

## Post Pandemic Brain Changes: Results from 50k Students

### *The Reason Younger Students Are Falling Further Behind Academically Than Older Peers*

- **All students are showing weaker memory skills.** Students who were in elementary or pre-school during the pandemic (currently ages 8-13) are showing the largest declines.
- Given the cumulative nature of learning, particularly in mathematics, memory skills are key to academic achievement. **Unaddressed memory challenges would be expected to lead to even larger declines in achievement over time.**
- **Students across all age groups also showed weaker executive functions** which likely are contributing to lower than expected academic performance and challenging behaviors.

A study of 50k students' pre and post pandemic cognitive skills (complex reasoning, memory, executive functions) shows significant declines in memory and flexible thinking relative to student performance before the pandemic. Cognitive skills are highly correlated to and predictive of academic achievement. The larger declines in cognitive skills in younger students are consistent with recent studies on the larger academic declines in younger students in both math and reading. Overall declines in students' post-pandemic cognitive skills are also consistent with prior research on the impact of chronic stress on brain development.

MindPrint research also found that learners from lower income communities showed greater declines in cognitive skills, which is consistent with reported differences in post-pandemic achievement and learning environments during the pandemic.

As schools report on [divergent achievement performance by grade level](#), it seems increasingly clear that students' cognitive skill development was impacted based on their experiences during the pandemic and that weaker cognitive skills are contributing to the current variability in achievement. The good news is that insights into changes in cognitive skills also provide clear pathways to address academic challenges. Schools can provide effective subject-specific interventions based on underlying cognitive factors. Since learning is cumulative, particularly in mathematics, the declines in achievement scores across grade levels and particularly in math suggest that there could be immediate achievement gains if schools respond to knowledge gaps by strengthening memory and retention, particularly in younger students.

There is a high probability that these findings would generalize to broader populations and contexts. **However, given the variety of factors that are likely contributing to changes in cognitive skills, including age at pandemic onset, learning environment during the pandemic, and socio-economic status, as well as the importance of designing interventions based on identifiable cognitive challenges, it is recommended that schools evaluate their own student population by grade level in both academic and cognitive skills to determine the optimal grade-level interventions rather than rely on the generalized results of this study.**

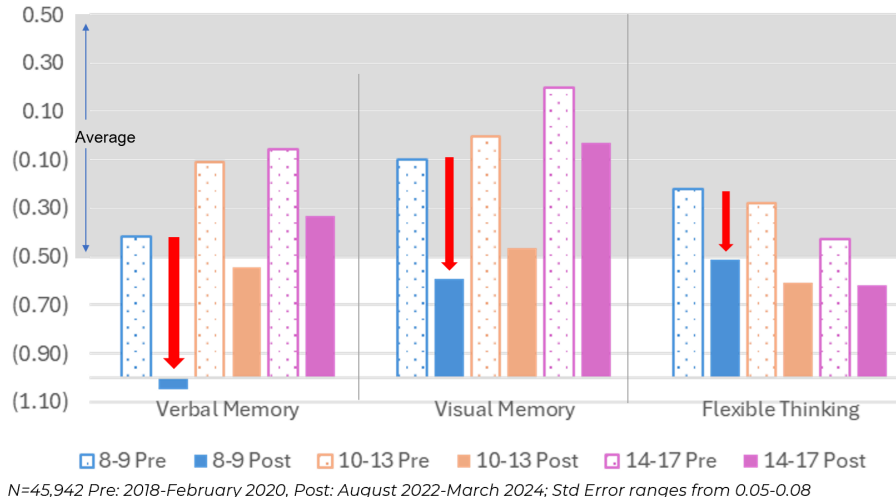
#### **Additional discussion points for next article:**

- Teachers are showing similar declines as students
- Full study results available upon request

**Figure: Pre and Post Covid Changes in Memory and Flexible Thinking by Age**

Memory is more highly correlated with academic achievement in younger students as they build foundational skills and would be expected to have a greater impact on academic achievement scores.

Standard deviation of students by age group. A standard deviation of 0 is the 50th percentile.



**Figure: Pre and Post Covid Changes in Cognitive Skills (All Ages and Income)**

Students showed post-pandemic declines on all cognitive skills. The most significant declines were in Verbal Memory, Visual Memory and Flexible Thinking.

Beginning and ending standard deviation of population. The standard deviation drop in memory is equivalent to an approximately 13% decline

