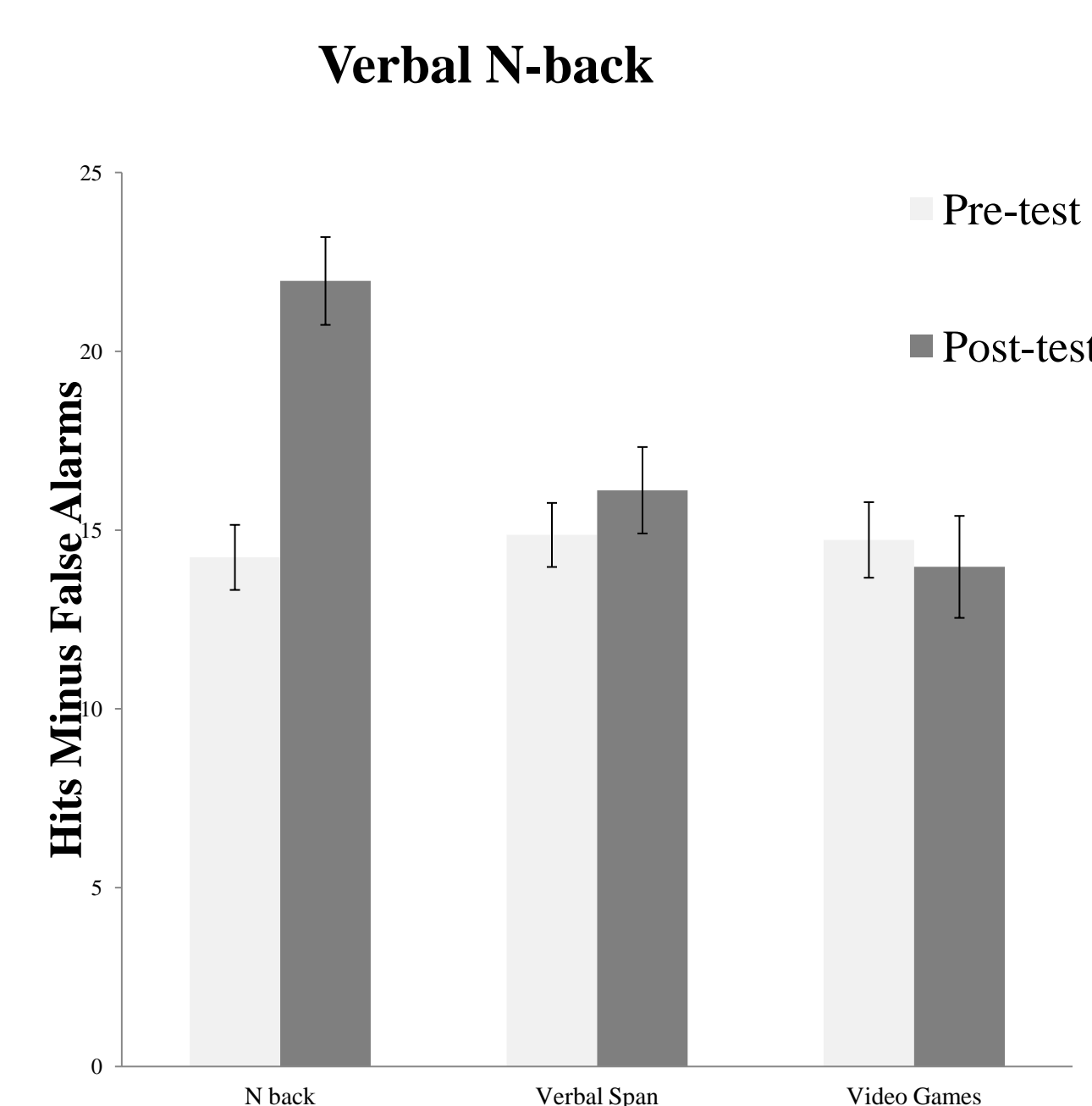
All participants participated in 6 hours of pre-testing and 6 hours of posting conducted the week before and the week after training. All the training groups practiced adaptive versions of the training tasks (i.e. the difficulty was calibrated to their performance) across 4-5 weeks.

RESULTS

Training Results: Both the Verbal Span and N-back training groups showed significant improvement across the training period

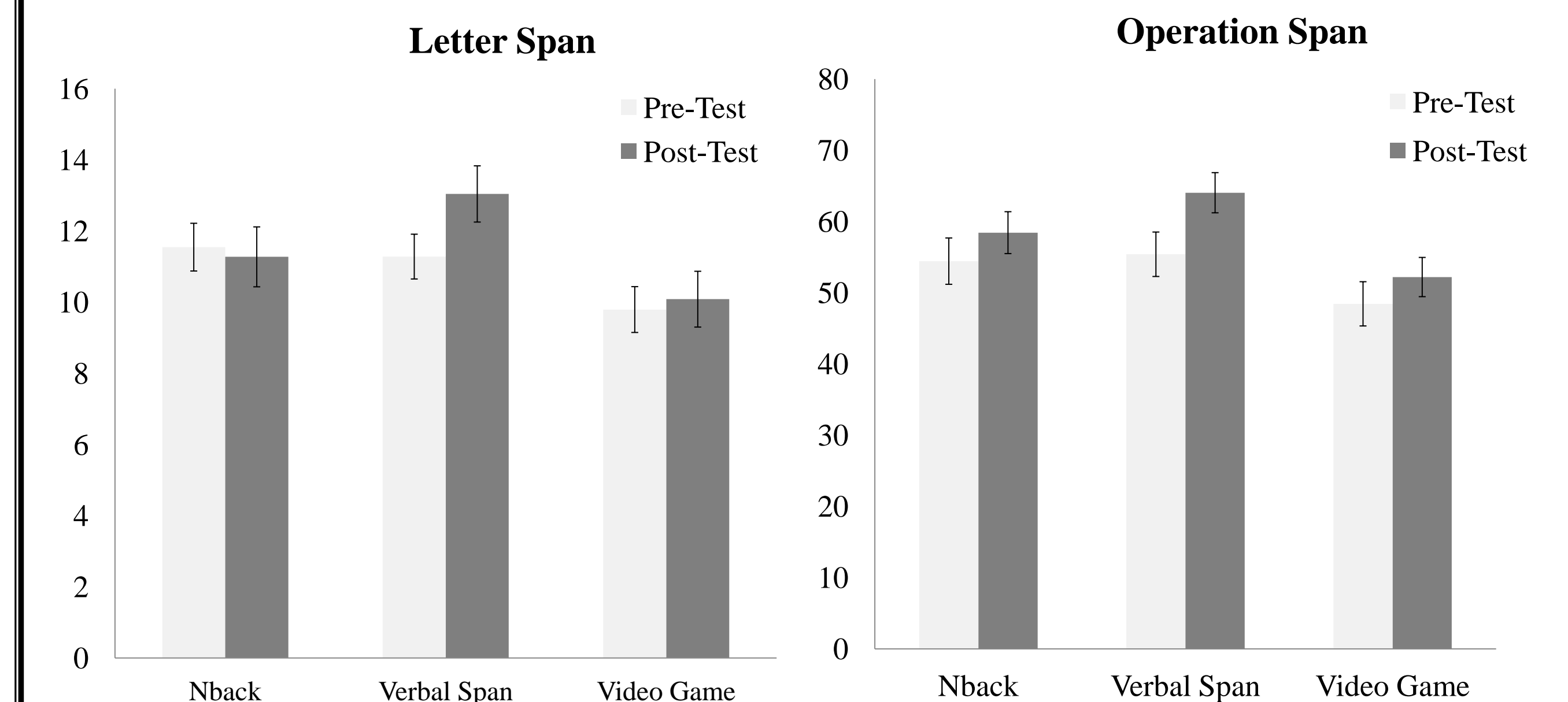


Transfer results:

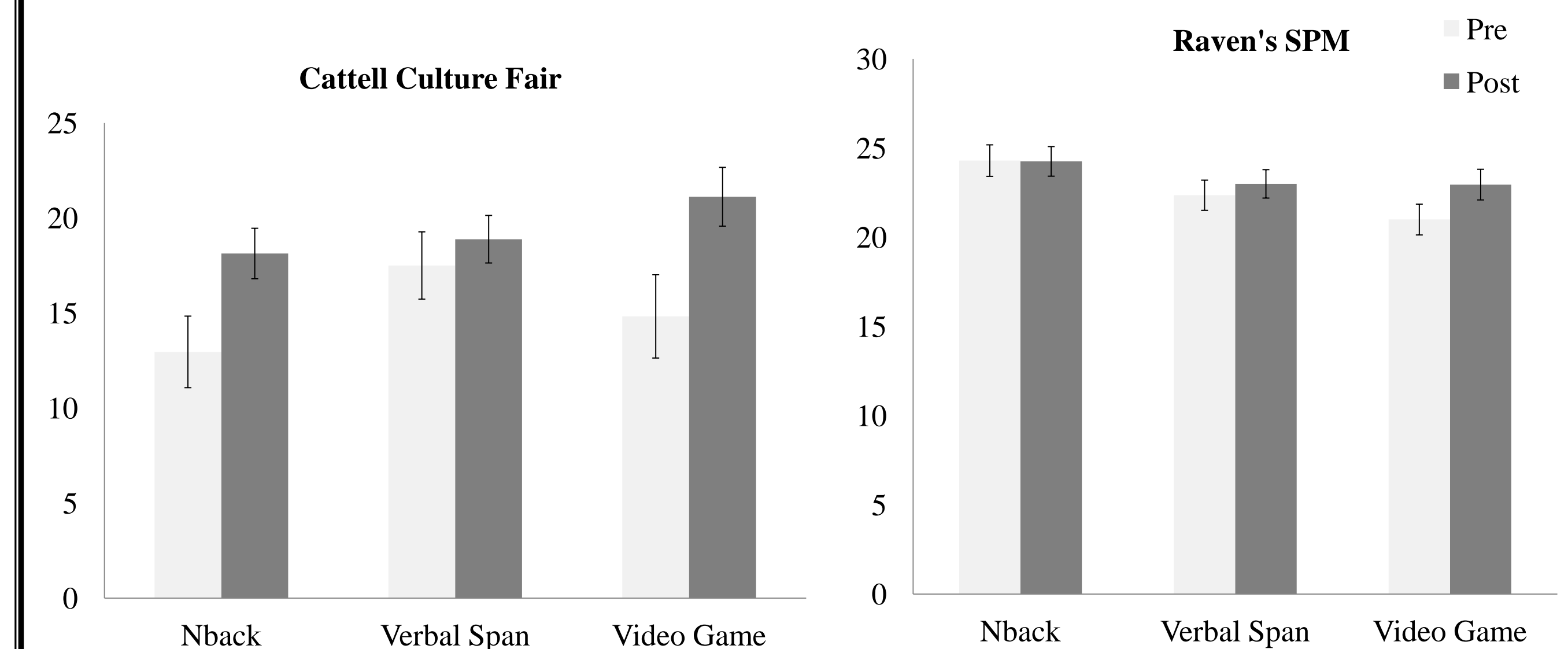


The clearest evidence for group specific transfer was for the N-back tasks with significantly larger improvements for the N-back training group.

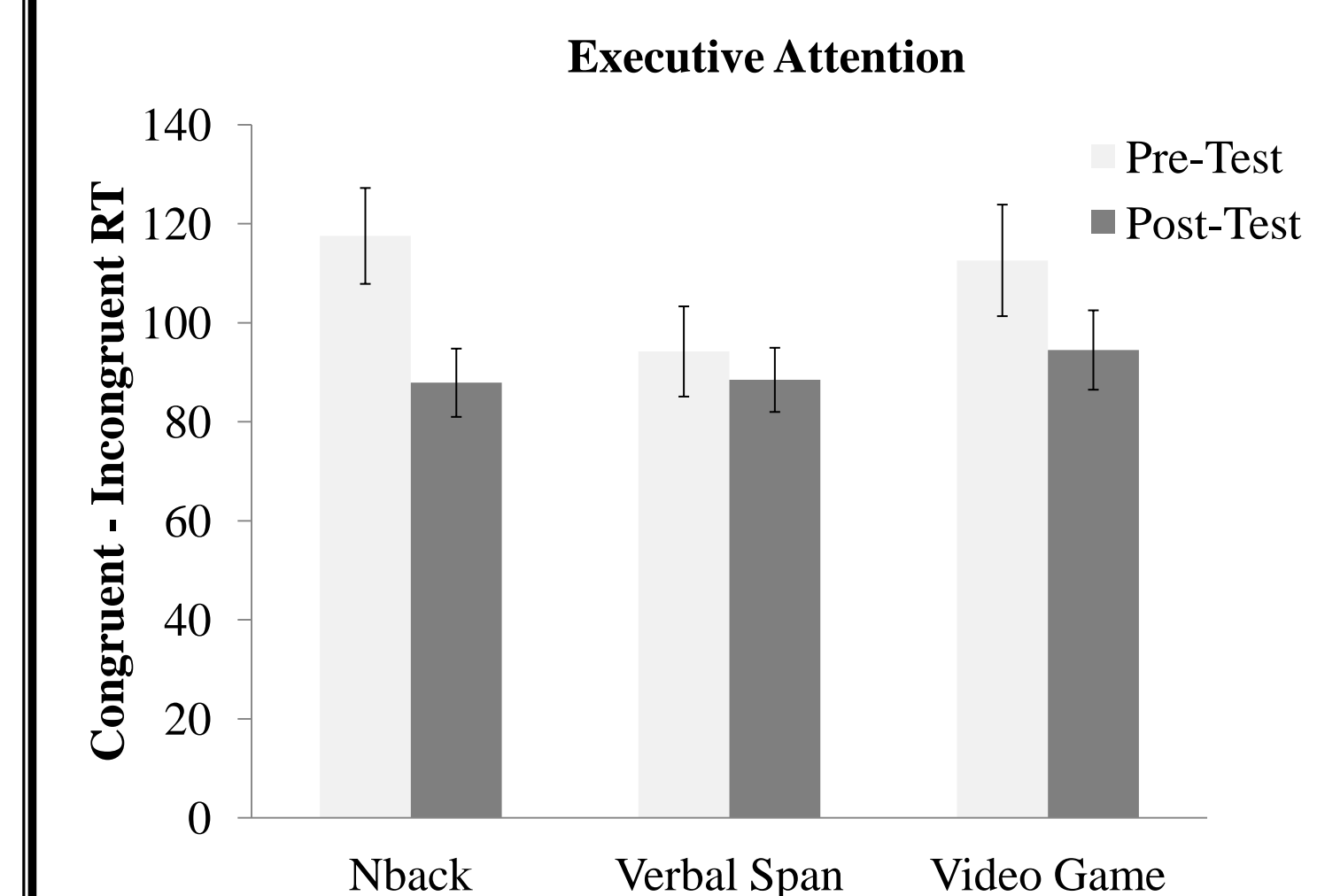
RESULTS



Short-term and Working Memory Measures: We found no significant pre to post test improvements between groups. However, the Verbal Span group had improvements on Letter Span and Operation Span that were not statistically significant.



No difference between the groups on RSPM. Both N-back and Video Game groups improved on Cattell Culture Fair Test.



The N-back training group showed a significantly greater pre to post change in Executive Attention (with no differences in either Alerting or Orienting). There were no differences seen in Spatial Stroop.

We are currently finishing the collection of additional data including an active control group who trained on a non-adaptive version of the spatial N-back training.

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