



Executive function in secondary school

School resources

Adolescence is an important period for young people to develop independence and autonomy. This is a time when many young people rely more heavily on friendships for support than they have in the past. They also demonstrate their developing decision-making and critical thinking abilities. These developmental shifts are supported by a growth in executive function skills. For instance, older children and adolescents demonstrate that they can complete longer and more complex tasks than younger children¹. They also start looking ahead and planning for their future. As adolescents move into secondary school, these important skills come out in a variety of ways.

In adolescence, executive function skills help guide young people as they navigate questions such as:

- How do I focus on short- and long-term goals and follow through with commitments?
- With so much happening in my life, how do I make choices about what to focus on and how to spend my time?
- How do I use time management skills to achieve my goals?
- How do I juggle competing demands and interests?
- How do I make effective decisions in the moment?
- How can I make good choices even when my impulses might lead me down another path?

By understanding the components of executive function, parents, teachers, and other important adults can better support the development of these skills for the adolescents in their lives.

What is executive function?

Executive function stems from the coordination of three cognitive processes: cognitive flexibility, working memory, and inhibitory control. In secondary school, teenagers practise **cognitive flexibility** skills in learning how to pay attention to what is important in the moment and ignoring distractions (for example, paying attention in class even if they are excited for a sports competition or social gathering after school). They also put these skills into action through appreciating differing perspectivesⁱⁱ. For example, a teen needs to be cognitively flexible in compromising with peers when working on a group project.

Working memory is the ability to remember multiple pieces of information and make new connections holding this information in mind. One way that adolescents use their **working memory** is when they apply foundational math concepts to solve complex problems. Working memory also helps young people keep in mind tasks that they need to accomplish throughout the day or in the longer term to achieve their academic or social goals. Finally, **inhibitory control** enables one to stop an impulsive response and display a response that is more appropriate or adaptive for the context. For example, teens use inhibitory control skills when they resist peer pressure to engage in a negative or less helpful behaviour and avoid doing something they would regret in favor of a more appropriate activity. They may demonstrate inhibitory control in making a choice to stay home and study for an upcoming exam over spending time with peers, or they may demonstrate inhibitory control in putting away technology (such as cell phones or video games) to spend time with their family and peers.

Together, these three cognitive processes (i.e., attentional/cognitive flexibility, working memory, and inhibitory control) work together, and can be seen in many aspects of behaviour. Through experience, brain development, and learning contexts, executive function can be practised, strengthened, and improved. By secondary school, teens develop stronger time management and organizational skills along with the focus and motivation to achieve their personal and academic goals.

How executive function develops

Executive function develops early in life. It is influenced by maturation, including brain development, and through the interactions that children have with the people in their lives including parents, teachers, siblings, classmates, and extended family membersⁱⁱ. The foundation for executive function develops in the context of the early attachment relationship that infants develop with the important adults around them. Infants and young children who experience warm and supportive interactions with the important adults in their lives are more likely to feel safe and secure. This sense of security from trusted adults helps children build confidence that allows them to comfortably explore their world, develop independence, and practise problem-solving. Secure relationships also lay the foundation for strong social emotional development and executive function skills in children. Children who develop executive function skills early in life are more likely to demonstrate self-control in social and academic environments, especially as children get older and make the transition from primary to secondary school. In secondary school, adolescent executive function skills are reflected in how young people set long term goals, organise their time, follow-through with tasks needed to achieve their goals, and practise appropriate self-reinforcement to pursue these goals. Importantly, executive function skills are positively associated with academic achievement, social competence, and personal wellbeing, including physical and mental healthⁱⁱⁱ.

Strengthening adolescent executive function skills

Building warm and positive relationships with adolescents is foundational for executive function. In particular, relationships that are supportive and responsive to an adolescent's needs help scaffold executive function skills. School environments that support strong executive function have many characteristics in common^{iv}. These include:

- Safe spaces for teens to talk and calm down after stressful events
- Organised classroom environments with clear expectations for student behaviour
- Consistent methods of discipline that set boundaries (without being punitive), focus on teaching students about the consequences of their actions and offer alternatives to inappropriate behaviour
- Encouragement and opportunities for teens to self-monitor their own behaviours

In addition to creating school environments where students are set up for success, teachers can provide opportunities for adolescents to practise executive function^v. The most effective way to bolster executive function is to embed skills in teaching and daily activities, providing adolescents with opportunities to practise skills across multiple settings while also offering supportive feedback. In addition, teachers can model, reinforce, and teach executive function skills while also empowering parents to scaffold adolescent executive function development at home.

Strategies for improving executive function skills

Executive function skills can be taught and practised throughout secondary school^v and below are listed strategies that can be used by teachers and parents to promote them. As discussed in the previous

section, strategies that have been shown to be effective in supporting executive function skills include fostering positive relationships, organising the environment to scaffold adolescent executive function skills, and providing opportunities to practise skills through multiple approaches and contexts (such as home and school).

Continue to build warm and responsive relationships

Throughout the lifespan, relationships serve as an important role in the development and maintenance of executive function skills. Teachers can continue to foster and build positive relationships with students in secondary school. These students are moving into young adulthood where peer relationships become increasingly important. During this shift, parents and other important adults can support adolescents as they move through secondary school and listen as they navigate their thoughts, feelings, and reactions. In addition, teachers, parents and other adults in children's lives can serve as role models of executive function skills. For example, sharing choices and reasons for short- and long-term goals can help young people learn critical thinking strategies that they can apply to their own goals.

Structure the physical environment to support executive functions skills

Secondary school students are expected to follow and adapt to what can be increasingly dynamic classroom and school demands. As students transition from primary to secondary schooling, they become more independent and eager to be autonomous, but they still benefit from structured and consistent environments. While students in secondary school may not need the same type of environments and instruction as younger children (such as scaffolding, visual direction cues, and so on), they can benefit from having an organised environment. Some strategies include providing and encouraging students to use a daily planner, having physical resources such as pencils, notebooks and devices available, using labels, and encouraging students to organise their backpacks, lockers, and personal materials.

Support effective decision making and problem solving by embedding executive function into learning and curricula

Have discussions that highlight examples of executive function and include these into classroom curricula. For example, using books and videos, talk about choices that characters or historical figures make. What factors impacted their choices? What information did they use to make choices? Do you think they made effective decisions? What consequences came from their decisions? What would you have done in their situation?

Encourage goal setting, planning, prioritising and self-monitoring

Students are required to complete tasks on a daily, weekly, and long-term basis. In addition to school-related activities, students are often engaged in extracurricular activities, a paying job, or family responsibilities that take up space and time. Outlining for students how to effectively plan, prioritise, and achieve their goals (or complete a task) helps students stay on task and supports their executive functioning skills. One way to support students is to talk through a step-by-step process for completing a task or achieving a goal that they can then apply to different activities and contexts. For example, an English teacher who assigns a 300-page book for students to read in two months' time can walk students through a general timeline (for example, 'on this date, you should be halfway through your book') and help them monitor their progress weekly and/or monthly. Helping students set their own goals will help them complete tasks on time, while setting their own priorities for when and how to accomplish the task. Teachers can also provide multiple opportunities to check on these goals. After a task has been

completed, teachers can ask students to reflect on what worked and what did not. What helped them to be successful? Is there anything they would do differently next time? It is important to keep goals short, clear, and manageable for the time allowed and appropriate to the developmental age and stage of the student.

In addition to creating clear strategies for reaching a goal, parents, teachers, and other important adults can also encourage children to practise **self-monitoring**. As students work to achieve their long- and short-term goals, they can monitor their progress daily, weekly and monthly if appropriate. Teachers can provide activities and assignments where students set their own goals, make a plan, and have a chance to follow through and reflect.

Encourage parents and caregivers to support executive function development at home

Working with families to support students' executive function skills is key. One way to extend classroom learning at home is by sharing with families the benefits of executive function skills along with resources showing how they can be reinforced at home. Teachers can ask families to discuss ways that they can model their own executive function skills. For example, families may include teens in their meal planning and cooking. Teens can pick a meal to make and work with parents or other adults to plan and organise the meal, including helping with the ingredients, shopping, planning, cooking, and enjoying the meal and time spent together. Parents and other adults can also engage adolescents in decision-making related to family plans, routines, and rules. Talking about family rules and boundaries and having discussions about why they are important can help adolescents think through the decisions they make and strengthen their own autonomy and reasoning skills. Supportive family conversations can also provide an opportunity for young people to express their own growing needs for autonomy and help families work with their children to meet those needs. For example, adolescents who take responsibility for communicating with parents when they are out with friends and respecting rules and limits of when they need to be home are reinforcing their executive function skills.

Recognise all adolescents as learners

In both school and home settings, it is important to remember that adolescents are learners. The aim of the adults in their lives is to support skill development - executive function skills as well as others. When adolescents make a mistake, demonstrating a breakdown or area for growth (for example, they struggle with paying attention, fail to follow through with an assignment, or make a poor decision), adults can help them reflect on what would have helped them in the moment and what they can do differently next time. Having supportive feedback is critical to the growth and development of these skills. And adults are likely to make mistakes along the way as well, which can be used as teaching opportunities when talking with young people.

As in younger children, executive function skills continue to be important for adolescents as they gain independence, improve their critical thinking skills, set and follow through with goals, and look ahead to their futures. As adolescents mature, the adults in their lives (parents and other important adults) are critical for the development and maintenance of these skills.

Endnotes

- i Pearson, P. D., & Duke, N. K. (2002). Comprehension instruction in the primary grades. *Comprehension instruction: Research-based best practises*, 247-258.
- ii Carlson, S. M. (2009). Social origins of executive function development. In C. Lewis & J. I. M. Carpendale (Eds.), *Social interaction and the development of executive function. New Directions in Child and Adolescent Development*, 123, 87–97.
- iii 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. *Proceedings of the National Academy of Sciences*, 108(7), 2693-2698. <https://doi.org/10.1073/pnas.1010076108>
- iv Sosic-Vasic, Z., Keis, O., Lau, M., Spitzer, M., & Streb, J. (2015). The impact of motivation and teachers' autonomy support on children's executive functions. *Frontiers in Psychology*, 6, 146.
- v Diamond, A., & Ling, D. S. (2016). Conclusions about interventions, programs, and approaches for improving executive functions that appear justified and those that, despite much hype, do not. *Developmental Cognitive Neuroscience*, 18, 34-48. <https://doi.org/10.1016/j.dcn.2015.11.005>

PREPARED FOR THE EDUCATION HUB BY



Dr Megan McClelland, Dr Shauna Tominey, Alexis Tracy, Dr Alexandra Nancarrow and Jasmine Karing are based at the Hallie E. Ford Center at Oregon State University where their research focuses on optimising children's development and supporting positive social and emotional outcomes for children and families, especially as they relate to children's self-regulation, early learning, and school success.