

# Executive function in early childhood



ECE resources

## What is executive function?

Why do some children have an easier time paying attention than others?

Why do some children follow directions well, but others do not?

Why are some children more likely to hit others when they feel frustrated, rather than stopping and using their words instead?

Many of the differences we see in young children's behaviour relate to their executive function. Executive function is a set of skills that stems from the coordination of three cognitive processes: cognitive flexibility, working memory and inhibitory control<sup>1</sup>. These skills help us plan, focus, remember instructions and complete tasks. Executive function is important throughout life and starts to develop early. Cognitive flexibility is the ability to pay attention and switch attention from one task to another. For example, children use cognitive flexibility when they focus on one activity, such as building with blocks, but then switch to another activity, putting the blocks away and joining their peers for a story. Working memory enables us to mentally hold and process information<sup>2</sup>. Young children use working memory when they have to remember and follow one or more instructions, such as when working on an art project and then putting their materials away. Inhibitory control allows us to stop an impulse and display a more appropriate response<sup>3</sup>. We see this often in young children when they have to take turns in sharing a desirable toy (for example, asking 'Can I have a turn?' rather than grabbing the toy). In young children, the three aspects of executive function work together and can be seen in many different ways, such as when a child has to listen and follow directions, ignore distractions and wait in line.

## How executive function develops

Executive function begins to develop early in life. Babies who experience warm and supportive interactions with important adults in their lives are more likely to feel safe and secure. This helps children develop positive relationships with parents and adults, giving children the confidence they need to explore their world and develop independence and problem-solving skills. Secure relationships also lead to strong social emotional development and executive function skills in young children. Children who develop executive function skills early in life are more likely to show self-control, especially as they get older and make the transition to more structured learning environments.

## Executive function skills are important

Early education teachers often report that children's executive function skills are foundational for success in educational settings and social situations<sup>4</sup>. More than two decades of research have shown that these skills are important for many aspects of our lives, including:

- Mental and physical health across the lifespan<sup>5</sup>
- Effective social communication<sup>6</sup>
- Short and long-term success in school<sup>7</sup>
- University completion<sup>8</sup>

In fact, executive function has been a stronger predictor of early academic achievement than IQ<sup>9</sup>.

Although executive function is a key predictor of many outcomes, a significant number of young children struggle with these skills. This is especially evident when children make the transition from early childhood settings to formal educational settings such as primary school, which are often more structured than ECE settings. Many young children easily transition to primary school but a significant number of children experience difficulty. Teachers report that young children struggle most with challenging behaviours that relate to aspects of executive function like being able to focus and pay attention, persisting with tasks and demonstrating self-control in academic and social situations. This is concerning because we know that these skills help children navigate classroom settings. In fact, children who struggle with executive function are more likely to dislike school and become disengaged, which can place them at risk long-term.

## Strengthening executive function skills

Based on evidence showing us how important executive function is for children's school success, an essential question to consider is how to support development of these skills in young children. Executive function skills are particularly malleable in early childhood<sup>10</sup>, and intervention research has shown that these skills can be taught, practised and improved<sup>11</sup>. This is especially evident for children who struggle with executive function skills. For example, children aged 3-5 who participated in an intervention aimed at helping children practise executive function skills with music and movement games (called [Red Light, Purple Light!](#)) demonstrated improvement in their executive function skills<sup>12</sup> and early academic achievement<sup>13</sup> compared with children in a control group. Providing children with opportunities to practise executive function skills in fun and engaging ways has been shown to help children improve these skills and then demonstrate them in a variety of settings, including home and school.

## Strategies to improve executive function skills

Parents, teachers and other adults serve an important role in helping children develop executive function skills. As noted, positive early relationships lay the foundation for executive function skills by helping children feel safe, secure and ready to explore and problem-solve. Parents and teachers do many things that encourage the development of children's executive function, even if they do not know it! Below we include several strategies that teachers can use to support these skills in early childhood settings.

- Take time to **build relationships** with children. This can be hard when there are many children in a group and when individual children may need extra support! However, taking time to build positive teacher-child relationships provides children with a strong foundation for social emotional skills and learning. Children who have strong relationships with their teachers make greater gains in school readiness and positive behaviour over the year.
- **Model** what strong executive function skills look like. Children look to adults as a guide for their own behaviour, and one way teachers can support executive function in the early childhood settings is by talking aloud. For example, teachers can narrate their actions as they walk through the space and clean up: 'We need to clean up the toys at activity centres, so I'm going to start with the art centre first and then clean the dramatic play centre. Then we will be ready to go outside to play!' By modelling positive behaviour, children can see how adults use executive function in their daily lives to be organised and planful.
- Set up the space to **promote executive function skills**. Teachers can organise learning and play spaces in ways that encourage children to practise executive function skills. In order to support executive function, it helps to plan and focus activities that can build upon one other. For example, teachers can allow children the opportunity to move between relatively unstructured activities, like dramatic play, and more complex activities like a multi-step art activity where children need

to remember and follow directions while ignoring distractions to stay on task. Children need both types of activities to practise executive function skills and then process what they are learning through play. Teachers can also give children materials and activities that require them to practise executive function skills. For example, teachers can promote focus and attention (which are important parts of executive function) by having children practise their fine motor skills in a maths game that involves them having to use tweezers to sort small manipulatives into categories (such as colour).

- Use **games as a teaching tool**. Children develop strong executive function when they practise these skills in different contexts and settings. This means that it is important to practise executive function skills outside of challenging moments. One fun and simple way to incorporate executive function into everyday activities is to use music and movement games and add steps to make them more complex over time. For example, interventions such as [Red Light, Purple Light!](#) include games that become more challenging over time<sup>14</sup>. In one game, the **Freeze** game, children dance to music and then freeze when the music stops. After children practise the basic rules of the game, more complex rules are added. Children are then asked to dance quickly to fast music, slowly to slow music and freeze when the music stops. To add another level of complexity, children are then asked to do the opposite (which can be tricky!) and dance quickly to slow music and slowly to fast music.
- In another game, called the **Sleeping Game**, the teacher sings a short lullaby and the children pretend to go to sleep when they hear the song. The children then 'wake up' when the teacher says: 'and when they woke up, they were kangaroos hopping around the room'. Children move around the room pretending to be the animal or action named by the teacher. The teacher then uses the lullaby as a cue for children to pretend to sleep again. As children learn new executive function activities and games, teachers can also allow opportunities for children to lead the group in game play (for example, a child names the animal or action during the sleeping game). These are just a few examples of ways that teachers can embed aspects of executive function into their everyday activities. Typical activities can be easily modified to more explicitly support children's executive function skills as well.
- Engage families in **supporting executive function at home**. Children's first teachers are their parents and other important adults in their life. Engaging families in activities surrounding the development of executive function skills can provide the extra support children need to succeed. Teachers can play games like the ones mentioned above with children as part of family events or open days. This helps parents see some of the ways that they can promote executive function skills at home. Teachers can also share information with families about the importance of executive function skills, encourage parents and other adults to model these skills themselves, and send home flyers with examples of activities that families can do at home to help children practise executive function skills.

Children's executive function skills include their ability to focus and pay attention, remember instructions and demonstrate self-control. These skills are important aspects of early learning and development that help children regulate their behaviour and they are correlated with social and academic success. Executive function skills develop early in life and are supported through warm and secure relationships. The early childhood years are a sensitive period of development when these skills are especially malleable. Teachers can do many things to build positive teacher-child relationships and promote executive function skills in early childhood settings, including adapting existing activities to help children practise these skills. Including families in these efforts can also help support children's executive function at home and in other important contexts of their lives.

## Endnotes

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- <sup>10</sup> Zelazo et al. (2016).
- <sup>11</sup> McClelland, M. M., Tominey, S. L., Schmitt, S. A., Hatfield, B. E., Purpura, D. J., Gonzales, C. R., & Tracy, A. N. (2019). Red Light, Purple Light! Results of an intervention to promote school readiness for children from low-income populations. *Frontiers in Psychology*, 10, 1-15. DOI: 10.3389/fpsyg.2019.02365
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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.