Executive Function and Academic Achievement

In this article in the *Review of Educational Research*, Robin Jacob (University of Michigan) and Julia Parkinson (American Institutes for Research) report on their meta-analysis of the link between executive function and student achievement. Executive function involves working memory, attention control, attention shifting, and response inhibition. Specifically, it is a person’s ability to:

- Prioritize and sequence behavior – for example, putting on pants before putting on shoes;
- Inhibit dominant or familiar responses – for example, raising a hand rather than just blurting out an answer in class;
- Maintain task-relevant information in mind – for example, remembering the teacher’s request to put on coats before going outside;
- Resist distractions – for example, listening to the teacher rather than watching children outside on the playground;
- Switch between tasks – for example, shifting between collecting information for a research report and organizing the information into an outline;
- Use information to make decisions – for example, which history class to take, of the four being offered;
- Create abstract rules and handle novel situations – this is a skill used in many math problems.

The link between executive function and school achievement seems self-evident, say Jacob and Parkinson: “As a result, scholars and practitioners have expressed considerable enthusiasm regarding school-based interventions that target executive function, hypothesizing that an explicit focus on developing executive functioning skills in school could yield substantial gains in student achievement.”

But is there a causal link between the two? That is, if we are able to improve students’ executive function skills, will their academic achievement go up? “Executive function could simply be a proxy for other background characteristics of the child,” say Jacob and Parkinson, “such as socioeconomic status or a parent’s level of education, each of which is highly correlated with both achievement and executive function.”

The authors’ extensive meta-analysis of research on this subject came to three conclusions:

- There is a moderately strong correlation between executive function and academic achievement, both at one point in time and as a predictor of future performance. The correlation is present for both reading and math achievement.
- This is true for all K-12 age groups, different subcomponents of executive function, and different ways of measuring it.
- There is limited evidence of a causal link between executive function and academic achievement. This is true of several programs designed to develop executive function, including Tools of the Mind, Head Start REDI, the Chicago School Readiness Program, Red Light, Purple Light, and computerized attention training. “The few random assignment studies that rigorously evaluate interventions designed to impact executive function,” say Jacob and Parkinson, “provide some evidence that executive function can be influenced by interventions (most of the studies we reviewed showed some
positive impacts on measures of executive function) but provide no compelling evidence that impacts on executive function lead to increases in academic achievement. Although several interventions found positive impact on achievement, these studies all involve interventions designed to influence executive function and achievement simultaneously, and as a result there is no way to determine if changes in executive function led to observed increases in achievement.”

More research is needed to develop and fine-tune school programs that will drive achievement and can be taken to scale, the authors conclude.

“The Potential for School-Based Interventions That Target Executive Function to Improve Academic Achievement: A Review” by Robin Jacob and Julia Parkinson in *Review of Educational Research*, December 2015 (Vol. 85, #4, p. 512-552), http://bit.ly/1TwEHzV; the authors can be reached at rjacob@umich.edu and jialark@gmail.com.