

*This tip sheet focuses on an aspect of executive function called inhibitory control.<sup>1</sup> We'll look at the evidence for music training as a way to support children as they develop inhibitory control.*

*This tip sheet was created in partnership with MacPhail Center for Music.*

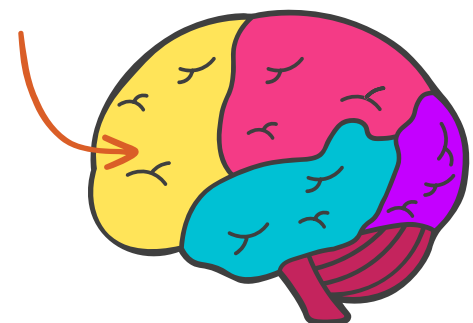
Inhibitory control can be defined as “the ability to exercise voluntary control over our reactions and behaviors.”<sup>2</sup> That can mean overriding a strong internal impulse. It can also mean resisting an external temptation. We can exercise inhibitory control over our “attention, behavior, thoughts, and/or emotions.”<sup>1</sup>

**“[I]nhibitory control makes it possible for us to change and for us to choose how we react and how we behave rather than being unthinking creatures of habit.”**

–Adele Diamond<sup>1</sup>

Our ability to learn executive function skills increases quickly during early childhood. That's because of the rapid brain development that's happening during that time of life. A part of the brain called the prefrontal cortex is very important to executive function.<sup>4</sup> This part of the brain is still developing in young children. So while executive function skills are difficult at any age, children under age five have an especially hard time with them. Environmental stressors like poverty can add to that difficulty.<sup>3 5</sup> Fortunately, anyone—at any age—can improve their inhibitory control.<sup>1</sup>

**Prefrontal cortex**, responsible for executive function skills. Not yet fully developed in young children.



## RECALL IT

As we saw in the *Introducing It: The Benefits of Music Integration to Emotional Regulation Development in Young Children* and *Applying It: Engaging in Musical Play with Young Children* tip sheets, music is an effective teaching tool. It can be used to support children's development of executive function skills.

- **Executive function** is a term encompassing a set of skills that allow people to control their own behavior and direct it towards longer-term goals, rather than what is automatic or easiest to do.
- **Music Integration** is a method by which music is incorporated into new or existing activities. Musical activities should be meaningful additions that engage children, impact their learning experiences, and enhance the classroom climate. This teaching strategy is the focus of MacPhail's Learning with Music teaching approach.<sup>3</sup>

## **MUSIC AND INHIBITORY CONTROL**

As noted in our previous Tip Sheets on music integration, musical expression often comes naturally for young children. You may notice them humming or singing throughout their day, even making up songs about their daily activities.<sup>4</sup> Music is also a tool that anyone who works with children can use. Studies suggest that music training can help young children develop inhibitory control.<sup>2 6 7 8 9</sup>

Some scientists think that the reason why music can help with inhibitory control has to do with the fact that musicians have to adjust to frequent changes in key, time signature, and tempo.<sup>7</sup> One study linked inhibitory control specifically to rhythm. Rhythm can be defined as a strong or regular pattern of movement or sound. It is a core element of music. Researchers who studied adult percussion players and non-percussion players found that a strong sense of rhythm was linked with strong inhibitory control.<sup>10</sup>

Music and rhythm help us pay attention to our bodies and get more practice changing out of automatic patterns. When children switch from slow to fast rhythms, from stomping to clapping, and so on, they are practicing the skills they need to override automatic impulses and use their bodies more mindfully.

## **REFERENCES**

The sources referenced in this tip sheet can be found at [z.umn.edu/inhibitrefs](https://z.umn.edu/inhibitrefs).

Setting words to music really boosts our ability to remember them. So music, especially with repetitive words, can be used to help children keep a goal (like cleaning up toys) in mind. That, in turn, can help them inhibit other behaviors.

## **DIVING INTO IT**

### **For additional information on this topic:**

Check out the Sing, Play, Learn with MacPhail® program: [macphail.org/learning-with-music](https://macphail.org/learning-with-music)

Don't miss the companion Tip Sheet, Applying It: Helping Young Children Practice Inhibitory Control with Music: [z.umn.edu/music-inhibitory](https://z.umn.edu/music-inhibitory)

Download more music Tip Sheets from CEED and MacPhail:

- **Introducing It: The Benefits of Music Integration to Emotional Regulation Development in Young Children** and **Applying it: Engaging in Musical Play with Young Children:** [z.umn.edu/music-regulation](https://z.umn.edu/music-regulation)

Read CEED's blog post on supporting young children's development with music: [ceed.umn.edu/beyond-the-cleanup-song-supporting-young-childrens-development-with-music](https://ceed.umn.edu/beyond-the-cleanup-song-supporting-young-childrens-development-with-music)

Please visit CEED's website: [ceed.umn.edu](https://ceed.umn.edu)