

Strengthening Executive Function in Children: Tips for Parents and Practitioners

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The term *executive function* has become increasingly popular in child development research and is growing in use by parents and practitioners. The term is also used in discussions related to the research on motivation and grit in adolescence. Understanding executive function can help parents, teachers, and other professionals see these capacities in their children. Although executive function may sound like a highly technical term, the good news is, adults can easily do many things to promote the growth of these skills in children.

What is executive function?

Executive function is a set of skills that allow people to control their behavior and direct it toward longer-term goals, rather than doing what is automatic or easiest to accomplish. These skills are exercised when children pause and reflect before reacting, according to researchers.¹

Executive function can be compared to air traffic control at a busy airport. “Some planes have to land and others have to take off at the same time, but there is only so much room on the ground and in the air,” explain researchers at FrameWorks Institute.² Executive function is like an air traffic control mechanism, these researchers explain, because “it regulates the flow of information and the focus on tasks, creates mental priorities, and keeps the system flexible and on time. In children, this mechanism needs to be actively geared up as early as possible.”²

There are three components of executive function:

- **Working Memory** is the capacity to hold and work with multiple pieces of information simultaneously.
- **Cognitive Flexibility** is the capacity to easily switch between different ways of thinking, such as changing behavior to fit different situations or seeing something from a different perspective.
- **Inhibitory Control** is the capacity to interrupt an automatic response, control the body, and resist distractions in order to do what is advantageous in the long run.

Adults can easily do many things to promote the growth of executive function in children.

Helpful tips to help children
SOAR are on page 4.



Why is executive function important?

Executive function skills are used constantly in daily life. Examples include calming yourself down instead of yelling and throwing things when you're upset, continuing to work on your math homework even when it's frustrating, remembering to raise your hand rather than blurt out an answer in class, and waiting until after dinner to eat your dessert. Researchers have found that when children exhibit executive function, they are able to learn more in the classroom, because they can focus on the teacher and their work.^{3,4}

Executive function can also help children get along better with others, because they are able to see things from other people's points of view and control their emotions and actions. Executive function skills have also been shown to predict long-term developmental outcomes. Research shows that individuals who display higher levels of executive function as children are more likely to go to college, get a good job, make more money as an adult, and have fewer health problems than their peers who do not.^{5,6}

Understanding executive function can help parents and teachers better understand children's behavior. Executive function develops over time, not reaching stable levels until the end of the teen years.¹ Children's brains are not as efficient as adults' brains in dealing with demands on their executive function. In fact, sometimes behaviors that look like laziness or defiance can be symptoms of children struggling with demands on their executive function. Remembering multiple directions or continuing to work despite distractions may be too much for a child's air traffic control system to handle.

Reducing the executive function demands on children, such as giving one direction at a time or removing desirable distractions from the immediate vicinity, can allow children to practice their developing executive function skills successfully.

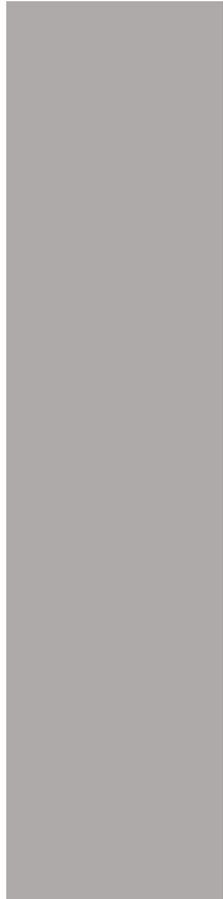
Executive function skills are constantly used in daily life. Examples include calming yourself down when you're upset or waiting until after dinner to eat your dessert.

1. Carlson, S. M., & Zelazo, P. D., & Faja, S. (2013). Executive function. In P. D. Zelazo (Ed.), *The Oxford handbook of developmental psychology, Vol. 1: Body and mind* (pp. 706-743). New York: Oxford University Press.
2. Kendall-Taylor, N., Erard, M., Davey, L., & Simon, A. (2010). Air traffic control for your brain: Translating the science of executive function using a simplifying model. Washington, DC: FrameWorks Institute.
3. Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development, 78*(2), 647-663.
4. Benson, J.E., Sabbagh, M.A., Carlson, S.M., & Zelazo, P.D. (2013). Individual differences in executive functioning predict preschoolers' improvement from theory-of-mind training. *Developmental Psychology, 49*(9), 1615-1627. doi: 10.1037/a0031056.
5. Mischel, W., Ayduk, O., Berman, M. G., Casey, B. J., Gotlib, I. H., Jonides, J., . . . Shoda, Y. (2011). "Willpower" over the life span: Decomposing self-regulation. *Social Cognitive and Affective Neuroscience, 6*(2), 252-256.
6. Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., . . . Caspi, A. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceeding of the National Academy of Sciences, 108*(7), 2693-2698.

All executive function skills involve the prefrontal cortex of the brain. However, different pieces of executive function also involve other parts of the brain, and research continues to explore these connections.¹

Although air traffic control is not a perfect metaphor for executive function, it can give us a way to think about these skills. Here are some examples of how the three components of executive function might be used by an air traffic controller and by a child.

| | Air Traffic Controller | Child |
|------------------------------|--|---|
| Working Memory | I can safely land multiple planes at the same time, by imagining the path each plane has to take and giving directions to each plane without forgetting about the others. | I can follow directions that have multiple steps. If someone asks me to put on my coat, hat, and mittens, I can keep in mind what I have already done and what I need to do next. |
| Cognitive Flexibility | I can recognize the specific needs of each plane, switch my attention from one plane to another, and follow different procedures for different planes so that each plane lands safely. | I can adjust my behavior to the situation I am in. For example, I follow different rules when I am at the library versus at the park. |
| Inhibitory Control | I can keep my focus on the planes I am directing, and not get distracted by other people's conversations or actions. | I can do what I am supposed to do rather than what I want to do. For example, when asked to clean up, I can put my toys away instead of playing with each toy I pick up. |



Let children make as many of their own choices as possible within appropriate boundaries.



What can you do?

The good news is that executive functions aren't set at birth—all children have the capacity to develop their executive functioning skills with practice.

Adults can help children's executive functions increase by keeping in mind the acronym SOAR

Support imagination

Offer choices within limits

Assist reflection

Raise activity levels



Support Imagination. Being able to step outside of the present moment is a key aspect of executive function. It is easier to use good executive functioning when thinking about a problem as if it was happening to another person rather than to oneself. In young children, pretend play is a great way to practice this skill. As children get older, being immersed in the fictional worlds of reading or writing serves the same purpose, and in adolescence thinking about the past, the future, and “what if” situations can keep this skill active. Encourage children to use their minds to explore other worlds, beyond what they are currently experiencing.



Offer Choices within Limits. One of the best ways for a child to improve executive functioning skills is to practice. Adults need to help children regulate behavior by providing clear limits. However, within those limits, children can learn to regulate their behavior. Carefully watch and listen to your child, and see how much help they need and how much they can actually do on their own. Executive function skills will grow when children have the responsibility to monitor their progress and recognize and correct their mistakes. Don't be uninvolved, but let children make as many of their own choices as possible within appropriate boundaries. For example, rather than telling the child what he or she is going to eat for breakfast (no choice) or asking the child what he or she wants for breakfast (unlimited choice), you might ask if your child wants cereal, oatmeal, or eggs.



Assist Reflection. Help your child to pause, step back, look at the big picture, and plan ahead before acting. When your child has a problem to solve, talk to him or her about the options available and the consequences of different choices. When your child interacts with others, talk about emotions that other people may be feeling and how other people's point of view may be different than your child's. Talking about what is going on inside their head can help a child reflect and make conscious decisions, rather than run on auto-pilot.



Raise Activity Levels. Getting heart rates up increases blood flow to the brain, which is important for brain development, including the parts of the brain used for executive function. Being active also reduces stress, which is another way to help executive functions grow. Many types of exercise are also good practice for executive function skills such as body awareness and control, remembering rules, and controlling emotions. Running, swimming, soccer, dance, yoga, martial arts, or other physical activity that your child enjoys can help their executive function.

Can Executive Function Be Modeled?

A great way to teach children is through modeling your own behavior. Children can learn all of the SOAR components from watching adults. For example, when interacting with your children, show them how to reflect and think before acting; do this by talking about the emotions you feel and what you do to control them. There are also things adults can do that are detrimental to children developing executive function skills. Physical punishment, such as spanking, has been linked to lower levels of executive function. Discipline that involves talking through the child's behavior and explaining the problem is more likely to help the child learn how to act when he or she is upset.

Helping a child develop executive function is crucial to his or her long-term success. By recognizing executive function in your children and practicing some of these strategies, you can help your child reach his or her potential.