

EXECUTIVE FUNCTION IN EVERYDAY LIFE: FROM RESEARCH TO INTERVENTION



GLOBAL
DOWN SYNDROME FOUNDATION

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THIS PRESENTATION

1. What is Executive Function? Why is it important?
2. Executive Function in People with Down syndrome
3. How we can support the development of Executive Function



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WHAT IS EXECUTIVE FUNCTION?

*Thinking skills that we
use for
planning to
reach goals*



WORKING MEMORY

Holding and manipulating information while completing a task



INHIBITORY CONTROL

Resisting impulses and distractions

COGNITIVE FLEXIBILITY



Ability to modify thinking and/or strategies across contexts

PLANNING



Chaining steps together toward a goal

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MIDDLE CHILDHOOD EF IN PEOPLE WITH DOWN SYNDROME

Children with Down syndrome may show:

More pronounced difficulties with working memory and planning

Some children show additional challenges in ‘holding back’/inhibition

EF research suggests flexibility may become more of a challenge for some individuals with Down syndrome in adolescence and adulthood

How does executive function performance impact adaptation in home, community, and school environments?

EXECUTIVE FUNCTION IN PEOPLE WITH DS

Self-care in children



EF performance



Employment in adults



EXECUTIVE FUNCTION IN PEOPLE WITH DOWN SYNDROME



Executive function skills are associated with:

- early academic achievement in the primary grades
- practical skills in home, school, community settings
- Employment outcomes in adulthood (working memory)

EF IN PEOPLE WITH DS SUMMARY

- A clear pattern EF skills is evident during middle childhood, with direct implications for education and adaptation
- What do starting states look like prior to the toddler years?
- Can we use this information to shape interventions?



INFANT FINDINGS

Some infants: high levels of active early planning (eyes + hands + mouth)

Some infants: more passive early planning skills (mostly eyes)

This information can be useful!

THIS PRESENTATION

1. What we can learn about early development and why its useful
2. Early development of Executive Function
3. How we can use this information to improve intervention for people with Down syndrome



Use developmental knowledge to inform intervention



Anticipatory Guidance:

Select enrichments support
early learning;

Proactively target critical
areas from early stages

(Fidler, Philofsky & Hepburn, 2007)

Executive Functioning

Emotional Control

the ability to manage emotions while finishing a task or goal; controlling and directing behavior

Sustained Attention

the ability to focus and complete tasks despite fatigue or boredom

Response Inhibition

thinking before acting; ability to assess and evaluate a situation before responding to it

Task Initiation

starting projects without procrastination

Planning and Prioritization

making decisions and mapping out plans towards achieving a goal or completing a task while identifying irrelevant information

● Inhibition or self-control

allows an individual to set priorities and curb impulsive behavior.

Organization

creating and maintaining a system that helps keep track of information, materials, personal possessions

Time Management

the ability to estimate and allocate the time needed to complete a task or meet deadlines

Goal-Directed Persistence

ability to not lose sight of a goal and seeing it to the end without getting swayed by distractions or competing interests

Flexibility

adapting to obstacles, new information, or changing situations

Metacognition

ability to step back to assess and observe oneself in situations; involves self-monitoring and self-evaluative skills

Executive functioning involves three major types of brain functions or core skills. These are:

● Mental or cognitive flexibility

which enables an individual to adapt to changing conditions, respond to different demands, and analyze situations in several ways. This plays a key role in solving problems, whether in school or daily life.

● Working memory

or the ability to hold and process information over short periods. It allows an individual to hold information while actively processing information without losing track of a bigger task.



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GROWTH STRATEGIES



WORKING MEMORY

- Build something together (Use visual directions for support)
- Arts and crafts
- Mental math
- Matching games (Start with a smaller set and build on it)
- Songs with motions

Classic Gameplay



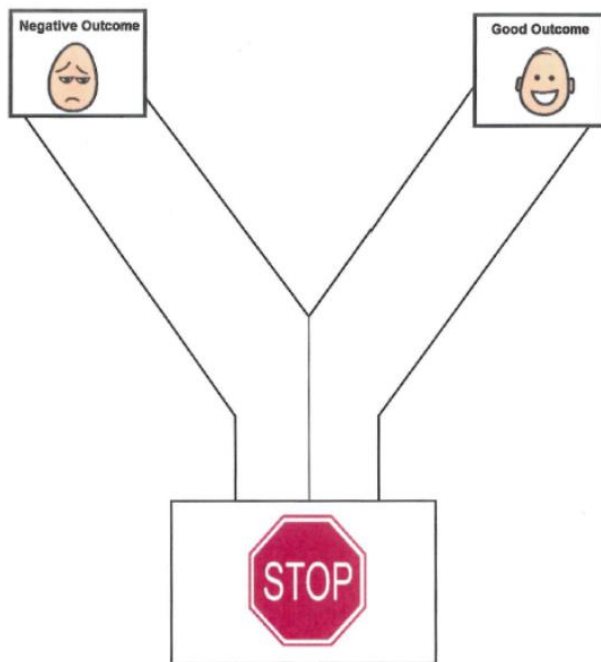
INHIBITORY CONTROL

- Red light green light
- Musical chairs
- Simon says
- Freeze Tag
- Turn taking games
- Baking/Cooking
- Online games



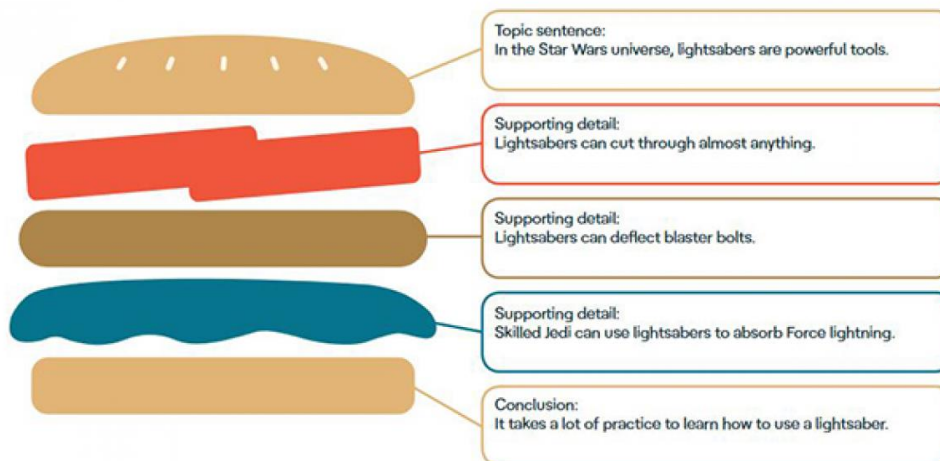
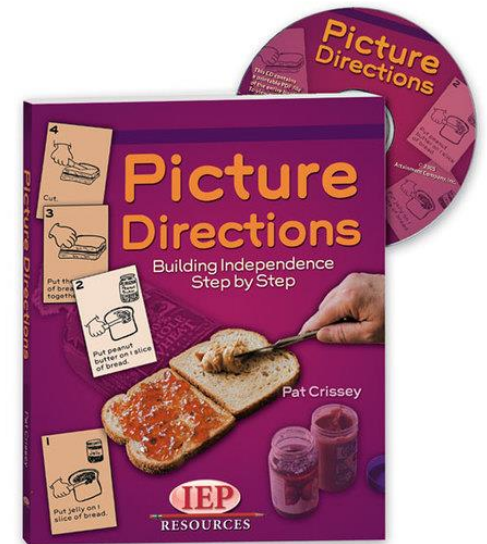
COGNITIVE FLEXIBILITY

- Change card in a schedule
- Play sports
- Do puzzles
- Change the ending of a movie
- Narrate problem solving steps

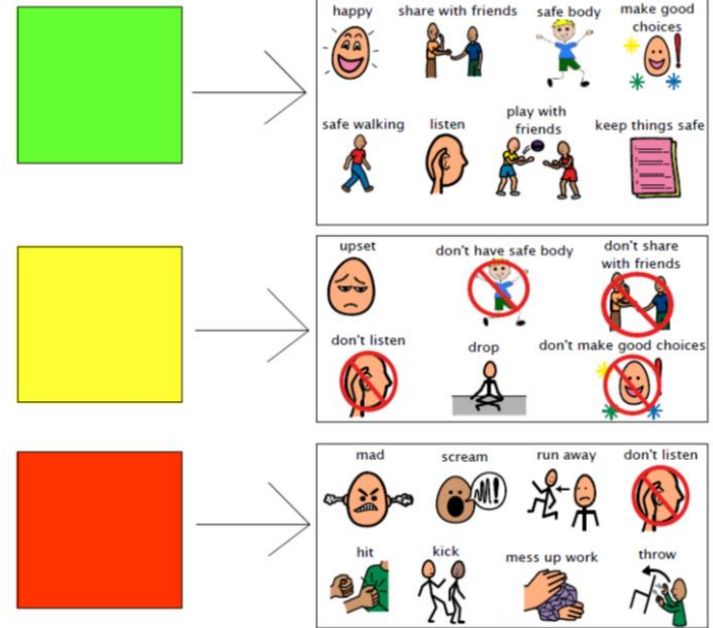


PLANNING AND ORGANIZATION

- Plan and prepare a meal together
- Organize a person's room
- Make a schedule at the start of each day
- Chores that involve sorting and categorizing like putting away dishes, matching and folding laundry, storing groceries, etc.
- Graphic organizers to help with sequencing thoughts, connecting ideas, and noting relationships between concepts.



SELF-REGULATION

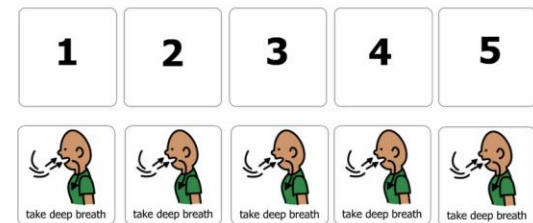


How to Show I'm Calm



	Sit
	Show safe hands
	Deep belly breaths
	Use your words

I can use my breathing to calm down.



HELPER STRATEGIES

- **Proactive strategies** are tools used to prevent or avoid an issue from happening.
- **Compensatory strategies** help people perform tasks in a different way or by using adaptive tools to make up for what skill they may lack or may have a difficulty with

PROACTIVE COMPENSATORY STRATEGY: SCHEDULES



PROACTIVE COMPENSATORY STRATEGY: BREAK DOWN TASKS

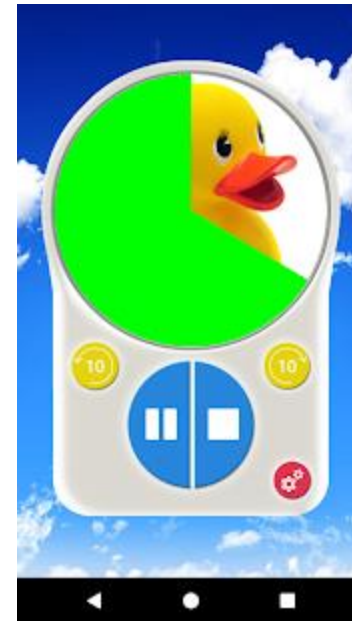
Clean Room Checklist	
	Made my bed _____
	Dirty clothes in Basket _____
	Put away clean Clothes _____
	Pick up trash _____
	Put stuffed animals on beds _____
	Put books away _____
	Pick up shoes _____
	Clean under bed _____
	Clean under Dresser _____
	Clean out Closet _____
	Organize top Of dresser _____



<input type="checkbox"/>	Turn on washing machine
<input type="checkbox"/>	Open washing machine
<input type="checkbox"/>	Put dirty clothes inside
<input type="checkbox"/>	Open soap door
<input type="checkbox"/>	Pour soap inside
<input type="checkbox"/>	Close soap door
<input type="checkbox"/>	Set to NORMAL
<input type="checkbox"/>	Push START

Washing Clothes

PROACTIVE COMPENSATORY STRATEGY: VISUAL TIMERS



PROACTIVE COMPENSATORY STRATEGY: REDUCE VISUAL AND AUDITORY DISTRACTIONS



PROACTIVE COMPENSATORY STRATEGY: TELL WHAT TO DO INSTEAD OF WHAT NOT TO DO

- Direct
 - Hands to self
- Focus on restating the expectation
 - We are _____"
- Praise what the child is doing
 - "I like how you are _____"

PROACTIVE COMPENSATORY STRATEGY: SCAFFOLDING

		Least Restrictive / Most Independent			Most Restrictive / Least Independent		
		Visual	Verbal	Gestural	Modeling	Partial Physical	Full Physical
Week of:		Visual clue or guide	Telling	Pointing or motioning towards	Demonstrating	Guiding by elbow	Hand-over or hand-under hand
Goal	What prompt level is needed for this student to complete his / her IEP goal?						

PRESCHOOLER EXECUTIVE FUNCTION INTERVENTION

New intervention to Promote Early Executive Function skills

*Current research
opportunity*

Virtual Participation

*Focus groups with
parents and caregivers*

Contact ddlabcso@gmail.com



EXcEEDS: Executive function early evaluation in Down syndrome



Children ages 2.5 to 8 years old with Down syndrome participate in eight 2-hour sessions or four 4-hour sessions over the course of one year. Caregivers are asked to fill out questionnaires about their child's development.

Contact ddlabcusu@gmail.com



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of Child Health and Human Development



Executive function is important for independence and well-being in a range of settings

Understanding the development of EF can shape more effective intervention

The more we know, the more we can plan to support healthy outcomes!





THANK YOU



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Research #H133G100197**

QUESTIONS?

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Resources

If you are interested in participating in research:

- <https://www.chhs.colostate.edu/hdfs/research/research-labs/developmental-disabilities-research-laboratory/>
- ddlabcusu@gmail.com
- 970-491-1969

Activities for Learning and Practicing Executive Function Skills

- <https://www.thepathway2success.com/executive-functioning-skills/>
- <https://developingchild.harvard.edu/resources/activities-guide-enhancing-and-practicing-executive-function-skills-with-children-from-infancy-to-adolescence/> <https://www.wesd.org/cms/lib/OR01915639/Centricity/Domain/45/Inhibition%20games%20and%20activities.pdf>
- <https://www.zonesofregulation.com/index.html>
- Teachers Pay Teachers: Search Executive Function Tasks, Self-Regulation, etc.
- Pinterest: Search Executive Function Tasks, Self-Regulation, etc.

Resources Continued

Organization, Time Management, and Schedule Tools:

- FTVS HD App: FTVS HD lets you easily and quickly create and use ALL these visual supports in just one app: First Then boards, Visual schedules, Task analyses, Social stories, Choice boards, Video models. You can add timers for each activity too.
- Choiceworks App: Learning tool that helps children complete daily routines (morning, day, & night), understand & manage feelings and improve waiting skills (taking turns and not interrupting). It can also be customized for teachers in a school setting.
- iPhone Calendar: Set alarms and event notifications, set reminders to help with transition time, add in links to virtual meetings or resources needed so that all information needed is in one place. The notes section in the invite can be used to give further details.
- Google Calendar: Set alarms and event notifications; set reminders a certain amount of time before to help with transition time; add in links to virtual meetings or resources needed for that activity so the information needed is all in one place; and be as detailed in your event description as possible. The notes section in the invite can be used to give further details.
- Google Keep: Written checklists
- Remember the Milk: To Do List: Written checklist
- Plan It Do It Check it Off: Visual Checklist
- Habitica: Gamified Taskmanager

Resources Continued

Visual Timers:

- Time Timer: <https://www.timetimer.com/>
- Children's Countdown App: This visual countdown timer App uses color and reveals a picture to show the passage of time.
- Apple Watch: Set a timer for vibration notification to be more discrete.
- Time Tracker: Uses Green and Red light to show progression of time.

Cookbooks and Grocery App:

- Cookbook: <https://nationalautismresources.com/picture-directions/>
- Visual Recipes: A Cookbook for Non-Readers by Tabitha Orth
- <https://able2learn.com/categories/visual-recipes>
- Lista App by kobiuter: visual grocery list available in several languages

Self-Regulation Tools:

- Zones of Regulation
- CosmicKids Yoga App and YouTube
- Brain Break Activity Cards
- ICanSpecialNeeds Learning App