EXECUTIVE FUNCTION IN EVERYDAY LIFE:
FROM RESEARCH TO INTERVENTION

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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
1. What is Executive Function? Why is it important?

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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 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

- 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:

- Inhibition or self-control
  - allows an individual to set priorities and curb impulsive behavior.

- 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.
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
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.

1. Take deep breath
2. Take deep breath
3. Take deep breath
4. Take deep breath
5. Take deep breath
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

Morning Routine:
- 6:15 am: Wake Up
- 6:20 am: Feed & Water Dog
- 6:25 am: Make Bed
- 6:30 am: Brush Teeth/Wash Face
- 6:35 am: Brush Hair
- 6:40 am: Get Dressed
- 7:00 am: Take Medication
- 7:15-7:20 am: Get on Bus

Get Dressed
Brush Teeth
Bath Time
Bedtime
Put Pajamas On
Nap Time
Potty
Wash Hands
Brush Hair

Lauren's Daily Schedule:
- 8:00 am: Morning routine, Brush teeth, Get dressed, Make bed, Breakfast
- 9:00 am: Academics, Math, Writing, Science
- 10:00 am: Snack time, Snack, Tops
- 10:30 am: Creative time, Art, Music, Yoga
- 12:00 pm: Lunch time, Eat, Daily Chores, Free Play
- 1:00 pm: Quiet time, Reading, Journal
- 2:30 pm: Academics, Educational Games, Totes
- 4:00 pm: Free play, Free
- 5:00 pm: Evening routine, Dinner, Shower, Brush Teeth, Bedtime
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

Play Routine for Pretending to Wash Dishes

Washing Clothes
- Turn on washing machine
- Open washing machine
- Put dirty clothes inside
- Open soap door
- Pour soap inside
- Close soap door
- Set to NORMAL
- Push START

www.autismclassroomnews.com
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

<table>
<thead>
<tr>
<th>Goal</th>
<th>Visual</th>
<th>Verbal</th>
<th>Gestural</th>
<th>Modeling</th>
<th>Partial Physical</th>
<th>Full Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Visual clue or guide</td>
<td>Telling</td>
<td>Pointing or motioning towards</td>
<td>Demonstrating</td>
<td>Guiding by elbow</td>
<td>Hand-over or hand-under hand</td>
</tr>
</tbody>
</table>

What prompt level is needed for this student to complete his/her IEP goal?
New intervention to Promote Early Executive Function skills

Current research opportunity

Virtual Participation

Focus groups with parents and caregivers

Contact ddlabcsu@gmail.com
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 ddlabcsu@gmail.com
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!
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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/](https://www.chhs.colostate.edu/hdfs/research/research-labs/developmental-disabilities-research-laboratory/)
- [ddlabcsu@gmail.com](mailto:ddlabcsu@gmail.com)
- 970-491-1969

Activities for Learning and Practicing Executive Function Skills

- [https://www.zonesofregulation.com/index.html](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