LANGUAGE DISORDER AUSTRALIA

Executive Function Skills

Executive function skills are a group of interrelated cognitive skills critical for facilitating and supporting the learning process. Executive function skills allow our brains to juggle multiple tasks. We can think of executive function in our brains as the air traffic control system at a busy airport. As air traffic control coordinates multiple airplanes at once, so must our brains coordinate numerous sources of information at once. Executive function skills help our brains filter information and disregard distractions while making plans, holding and manipulating information, transitioning between activities, and regulating our emotions and behaviours. By managing the different executive function skills, students can achieve goals such as initiating tasks or finishing projects.

Keywords: *executive function skills, cognition, classroom strategies*

No one is born with executive function skills

Rather, most people are born with the *potential* to develop executive function skills (Center on the Developing Child at Harvard University, 2011). The foundation for developing these skills is laid in infancy when babies learn to pay attention (Greenstone, 2011). Experiences during infancy, throughout childhood, and into adolescence contribute to the development and refinement of executive function skills.

Research shows executive function skills at the preschool age are predictive of long-term academic achievement and positive wellbeing measures, including social competency and stress resilience (Hodel, 2018).

Although reduced executive functioning may be associated with early adversity in life and neurodevelopmental conditions such as autism, attention-deficit/hyperactivity disorder, mood and anxiety disorders, and intellectual disability (McLean, 2018), all individuals can be supported to develop these important cognitive skills.

Did you know?

The single greatest predictor of academic success is **executive functioning**.
It is even more important than IQ!

The neurology of executive function

Research into brain function and structure suggests that the prefrontal cortex is the brain region primarily involved with executive function skills (Akyurek, 2018). The prefrontal cortex is interconnected with the nervous system, which activates the fight-or-flight response (Šimić et al., 2021). This interconnection is crucial in childhood and adolescence as emotional states influence the development of cognitive skills (Center on the Developing Child at Harvard University, 2011).

Typically, the prefrontal cortex is fully developed by the age of 25 (Arain et al., 2013). At this stage, executive function skills, such as inhibitory control, become responsible for regulating emotions. These enhanced executive function skills allow for complex cognitive behaviour including personality expression, decision making and moderating social behaviour (Akyurek, 2018). Communication, although developed much earlier in life, is also a complex cognitive skill.

Executive function and language

Research suggests a significant association between executive function skills and language (Gooch et al., 2015). Executive function difficulties are frequently reported in students with Developmental Language Disorder or with Language Disorder associated with another condition (Marini et al., 2020; Gooch et al., 2015). Researchers are divided whether weaknesses in executive function negatively affect language development or whether language difficulties negatively affect executive function development (Gooch et al., 2015). Another contemporary theory is that neither executive function difficulties nor language difficulties are the primary cause of the other, but rather, these skills develop in an interdependent manner (Bishop et al., 2014). Researchers do agree on the importance of intervention in supporting executive function development (Marini et al., 2020). Therefore, it is important to identify and support executive function difficulties in the classroom.

Executive function in the classroom

Executive functioning is closely tied to academic functioning and has been associated with academic achievement in reading, mathematics, science, and social studies (Nagarhalli, 2021). Executive function skills play a crucial role in the process of learning by helping the brain to filter information and disregard distractions while making plans, holding and manipulating information, transitioning between activities, working towards future

objectives and regulating emotions and behaviours (Hofmann et al., 2012).

The following table outlines each of the seven executive function skills and describes how difficulties with each skill may present in the classroom or learning environment.

Executive Function Skill	Difficulties in this skill may look like:
Inhibitory Control The ability to resist impulses and control one's behaviour	• Impulsive behaviour (e.g., starting an activity before listening to instructions) • Problems staying focused/on task • Interrupting others or calling out in class
Shift The ability to switch attention, transition between tasks or places, cope with change, think flexibly, shift focus	• Difficulty adapting to change (e.g., not coping with a substitute teacher or change to routine) • Difficulty changing tasks and approaches to problems • Black and white thinking
Emotional Control The ability to control emotional responses and manage frustration	• Outbursts, sudden or frequent mood changes • Periods of excessive emotional upset • Difficulty reacting appropriately
Initiate The ability to begin a task or activity and come up with one's own ideas and problem-solving approaches	• Needing to be told to start, even if willing to do the task • Not knowing where to begin a task (e.g., needs to have steps broken down) • Requiring support with idea generation
Working memory The ability to retain information and actively use or manipulate it to complete a task	• Difficulty remembering things (e.g., instructions, personal details) • Losing track of what one's doing • Forgetting the purpose of a task or errand • Frequently failing to attend to an activity

Planning and Organising The ability to set goals, anticipate future developments, pre-determine steps necessary to complete a goal and organise information	• Losing track of homework assignments • Waiting until the last minute to start a task or project • Underestimating level of difficulty or time required to complete a task • Challenges understanding key points in written or verbal material
Organisation of materials The ability to keep track of one's materials and belongings and maintain them in an organised state and locate them when needed	• Difficulty keeping materials and belongings organised and space tidy • Forgetting or leaving items in the wrong place and having difficulty locating them • Frequently losing things
Monitor The ability to assess one's progress and performance of a task and monitor one's behaviours and the impact they have on others	• Difficulty assessing own performance (e.g., asking, "What worked and what did not work?") • Difficulty recognising of the effect one's behaviour has on others

Strategies to support executive functioning in the classroom

- Adapt teaching according to students' individual needs. For example, consider whether a student may need to access audio recordings of instructions, or if they would benefit from detailed written instructions or visual schedules.
- Minimise clutter in the classroom and in workspaces.
- Create visual checklists for daily activities and to help keep track of tasks (e.g., task analysis checklist).
- Utilise memory strategies such as mnemonics, rhymes, or acronyms.
- Identify and meet students' sensory needs to help them tune out distractions and increase focus (e.g., fidget tools, movement breaks, noise cancelling headphones, alternative seating options such as standing while doing a task).

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Want to learn more?

To learn more about Language Disorder and how to support children and young people for whom language is their primary disorder, please **contact us**. Language Disorder Australia provides holistic, innovative and effective therapy, education and support services and has a transdisciplinary team of speech pathologists, occupational therapists, educators, psychologists and physiotherapists.

Contact: 1300 881 763 or **hello@languagedisorder.org.au**

Website: **languagedisorder.org.au**

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