

## Executive Function Mapping Project: Untangling the Terms and Skills Related to Executive Function and Self-Regulation in Early Childhood

Executive function (EF) is increasingly used to refer to a variety of skills including attention, self-control, emotion regulation, creativity, and problem solving, among others. This poses a challenge for stakeholders in early childhood programs and services, who need to be able to identify research findings that are tied to specific skills. Current investment and interest in children's EF presents an opportunity to equip key stakeholders with the tools to untangle and interpret the meaningful differences between EF and other regulation-related skills.

*We define "EF" as the following skills: response inhibition, attention control, attention shifting (also called cognitive flexibility), and working memory.*

*We define "regulation-related skills" as a broader set of skills including self-control, emotion regulation, EF, problem-solving, and grit, among others.*

**Why does this matter?** Without a framework to clarify the differences between EF and other regulation-related skills, there is an increased likelihood of misunderstanding or mis-interpreting information about the key skills that have been linked to long-term outcomes, how and when these skills develop, and the best interventions or assessments for specific skills. For example:

- **Policy-makers** run the risk of funding or promoting programs that are not efficacious for the specific needs of the populations they are trying to serve.
- **Program developers and evaluators** run the risk of misunderstanding the impact of EF-related efforts if target skills are assessed using measures designed for other skills.
- **Teachers and caregivers** run the risk of choosing strategies that do not effectively target the intended skill, or are not appropriate for the intended age or context.

The EF Mapping Project was designed to help clarify differences between EF and other regulation-related skills for ACF leaders and staff. Below, we summarize our project findings and recommendations.

### Key Project Findings

- Both executive function (EF) and other regulation-related skills are important areas of children's development and are promising targets for interventions that aim to improve outcomes for children and youth.<sup>1</sup>
- Particularly in early childhood, the term EF is used to describe findings that are linked to other skills, such as self-control, delay of gratification, and emotion and behavior regulation. In a literature review designed to capture the wide array of terms and measures used in this body of research, over 40 unique terms were identified,

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<sup>1</sup> Bierman et al., 2008; Diamond et al., 2007; Diamond & Lee, 2011; Jones, Brown, & Aber, 2011; Raver et al., 2011; Riggs et al., 2006

referring to at least a dozen distinct skills. Although EF and these regulation-related skills share common features, they differ in ways that have implications for the design and evaluation of programs. Without more transparency and precision in how stakeholders communicate about EF and regulation-related research, these differences may be lost and important areas of skill development may be overlooked.

- Rigorous research has shown that EF along with other regulation-related skills – including effortful control, self-control, and emotion and behavior regulation – may have broad impacts on child outcomes.<sup>2</sup> To target these skills effectively, stakeholders could benefit from resources that articulate distinct regulation-related skills.
- In particular, a growing body of research suggests that promoting and measuring children’s EF and regulation-related skills in situations that involve emotions (i.e., tasks that require children to manage frustration, desire, anger) and social interactions (i.e., tasks that require children to share and take turns) may be especially relevant to children’s success in school and everyday environments.<sup>3</sup>

## Implications and Considerations for Stakeholders

**Need for more precision and clarity about the differences between EF and other regulation-related skills** – As part of the EF Mapping Project, we created a framework to help researchers and practitioners articulate important differences between EF-related skills, assessments, programs, and research findings. **The four organizing principles of our framework are:**

1. **Skill complexity<sup>4</sup>** – the relative complexity of a skill (whether a skill is complex, multi-faceted, and comprised of multiple smaller skills; or small, simple, and less complex)
2. **Developmental Stage** – the relevant stage for a skill, or age-specific manifestations
3. **Developmental Domain** – the social, emotional, or cognitive orientation of a skill
4. **Measurement Strategy** – the approach to assessing or observing the skill

**Looking Forward** – We suggest the field needs additional resources, perhaps based on the proposed framework, that allows users to (a) search a specific EF-related skill, (b) locate key research tied to that skill, (c) identify assessment and teaching strategies associated with that skill, and (d) synthesize relevant findings for broader policy recommendations. Policy recommendations are built on bodies of research, but **the current body of research is not cohesive; it reflects many different skills with unique findings tied to each skill.** The aggregation of individual studies into a larger, more robust body of evidence could help support broader policy work and provide a more accurate understanding of the science of EF. For example, the development of an interactive online resource would allow studies that have similar terms and measures to be compiled based on an overarching framework.

**Conclusion:** The growing research on EF and regulation-related skills has the potential to enhance efforts to improve important developmental outcomes. However, EF and regulation-related skills need to be carefully defined and measured in future studies, findings need to be conveyed with more transparency and precision, and researchers, practitioners, and policymakers should use specific and appropriate terms when communicating about or working in this field. In the accompanying Report, we provide more details about the project’s findings and recommendations.

<sup>2</sup> Best, Miller, & Naglieri, 2011; Blair & Razza, 2007; Bull et al., 2008; Duckworth & Seligman, 2005; Eisenberg et al., 2004; Graziano et al., 2007; McClelland et al., 2007; Moffitt et al., 2011; Raver, 2002; Valiente et al., 2011

<sup>3</sup> Jones, Greenberg, & Crowley, 2015; Mischel, 2014; Moffitt et al., 2011; Raver, 2002

<sup>4</sup> For example, playing basketball is a complex skill because it includes the coordination of many simpler skills that typically have to be mastered first – such as dribbling, shooting, passing, etc. Simpler skills typically serve as building blocks for more complex skills. We suggest that EF skills, such as working memory and inhibition, are building blocks for more complex regulation-related skills, such as self-control, emotion regulation, or problem solving.