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# Neuroscience Improves Early Childhood Education Quality



By Ellen Galinsky

Who doesn't want the education and care for young children to be high quality? Parents look for it, advocates fight for it, policy makers debate it. But just what is it?

Quality has remained somewhat of a black box in early education, but a just-released study conducted by New York University researchers is opening up the box. They tested the impact of a curriculum based on findings from neuroscience revealing that promoting executive function life skills enhances children's engagement and success in school and in life.

Traditionally, there has been a focus on what researchers call structural and relationship quality because they have found that children are more likely to thrive when both are present

Structural quality involves things that can be counted, including:

- A sufficient number of teachers for each child (staff-child ratios) and small enough group sizes so that children get individual attention;
- Teachers with higher levels of education and training; and
- Low staff turnover, which is promoted by better staff compensation among other things.



- Teachers who are responsive—that is who foster children’s learning by asking questions, listening to children’s answers, having back and forth conversations with children where they build on and extend what children are learning as well as by encouraging children to explore, think, and play.

The definition of quality has been enlarged by [this new study](#) conducted by Clancy Blair and C. Cybele Raver of New York University. The researchers are testing whether a curriculum based on promoting executive functions skills can improve children’s educational progress.

Executive function skills include children’s ability to avoid distractions, pay attention, hold relevant information in their working memories, and regulate their impulsive behavior. In [explaining why executive function skills matter](#) so much, Jack Shonkoff and his colleagues at Harvard University write:

*In practice, these [executive function] skills support the process (i.e., the how) of learning — focusing, remembering, planning — that enables children to effectively and efficiently master the content (i.e., the what) of learning — reading, writing, computation.*

The curriculum that Blair and Raver evaluated is [Tools of the Mind](#) created by Deborah Leong and Elena Bodrova. It is a comprehensive preschool and kindergarten curriculum of literacy, mathematics, and science activities aligned with the Common Core Standards that has been designed to promote executive function skills. For example:

- There are activity centers with specific activities designed to foster learning both content and executive function skills, including movement games where the rules get more complex and children have to pay attention, follow the rules, and not go on auto-pilot. For those who think that paying attention mainly means getting children to sit still, it is important to note that these skills are often best promoted through physical activities.
- Children meet with the teacher to set weekly learning goals, and learning and play plans to achieve these goals. This is important since executive function skills are always driven by goals. In setting goals and plans, children learn to plan ahead, remember their goals, and monitor what they are accomplishing—all of which call on executive function skills.
- In their meetings with the teacher, children talk about their work, including reflecting on and correcting mistakes, thus developing the sense that what they accomplish depends on their efforts (how they use their abilities not whether they have them) and that mistakes are something to learn from, rather than to be avoided.



- Children work in pairs with a “study buddy” who helps them remember what they are going to do, the rules for looking up the answers, and checks to make sure their partner has completed the activity.
- Play is an integral part of the curriculum. With mature make-believe play, children make up and act out their own versions of stories, thus strengthening their executive function skills by paying attention to plots, learning how the characters in their make-believe play think and feel, taking turns, being creative, and so forth. While some think that play has no place in school, in this curriculum play is used to foster deep learning, which is seen as more necessary than ever when children are increasingly entertained by television and video games.
- Teachers engage in a daily assessment of children’s development in core areas. They look at the skills and knowledge that each child has mastered and what he or she is ready to learn next with assistance from the teacher, and they then provide that help (called scaffolding) to foster the next steps in learning for that child.

To study the impact of this curriculum with kindergarten children, the study randomly assigned children to classrooms with this curriculum (treatment classrooms) and without it (control classrooms). The study involved 759 children in 29 schools in 12 school districts in Massachusetts.

The results are very positive and promising. Blair and Raver found that children in Tools of the Mind classrooms were better at focusing attention in the face of distraction, had better working memories, were better at processing information, in reasoning, and in regulating their stress hormones. In addition, these children improved in reading, mathematics, and vocabulary in kindergarten — and these gains carried over and, in fact, increased in first grade!

Furthermore, many of these findings were even more pronounced in high poverty schools, prompting Blair and Raver to see them as a way to close the achievement gap and reduce inequality in America, especially since a range of schools could effectively implement this curriculum using typical professional development activities that fall well within the budgets of typical kindergarten classrooms.

In announcing [the study release](#), Clancy Blair said.

*Our results suggest that a combined focus on executive functions and early academic learning provides the strongest foundation for early success in school.*



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