



Cognitive Connections



Executive Function Skills

1. S.T.O.P. and Read the Room or Situational Awareness Skills

The student will organize, identify and recall the space, time, objects and people from contextual situations presented in visual pictures, videos and daily situations with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will make appropriate inferences about a contextual situations presented in visual pictures, videos and daily situations with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will identify informational cues and draw a conclusion about emotions, thoughts, actions or information as they are occurring with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will state an "if....then.....therefore" statement to anticipate actions with a gradual release from the concrete to independent imagery at 90% accuracy. Example, when The student is told it is "11:30" (a time feature) she can use situational awareness to state "If it is 11:30 then I have history in 5 minutes therefore I need to think about getting to my locker to get my text book."

The student will STOP and observe other students in classroom situations and then synchronize her/her actions with the other students with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will increase his/her ability to refer to and use external mediators cues (lists, signs, reminders, calendars, etc.) to guide and prioritize actions and tasks with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will stop and read the room and label what is happening in the space, what time it is and what event is happening next, the objects he observes are being used for a task and state what the adult/teacher/ and or peers are doing as evidenced from an increase over his baseline at transition points (entering a room, changing classes, moving from a desk space to a class floor space, etc.) with a gradual release from the concrete to independent imagery at 90% accuracy.

2. Future Narratives for Planning Skills:

The student will predict future outcomes of pictured situations by selecting what will happen next with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will predict future outcomes of familiar and less familiar situations by selecting what will happen next with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will generate a narrative with detailed situational features with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will demonstrate forethought for upcoming tasks and state 2 to 4 actions that will take place in the next activity, task or situation with a gradual release from the concrete to independent imagery at 90% accuracy.

Self Regulation and Task Planning

Task Forethought

The student will demonstrate attentive listening to instructions and restate the direction prior to receiving/collecting materials to complete tasks with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will state the intent and the first two steps of their plan prior to initiating efforts for academic and personal tasks with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will demonstrate independent use of compensatory strategies for impulsivity in functional task completion. Examples of self talk to accomplish this goal include the following "What is my plan?", "What does my Done picture look like?" or "What is my future picture?" with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will identify the temporal-sequence set of steps to carry out the 'Done' picture or image of a plan with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will identify and demonstrate use of compensatory strategies (Get Ready * Do* Done Model) to improve task completion with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will state his/her plan for completing the task by completing the phrase "If I need to [goal or assignment), then" with as initial step or action plan in 4/5 targeted opportunities with a gradual release from the concrete to independent imagery at 90% accuracy.

Student will develop an internal source of motivation for wanting to improve _____ by finding ways to realize the connection between their desire and the activities that will help to achieve that goal with a gradual release from the concrete to independent imagery at 90% accuracy.

Organization

Homework

The student will submit 90% of their assignment work to the teacher using strategies with a gradual release from the concrete to independent imagery at 90% accuracy..

Given homework assignments within his academic capabilities, the student will continue to complete and submit each assignment at a level judged as complete by his teacher with a gradual release from the concrete to independent imagery at 90% accuracy.

Given an organized framework for recording homework information, the student will independently start and accurately record all details of a homework assignment and required materials in his agenda book in 4 out of 5 opportunities. Currently the student's planner reflects he does this -----%of the time. Benchmark is he can do this 90% of the time as evidenced by his independently knowing exactly what he needs to do for assignments and the requisite materials)

The student will complete all tasks at the end of the day which include; ensuring he has turned in all homework due that day, has completely filled out his homework agenda book, putting materials in necessary places, packing his belongings.

The student will on a nightly basis compare what he had written in the agenda book with the assignments posted on teacher websites with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will verbally compare his understanding of assignment demands with an adult and then break assignments down into clear and explicit smaller/manageable steps with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will plan and integrate interim “due by” steps into all his academic projects with more than two-day deadlines with a gradual release from the concrete to independent imagery at 90% accuracy.

Routines

The student will learn his/her basic schedule and classroom routines and exhibit forethought for these occurrences by stating what is the upcoming task/s in the sequence of the routine and then will state his plan for completing the task by completing the phrase "If it is time for ____ then I need to [goal or assignment), " with an initial step or action plan in 4/5 targeted opportunities with a gradual release from the concrete to independent imagery at 90% accuracy.

Will improve organizational skills for classroom work and homework through specific, repetitive modeled instruction, and use of: (visual pictures, written cues/checklists, text/phone reminders, agenda book/homework app, etc.) with a gradual release from the concrete to independent imagery at 90% accuracy.

Projects:

On 3 out of 4 opportunities within 3 days of receiving a large/long term project/assignment, the student will independently formulate and record his topic, thesis and goals, and check in with her teacher to establish a timeline with at least three check-in dates in order to meet the established due date with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will research a topic and write a research paper on the given topic. This will include the selection and narrowing of a topic, successfully obtaining appropriate resources from the library and the internet, organizing large amounts of information, constructing a bibliography, producing first and second drafts, and an edited final copy.

Time:

Given pictures of clock faces with the short hand pointing to an hour, will state the hour and also demonstrate that she can count to 60 by 5s with a gradual release from the concrete to independent imagery at 90% accuracy.

Given pictures of clock faces with the long hand pointing to the half hour, will state the time by saying the hour and the word thirty (e.g., seven-thirty) and demonstrate, by showing the direction on the clock, the rule that the clock hands always move in a “clockwise” direction with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will draw on a clock and show a “pie” of time demonstrating comprehension of the sweep and volume of time with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will read an analog clock and be able to for a given task with a gradual release from the concrete to independent imagery at 90% accuracy:

- a. show the sweep of allotted time
- b. mark the 1/2 way point of the allotted time
- c. at the 1/2 way point identify if he needs to: increase his pace to be able to reach his goal, or decrease his pace(either from rushing or for omitting steps of the task) to carefully complete a task, if he needs a new or different strategy to complete the task more effectively or if he needs a resource (a teacher, a form of technology, etc.)

The student will acquire a sense of time and estimate the features of time associated with a task: How long will it take? What can I reasonably accomplish in that amount of time? How long did it take last time? What is coming up? How much time do I need to build in for material management? These skills will improve as documented by the increase in accuracy of time management from current level of being timely to goal of 90% with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will develop self time guidelines for how long activities take (writing, math, research, etc.) by comparing the planned with the actual passage of time with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will anticipate the passage of time by accurately (using the minute gauge rule) to estimate a minimum, likely and maximum time for how long tasks are likely to take. The student will compare planned vs actual time to determine the increase in accuracy for estimating time. By the end of the IEP marking period the student will accurately estimate the required time for 8 of 10 documented tasks with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will set time limits for specific activities and use time related prompts to maintain awareness of the passage of time with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will improve his awareness of the passage of time by: estimating how long tasks will take to complete, recalling schedules, predicting NEXT events, marking analog clocks to track time while completing tasks to monitor time and using check points at half-way marks to begin monitoring his use of time and his overall performance with a gradual release from the concrete to independent imagery at 90% accuracy.

The student will demonstrate the ability to recognize time robbers and apply strategies to maintain and return attention to task in face of distractions with a gradual release from the concrete to independent imagery at 90% accuracy.

Executive Function Groups

1. What do I look like? Take photographs of each student when they are ready for school and or ready to go home.
 - a. Block and box the features of being ready.
 - b. Put in a plastic sleeve protector
 - i. Have the students practice sketching how they would look 'Same but Different'
2. Have students work together to create photographs of their morning and end of day routines.
3. Have students make Self Talk – Stated Intention notecards.
4. Have students clean and then photograph their desk, locker, cubby, backpack, room etc. Have students use their photos and “stated intentions” cards to gesture and self talk the steps to carry out to maintain a clean space.
5. Manage Materials: Have students take the materials out of their backpack.
 - a. Lay the items on the floor and then group the items that go together
 - b. Take a photograph of the items
 - c. Use an app (try Skitch!) or print the photo and then Block and Box the features of the packed bag
 - d. Create a luggage tag, create an Album in the students Phone/Device, or print the photos and place in a plastic sleeve protector in a notebook.
 - i. Practice sketching how their bag would look the 'same but different' for given situations:
 1. Bringing in a school project
 2. Needing to have a signed permission slip
 3. Going on a field trip and needing a bagged lunch and water bottle
 4. Having class outside and needing a change of clothes, a warm coat, and waterproof shoes
 5. Having study materials (flash cards, notebooks, etc.) for an upcoming exam
 6. Needing money for a book fair | school sale | school dance tickets, etc.
6. Practice the process of “How to Make a Checklist”
 - a. Use a Get Ready * Do * Done Template
 - i. Place a photo of the completed “To Do” in the Done space
 - ii. Have the student identify the locations of where they will go to do the task
 - iii. Have the student create a checklist from the Visual
 1. First create the list using action words: Pack Backpack; Make Lunch; Wear Sneakers; Bring Project, etc.
 2. Next create the list using the noun label: Backpack, Lunch, Sneakers, Project

7. Increase transitions

- a. Have students create “future-self” sticks and use them to ‘pre imagine’ their plan
- b. Have students place STOP Dots on Doors and Practice Reading the Room
 - i. Space | Time | Objects | People
- c. Create a STOP and read the room bulletin Board or Poster
- d. Practice Pointing Out a Plan when Standing Outside of a Space
- e. Take photos of Spaces where actions take place and put in plastic sleeve protectors in a Notebook
 - i. School: Classrooms, Library, Cafeteria, Recess, Bathroom, Skills Center, etc.
 - ii. Home: Mudroom, Kitchen, Bedroom, Bathroom, Living Room, Garage, etc.
 - iii. Community: Pool, Dunkin Donuts, Park, Athletic Field, Restaurant, etc.
 - 1. Have a student sketch themselves and their plan in the space
 - 2. Have the student gesture their actions in the given space
 - a. Try the DMD Panorama App!
- f. Map it Out, Walk it Out, Tap it Out!
 - i. Have students work together to create a sidewalk chalk map of their classroom. or Have students do the Mapping the Classroom Activity: Look at the National Geographic Classroom Cutouts:
<http://www.nationalgeographic.org/activity/mapping-classroom/>
 - 1. Re-create the map on a 8 x 11 piece of paper
 - a. Laminate or place in a plastic sleeve protector
 - i. Have the student tap or draw out their plan of action to move through a space.
 - ii. For students who struggle with making maps
 - 1. Check out the Me on the Map Book
 - 2. Use blocks to make the space, photograph the blocks, put the photo in a plastic sleeve protector and/or use tracing paper and trace the map from the blocks

8. Get Ready * Do* Done Model

- a. Create the GDD workspace: set out your mats
- b. Practice all Tasks Have 3 phases
 - i. Which phase does the photo represent
 - 1. Change the position? How do the Get Ready * Do *Done phases change?
- c. Start with the Done!
 - i. Plan backwards from a picture of a known task
 - ii. Plan backwards
 - 1. using a simple assignment
 - 2. with a Craft Project
 - 3. for a treatment activity or learning tool

4. for everyday tasks: cleaning a room, organizing notebooks, cleaning locker, packing a lunch, etc.
- d. Visual: Be a Future Sketcher
 - i. From Verbal Directives Sketch out what Assignments will look like
- e. Complex:
 - i. Sketch out Multistep Assignments, Prioritize the Order of the Steps
 1. Spread out the Visual Steps on the Calendar to Increase the Time Horizon
- f. Abstract
 - i. Find an image of a known Outcome
 - ii. Block and Box the Features of what is Known
 - iii. Use the Features to abstract details for a novel task.
- g. Independence
 - i. Remove the planning mats
 - ii. Working backwards, have students gesture their Done goal and the steps to achieve the goal

Time

1. Practice reading analog clocks and converting digital to analog time
2. Practice shading volumes of time (5 min, 10 min, 20 min, etc.)
 - a. Start in the middle of the clock
 - b. Draw out the minute hand
 - c. Shade in a clockwise direction, counting by 5's
 - d. Draw back to the middle of the clock to create a 'slice' of time
 - e. Shade in the time in the direction time will fill up
3. Practice shading time for given scenarios
 - a. It is 4:00pm and Sarah has 20 minutes to read her book.
 - b. It is 7:15 pm and Sarah has 45 minutes to work on her project before starting her bedtime routine.
4. Practice Shade | Mark | Check
 - a. Have students practice setting time markers and marking time on a corresponding activity
 - i. I like to practice this with easy worksheets such as word searches, easy math problems, crosswords, coloring tasks, a short story, making flashcards, etc.
 1. Practice doing the work while monitoring time
 - b. Have students use the Time Calculation Tool to calculate the volume of time they will need for given tasks
 - i. Then have the student use the Shade | Mark | Check strategy to create time markers for the given task
5. Manage Time Robbers

- a. As a group make lists of internal and external Time Robbers
- b. Create a list of Time Savers
 - i. Before a task starts have students practice predicting time robbers
 - 1. Then Jail their time robbers
 - 2. Implement Time Savers

Verbal Mediators: The Language of Executive Function

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Declarative Language

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Why is Declarative Language so important in fostering Executive Function Skills?

1. **Inner Voice:** Self-narratives help students develop an inner voice. After the initial language spark is ignited, most of us then go on to develop our own voice that we use to share our thoughts, recap experiences, talk about what we are doing, and talk about what we are thinking. Most of us also then go on to create our own inner voice. This is an important by-product of our language learning. We use our inner voice to problem solve and plan. We remember what we have learned or noticed in the past, and apply it to the here and now. For example, imagine you are getting ready to go to work and you can't find your keys. Your inner voice may say something like, 'Hmmm.... Now when did I last see my keys? Where do I usually put them down? What jacket did I have on yesterday?... Maybe they're in the pocket.' Your inner voice helps you think through the problem so you can get started on a plan of action to solve it. Children with Executive Functioning difficulties do not usually develop this inner voice to regulate their thoughts and actions on their own. Just as modeling was important when your child was learning to talk, thoughtful modeling now, in this regard, is equally important. So – talk out loud, think out loud, work through a problem, make predictions, ponder opportunities, consider possibilities, and reflect on past experiences when you are with your child. They will learn from your models, internalize the ideas, and begin to form their own inner voice.
2. **Perspective Taking:** Provide a window into another person's perspective. Some children with executive function challenges have difficulty taking perspective. Using declarative language to share your thoughts and feelings provides a student with a regular window into these communication exchanges in an inviting, nonthreatening way. We are providing them information that is critical in a social interaction that we know they may not pick up on their own. When we present declarative language in this way, we are not asking them to provide an answer that may be right or wrong. Rather, we are clueing them into social information and then allowing them to decide what to do with the information. By regularly using declarative language, we are also slowly building episodic memories and awareness that different people have different thoughts, opinions, perspectives and emotions. For example, you say something to your child but he is facing the other way, appearing not to listen. Rather than say to him "turn around!" or "look at me" (both imperatives) share your feelings and perspective with declarative language: "I notice you looking out the window", "What would help me know you are listening to me" or "I feel like you are not listening to me."
3. **Big Picture Thinking:** Students can better see the big picture in order to create multiple solutions to a problem. Declarative language can also help students create a visual image of the gestalt and how they would like to see the outcome of a situation in their "mind's eye". Often times when we focus on having students carry out specific detailed directions, we can all lose sight of the big picture. Because some children with executive

function challenges are strong when it comes to details, but weak when it comes to seeing the big picture, it is important to think about the big picture when we present information. Giving very specific directions or questions that have one right answer promotes that focus on details. For example, if we tell a child to “put the book in the book-box” or “line up at the door for music” we are zooming into the details and creating a situation where there’s one and only one right answer. However, if we use language instead to comment on what we see in the big picture: “I see a book on the floor” or “what do you look like if you are ready to go to music?” - we are instead encouraging our children to take a step back, notice the context and situation around them, and subsequently form a plan of action that makes sense to them. We are also leaving open the possibility that there may in fact be more than one solution –i.e., maybe the toy could go on a shelf or in the toy box, maybe the students could put away their work, line up by the door, or collect their music instruments and line up by the door.

4. **Problem Solving Skills:** Declaratives support students ability to develop problem solving skills rather than merely than just following direction skills. When we direct students as to what to do, ask them to follow directions, or ask them to answer questions with a definitive right/wrong answer, we are honing their receptive language skills. This is not a bad thing, but it may not be what the student with an executive function challenge needs most. In contrast, if we use declarative language to present information about the environment or situation at hand, we are instead inviting her to notice this information and develop a plan of action. We are inviting him or her to have an “aha!” moment where he or she figures out what to do with given information. We are giving students an opportunity to think more independently! Problem solving moments are critical for all students as they learn to see themselves as more independently functioning human beings in the world.
5. **Read the Room:** Help your child read what’s going on in his environment. We know that it can be difficult for some kids to tune into the social information that is going on around them. Rather than telling them exactly what to do and when to do it, use declarative language to help them notice what is important! For example, if it is time for a transition, instead of telling your child “go to the table for snack” or “put on your coat,” direct his attention toward the changes in the environment: “I notice all the kids are at the table” or “I notice all the kids are putting on their coats.” This will help internalize the importance of periodically checking in on one’s environment; there are visual clues available all the time, and they are important to pay attention to! We want our kids to learn that information is not always going to come to them - they have to become active information gatherers. In contrast, if we are using imperatives all the time with our kids, information is coming to them on a regular basis, and they don’t have the same need to look around or read the behaviors of others.

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AFTER RECESS, as part of the daily routine, the class reconvenes on the rug. Jackson runs from the back of the room where he has been playing with the class hamster to his cubby and slips off his jacket. It drops to the floor. He kicks off one boot. The teacher calls stragglers to join the others on the rug, so he hops to the circle wearing one boot and plops down. The teacher shares the agenda for the afternoon, which includes reviewing the science homework. Looking alarmed, Jackson pops up, and races back to his cubby while kicking off his other boot.

He pulls out his backpack, removes a homework folder, and grabs his assignment. Leaving the backpack open and boots scattered, he races to the homework bin. Realizing his name is not on the assignment, he zooms back to his desk to grab a pencil and sits back down on the rug with the rest of the class.

As the teacher gives instructions for the next activity, Jackson slips his homework underneath him and sits on it. The class is dismissed to their desks, and Jackson, talking excitedly to the boy next to him, stands up and follows the boy to his desk. His nameless homework is left on the floor. When he gets to his desk, his morning work folder and silent reading book are on the floor with assorted bits of paper. As the class starts the next activity, Jackson does not have the materials he needs. Again, he needs to walk about the class to get ready.

Anne has a music lesson Saturday morning at 9:00. Her mom wakes her at 7:30; Anne rolls over and groans, "Ten more minutes." Mom returns ten minutes later and tries again to wake Anne. After two more rounds of "Ten more minutes," Anne finally gets out of bed and heads for the shower. She showers for twenty minutes. Mom knocks on the door to announce the time. She encourages Anne to hustle so they can leave the house in thirty minutes. Anne gets out of the shower, puts on a robe, plops herself on the living room couch, flips open her laptop, and checks her social

media sites. Mom reminds her to get ready for music. Ten minutes later, Anne saunters into her room and stares at a land mine of clothes trying to decide what to wear. She sits on her bed and starts to remove her nail polish.

Mom hollers a reminder, "Get dressed!" Finally, ten minutes later, Mom exclaims anxiously, "We have to go...!" Anne responds to this seemingly sudden pressure and shouts, "I'm coming!" She heads into

Staying

the bathroom in her bathrobe to blow dry her hair. Patience waning, Mom asks about her instrument and sheet music; Anne directs her to the basement. Finally finished with her hair, Anne heads to the kitchen for something to eat.


Exasperated, Mom, who is standing at the door holding Anne's instrument, music sheet, and breakfast bar, exclaims, "We need to go now. We are late!" Anne yells back in frustration, "I told you to wake me up earlier!"

As adults, we joke about "senior moments." That moment when you have imagined an item you are going to retrieve and then when you finally that room to get it you draw a blank. "What did I come in here for?" Ack. A senior moment.

What do a student zigzagging about the classroom, a slow-paced teen, and a senior moment all have in common? Challenging executive function skills.

Weak executive function skills


Individuals with strong executive function skills stay a beat ahead. In contrast, teachers and parents describe individuals with weak



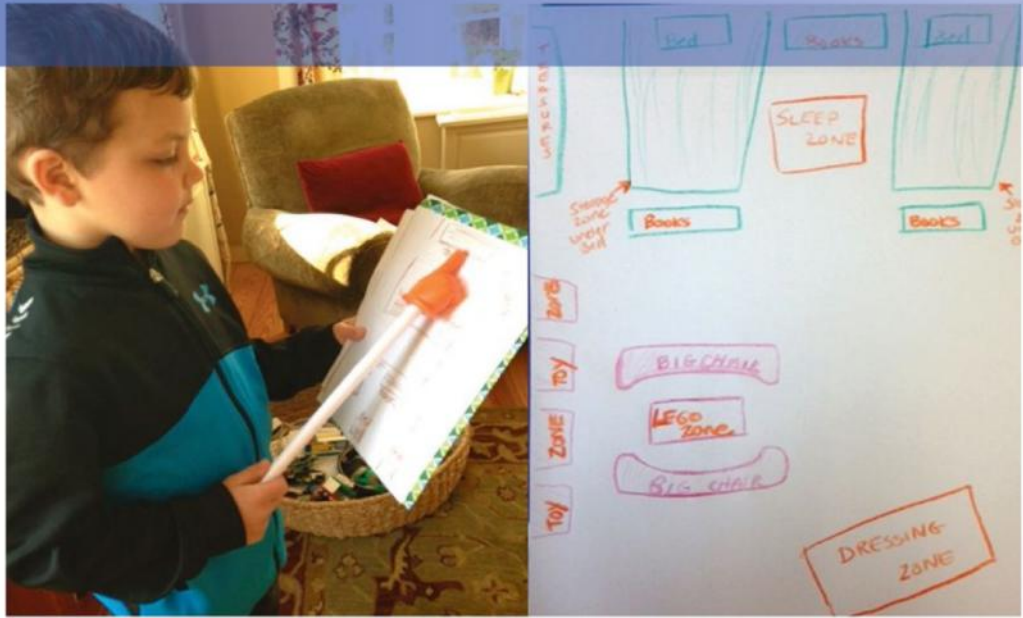
executive function skills as being “a beat” or—as Jackson’s teacher sighs—“twenty-two beats behind.” How do executive skills enable us to stay a beat ahead? Strong executive function skills enable us to imagine and plan a “dry run” of the task in our mind before we begin to carry out the plan. If a task is planned in a different space than where the task will be carried out, then we create an image of the future space in our minds. For example, when a child hears the direction, “Get ready for lacrosse,” he might be downstairs in the family room and imagine walking upstairs into the bedroom, heading over to the dresser, opening the third drawer, and retrieving their uniform. Then he might envision a transition from the bedroom to the mudroom and then the garage, where cleats and gear bags are stored.

The imagery is a mental anchor that allows the child to better resist distractions and maintain a pace so as to reach a goal. When forethought guides children’s actions, they can carry out tasks more successfully. Small glitches, such as looking for a missing item, can also be

a Beat Ahead



handled more smoothly. However, when children with weak executive function skills hear the instruction “get ready,” they hear the words, but do not pre-imagine the task or the steps to be ready. Even if they respond, “Okay,” they do not initiate any actions to move toward their goal. When these children finally enter their rooms, because they have not pre-imagined the task, they are only starting to ask themselves, “Okay, what am I doing?” Without the vision of an outcome in mind, they are open to distraction. When these children go into their bedrooms and see books, Legos, and a laptop, they easily disengage from the goal of getting ready. They are



ORGANIZATION & FOLLOWING DIRECTIONS: A basic map of a bedroom or a classroom can be used with a pointer to plan out directions and rehearse routines. This strategy can improve the use of mental imagery and self-talk, which are two skills that support a child's ability to carry out tasks and routines.

now a beat behind. Likewise, a senior moment is simply the loss of this pre-imagined intention.

Developing strong executive function skills

So, what can we do to develop a child's capacity to be a beat ahead and successfully carry out intentions in the future? According to Russell Barkley, in order to develop strong executive function skills, individuals "need to repeatedly practice: self-monitoring, self-stopping, seeing the future, saying the future, feeling the future, and playing with the future so as to effectively 'plan and go' toward that future."

Our natural inclination might be to provide checklists. While this strategy can sometimes work, it is limited. Checklists made by adults are not that helpful in creating mental imagery for children. For example, as adults, we might make a list of items to buy at the market. While making this list, we create, if only for a brief moment, a mental image of the supermarket, our dinner table, or shelves in our cabinets. These images help us navigate the market and remember items even if the list is left at home. When we hand children a checklist we've made, they have not used imagery to create the list and may find it hard to create imagery after the fact.

A better technique, when giving directions, is to use words that create mental imagery. For example, rather than asking a child, "What do you have for homework tonight?" pose a question such as: "When you walk into

class tomorrow, what do you see yourself handing to your science teacher Mr. Jensen?" Instead of directing your child to get ready for soccer, try asking, "If you were standing at the door ready to go to soccer what would you look like? What does 'ready' look like?" To improve the effectiveness of your instruction to go upstairs and get dressed, try saying, "What drawer do you see opening to find your sport clothes?"

Visuals are also helpful in teaching kids to get ready and organize themselves. It's often a struggle to get children out the door in the morning. Multiple prompts and checklists might get your child out the door, but the process is likely to be difficult. Instead, try snapping a quick photo of your child when he is ready for school and standing by the door with his coat, clothing, shoes, backpack, and lunch. The next morning, show your child the photo, and simply say, "This is what 'ready' looks like." Ask him to imagine a plan that enables him to "match the picture." Once children remember the images in these photos, they can use their mental imagery and the photos no longer need to be shown.

In the classroom, cue students to imagine their actions before they transition. For example, when students are transitioning from recess, as they line up, say: "Imagine yourself at your cubby. What do you look like? What do you see yourself doing?" For younger students, ask them to describe how they will prepare for an activity. They can use a pointer to point to the space they will go to and pre-imagine themselves in



What does 'ready to start the lesson' look like? You need 5 minutes before your lesson actually starts at 4:30 to prepare so that you are ready when the lesson starts. This 5 minutes gives you time to take your instrument out of the case, open the sheet music to the practice warm-up page and to be seated in front of the music stand.



Working backwards to shade in the time needed, what does the travel time look like? 5 minutes to walk through the parking lot, 15 minutes to drive to the music lesson.



Shading in 5 minutes to gather your instrument and sheet music and 10 minutes to dress and brush your hair and teeth, you can see that you need to start getting ready for your 4:30 music lesson at 3:50.

that space carrying out the expected actions, "I am going to go to the back of the room and get a worksheet, then I am going to walk to the counter under the windows and get my text book, then I am going to sit at my desk and take out my pencil."

Take this technique a step further. Ask the student to draw a blueprint of the classroom or their house. Tape this blueprint to a clipboard, so the child can 'tap out their plan' before a task. Use a pencil or pointer to tap on the blueprint while encouraging them to pre-imagine and verbalize their plan; this method will foster an important skill—self-talk. For example: "I am going to walk into the bathroom, brush my teeth, then go across the hall to my bedroom. Next, I'll go to my closet, get my shoes, then walk downstairs to the front hall to get my backpack."


Use an analog clock

Children may still have difficulties using an appropriate pace even if they have a mental image of the directions. If their pace is slow, then they are vulnerable to distractions. What helps children to imagine carrying out a plan within a particular time frame? An analog clock.

As adults, we often strategize times before verbalizing the plan to children. We say, "You need to start getting ready at 3:45." However, this direction is given after we have thought, "Dance starts at 4:30, so we need to leave the house at 4:00." Try asking children to work backwards from an end time. Many children benefit from seeing how time fills up on an analog clock. A dry erase marker can be used to shade "slices" of time and write actions when planning backwards on a glass analog clock. See the example of backwards planning for estimating the time to prepare and travel to a music lesson (see graphic above).

Students can also use the clock to visually plan their time for homework or in-class assignments.

Another advantage of drawing on the clock is building self-awareness. Students can see visual markers of the time that has passed, and then determine if they have used time effectively or had any "time robbers" such as daydreaming or getting distracted by the television or Internet. To stay a beat ahead, students must monitor how closely their outcomes match the future plan they had imagined.

Ask students to plan checkpoints when they can stop and determine if they are on track with their plan. Students set a mid-point timer to stop and check how well they are working towards completing an assignment. The purpose of the timer is to improve self-monitoring and an awareness of how time is used, but not how quickly they can complete an assignment. Students who set timers for the end of a task frequently experience more stress, whereas a timer set for check-ins midway through a task provides opportunities for problem solving. Overall, when students are given guidance to plan and self-monitor while using mental imagery, they often experience independence and a better sense of self-control. Try it! 

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A Clinical Model for Developing Executive Function Skills

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Nonfinancial Disclosure: Sarah Ward has no nonfinancial interested related to the content of this article. Kristen Jacobsen has no nonfinancial interested related to the content of this article.

Abstract

The purpose of this article is to describe a therapeutic program developed by our clinic that (a) considers the core features of executive control which must be understood in order to effectively implement an executive function treatment model, (b) how we included those features into a treatment program that successfully teaches students to develop independent executive function skills, and (c) demonstrates how the model has been applied across the developmental age span.

Executive Function

Self-regulation is essential for task execution and involves three key components: (a) any action that allows students to stop and direct themselves, (b) how this action results in a change in their behavior, and (c) how this behavior changes the likelihood of future consequences or the attainment of a goal (Barkley, 2012). This mental process of stopping and self-directing behavior is termed mimetic ideational information processing. The individuals essentially “mime the idea” in their minds and can even imagine a “dry run” of their impending actions to mentally simulate several possible future scenarios. In effect, it is a mental “trial and error.” Once this mental image is created, using nonverbal working memory, the individuals can then use “self-talk” to direct their actions. In other words, when we ask students to listen and follow directions, we are really asking them to momentarily stop (inhibit) their own actions and thoughts to consider the *what*, *where* and *when* of the desired future, to compare this future with previous experiences, and to determine the value: why is it important, necessary, or motivating?

Individuals with weak executive functioning (EF) skills exhibit reduced visual imagery to see the future, a weak ability to control and sustain this visual representation over time, limited self-directed talk, disinhibition, a limited or absent ability to pre-experience the emotion of the future, disorganized planning, weak initiation, and reduced sustained attention (Barkley, 2012; Barkley, Edwards, Laneri, Fletcher, & Metevia, 2001). The collective outcome is a reduced ability to plan, organize, and control their behaviors for task completion. Some students may also have difficulty clearly envisioning what their future selves might look like when carrying out a routine in a given context particularly if it is a novel situation, which can also trigger negative

emotional responses (Barkley, 2012). For example, a student who is anticipating his first visit to a Mexican restaurant may not form a mental image of what it might look like, and therefore could become anxious due to the novelty of the situation. The ability to access an episodic memory for the schema of “restaurant” would enable the student to predict the expected core features of an unfamiliar restaurant: hostess station, tables/booths, place settings, menu, kitchen, and décor. This ability to shift from the concrete to the abstract to form pattern perceptions — to abstract the quality of a concept and use this quality in a new context to identify how a future image is the same, but different, from a previous experience — is one of the keys to developing strong executive function skills (G. Caine & Caine, 2006).

According to Barkley (2012), in order to develop or rehabilitate EF skills, individuals “need to repeatedly practice: self-monitoring, self-stopping, seeing the future, saying the future, feeling the future, and playing with the future so as to effectively ‘plan and go’ toward that future.” Temporal capacity describes how far into the future students can consider to envision their goals and how they will use their time to attain their goals. Thus, clocks, calendars, and schedules are only a tiny segment of how students experience time in their lives. There are many hidden dimensions of time, and the language of how time is used to meet an end goal is often complex and abstract. Students need to develop strategies for the comprehension and production of time as it pertains to time management, complex planning, self-regulation/pacing, and temporal reasoning. All of these skills are developed during the daily events of a student’s life, such as managing homework, initiating and completing morning and nighttime routines, organizing the steps to “get out the door,” and arriving to class on time with the requisite materials. When supporting students through these daily events, we have found our approach helps them to develop the core temporal awareness skills that increase their gradual independence.

A common area of concern for both parents and teachers, and one that our EF treatment model has been designed to address, is a student’s ability to initiate and complete tasks in allotted time frames. Some students may exhibit a delayed initiation while others may appear to race through an assignment or task. Students with temporal sequential processing weaknesses present with a poor concept of time, struggle to process temporal prepositions, and are slow to learn how to tell analog time (Wren, 2013). When students visualize and mentally manipulate the temporal sequence of steps in order to meet an end goal, they gain a sense of pace that is necessary for completing the parts and whole of a task. It can be a challenge for them to interpret multi-step directions and to understand complex syntax with temporal markers (e.g., the direction “*Before you quickly go upstairs first put your homework away and don’t forget to hand it in after lunch.*”) Thus, it was important that the clinical model of executive function present the student with the ability to see and sense a unit of time, as well as the big picture of a task before they executed a multi-step procedure.

Higher order thinking skills are also related to the skills of temporal sequential ordering. Many high-level cognitive functions are sequentially organized, such as understanding cause and effect, problem solving, and using conditional reasoning for inductive and deductive thinking when, in the moment, they are required to temporally organize their thoughts and actions in an online fashion to inhibit impulses, plan ahead, organize their actions, and complete academic/linguistic tasks requiring higher order thinking skills.

Given the above, it is not surprising that Barkley notes that, for a program to be effective to improve the development of EF skills, it is critical to “externally represent” or “remove gaps in time,” to “externalize motivation,” and to “intervene at the point of performance” (Barkley, 2012). Yet many of the current interventions to improve executive control are checklists/contracts that focus the student’s attention on the immediate or “now” of what they are doing. Although the past decade has led to progress in the research, development and documentation

of interventions to improve executive control, there remains a need for evidence-based, effective intervention strategies to improve EF.

Core Components of the Clinical Model of Executive Function

The purpose of the clinical intervention described in this article was to pilot a service delivery model for students that could be used across settings to develop executive function skills in children that captured Barkley's definition that EF is self-regulation to sustain actions across time towards a goal (Barkley, 2012). Thus, our clinical model is an intervention that combines mimetic ideational information processing, situational and intention awareness, elements of temporal sequential ordering and higher order thinking to promote efficient and accurate completion of tasks within allotted time frames.

The Model

The Get Ready*Do*Done Model (GDD) (Figure 1) is a pilot methodology designed to teach students to develop situational awareness, create forethought of an end result, and then integrate all the materials, time and actions to complete a future task. It is based on 6 key principles of executive functioning:

1. Students must develop the capacity to use situational awareness and intention awareness to imagine a hypothetical future¹.
2. Nonverbal working memory (a private, visual/mental representation of the future) must predate self-speech (verbal working memory).
3. "If... then..." conditional reasoning plans must be used to create "distance" between the current "space" and "time" to the future "space" and "time." As a result, students will "see themselves" as agents of the action for the future goal being contemplated, which will provide time for a student to demonstrate self-restraint and impulse control (Gawrilow, Gollwitzer, & Oettingen, 2011).
4. Students must develop the ability to see and sense the passage of time.
5. Students must develop the capacity to self-monitor and adjust performance towards task completion.

To implement the GDD model (Figure 1) a student is given Get Ready, Do, and Done mats (Figure 2).

¹Situational Awareness (SA), as defined by authoritative expert on situational awareness Mica Endsley, is "the perception of elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future" (Endsley, 1995). Howard took Endsley's definition even further to show that, in order for individuals to successfully demonstrate SA, they must also be able to account for the intentions of the others that share the same situation" (Howard & Cambria, 2013). This is deemed Intentional Awareness (IA).

Figure 1. The Get Ready*Do*Done Model with Steps Labeled

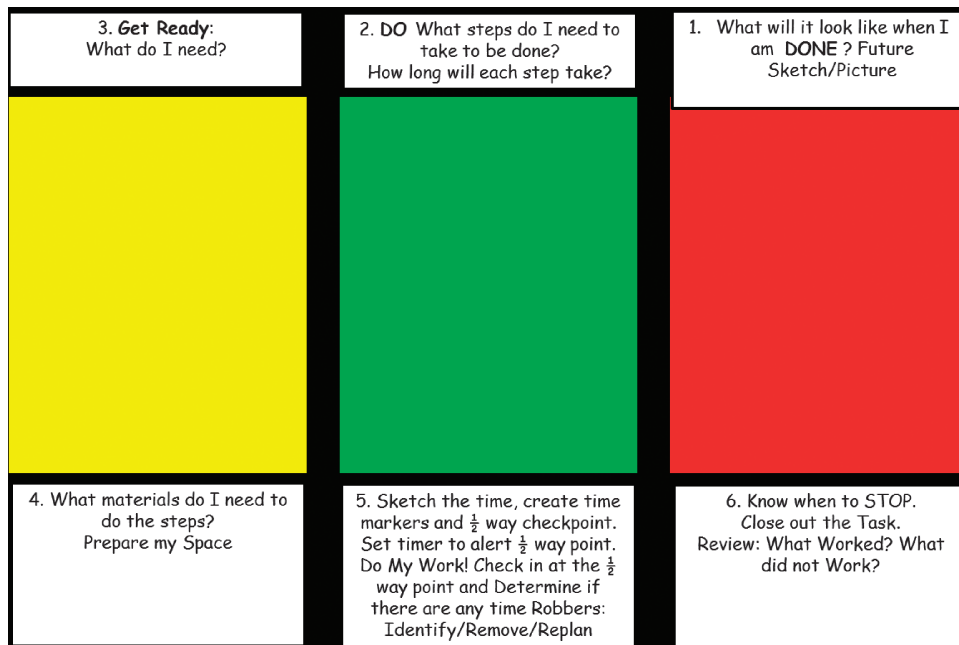
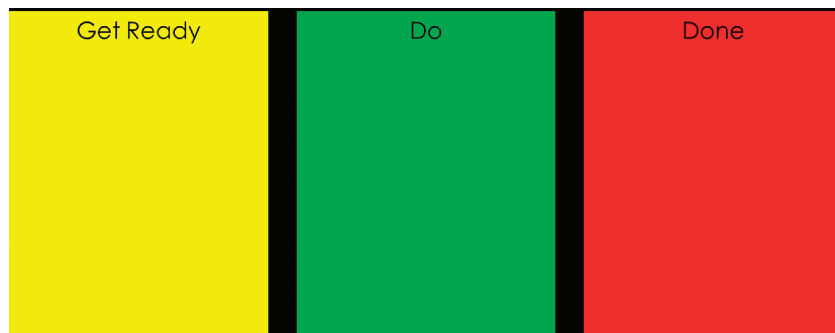


Figure 2. Get Read*Do*Done Mats Without Steps Labeled



The “Get Ready” mat is yellow, the “Do” mat is green, and the “Done” mat is red. The red “Done” mat signals students to imagine what something will look like in the end, and it also helps them visualize when to stop. The green “Do” mat signals students what to do, and it helps to remind the student to pre-plan what to do and then initiate or get them going on the task. The yellow “Get Ready” mat reminds students to slow down and to identify and gather the materials they need. The mats were preprinted and laminated or consisted of colored construction paper placed in plastic sleeve protectors. In this way, the students could use dry erase markers to write/draw on the protected mats and then erase as needed.

The GDD Model Stage 1: Task Planning

Done: What Will it Look Like? The process starts by asking students to put on their “future glasses,” to start with the end in mind, and then imagine what they or the task will look like when they are all done. For some students, a pair of silly sunglasses are used and called

“future glasses” to serve as a physical mediator to facilitate and simplify the complex and abstract concept of forethought. Students are asked to sketch out this image, find a photo, or to verbally describe what it/they would look like. Using the visual image as a guide, the clinician coaches the students on how to break the image down from the whole, to the features, to the parts.

Do: What Steps Do I Need to Take to Get it Done? How Long Will Each Step Take?

The students then use temporal sequencing skills to identify the steps required to match the future picture. The emphasis is placed on working backwards when planning and using an outcome to determine the relevant steps to achieve the visualized end result. Thus, when teaching the students the process of planning for task execution, it is important to choose therapy tasks that allow them to readily visualize or picture an outcome and, as such, eliminates the need for explicit instructions. In this way, students are responsible for looking at the pictured outcome and then using this visual to problem solve what steps are required to achieve their goals.

Students estimate the time needed for each step. It is important to note that when the time of a therapy session is limited, students can use dry erase markers on a clock (with a glass face) to sketch the total amount of time available and then fill in the time with the individual steps.

Get Ready: What Do I Need to Do? For each step, students use the future picture image and outlined set of steps to determine what materials are needed to complete the task. The planning for the maze project (Figure 3) and poster project (see Figure 4) are depicted below.

Figure 3. Task Planning for the Maze Project Using the GDD Model

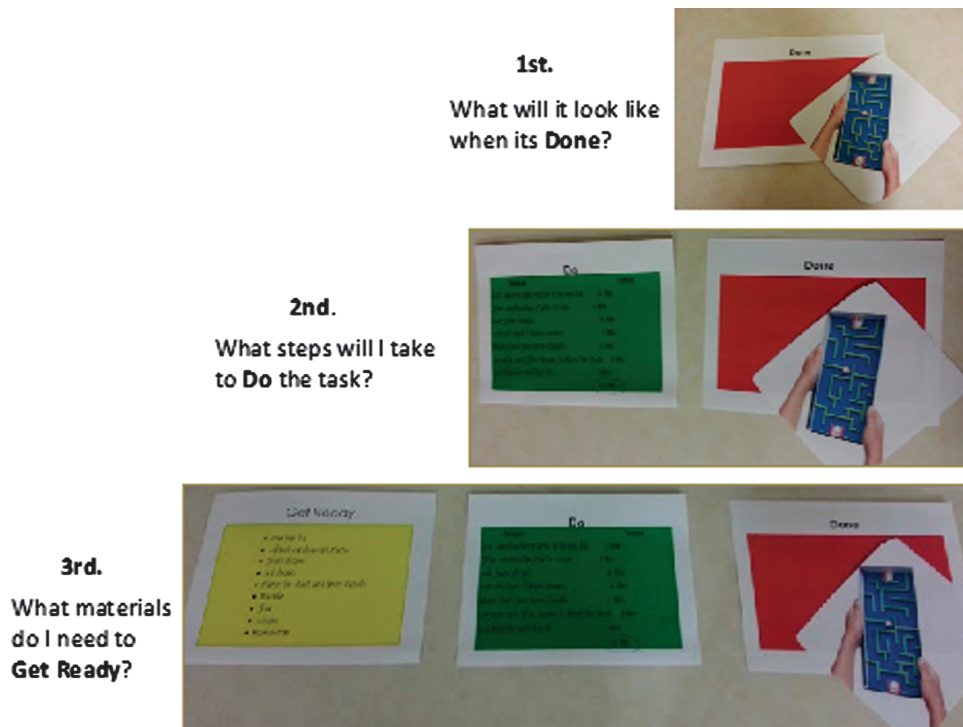
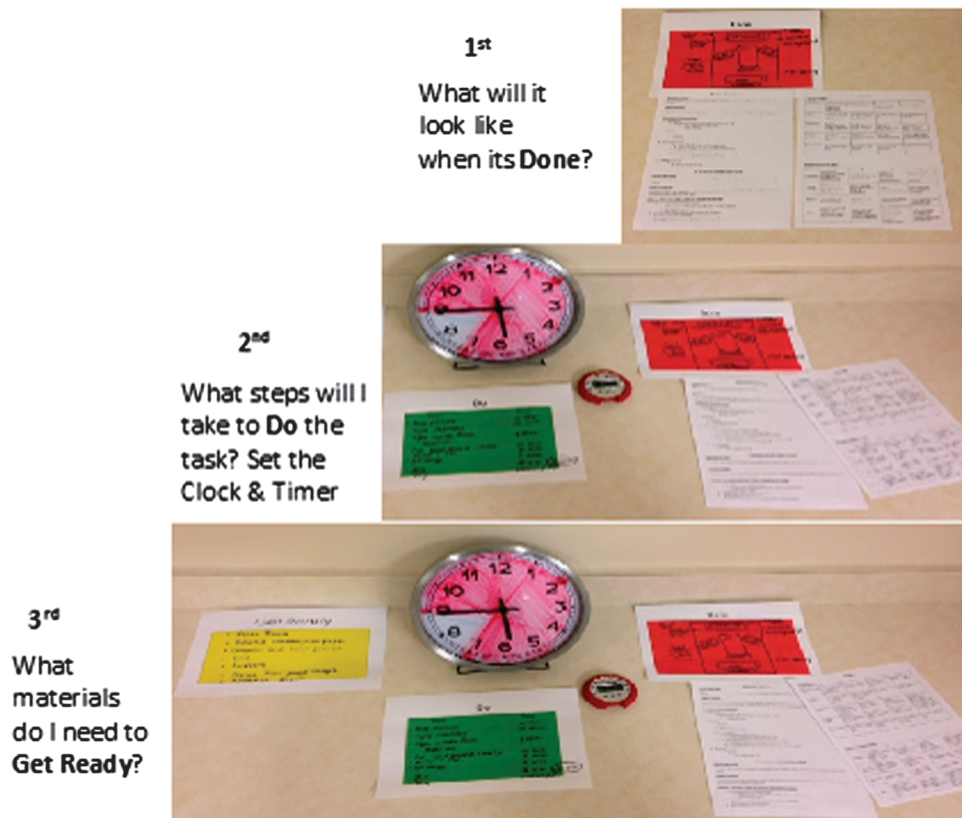


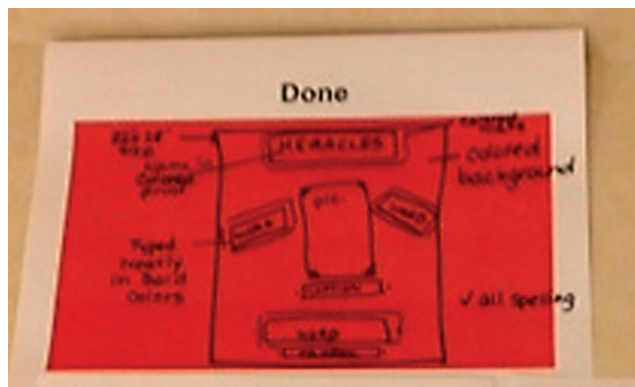
Figure 4. Poster Project: Task Planning Using the GDD Model



The maze project above included a picture model with the directions, so the picture was used in the “Done” mat. However, the poster assignment did not come with a picture model, which increased the complexity of planning for this task. The students needed to recall their previous experiences viewing and creating posters, and formulate an organized mental template of poster features based on those experiences. This mental template is used metacognitively to create a “future sketch” of the poster assignment. Thus, the student’s mental imagery of the basic features of a poster, such as title, pictures, and captions are sketched as a template on the “Done” mat (see Figure 5 on the next page). The elements of the poster are represented as boxes and labeled. This “future sketch” is an external representation of the student’s thinking that serves as the foundation for all the steps and materials that will be organized in moving toward that end result.

This is also a great time to pull in the directions and the rubric in order to complete the sketch by labeling all the components that the student will be graded on, as shown below. The completed sketch is then used to plan the specific steps and time for each step on the “Do” mat. It is beneficial for students to anticipate possible obstacles and use “if-then” thinking to consider solutions when engaging in the planning process. The time is then planned directly on the clock. Using a dry erase marker, a line is drawn from the center of the clock outwards to show when the task will begin and another line is drawn when the task is expected to end. A halfway checkpoint is marked on the clock, as well as on the “Do” mat to show which steps ought to be completed when halfway through the task. Continuing to work backwards, the

Figure 5. Task Planning for the Poster Project: Elements of the Poster Sketched on the Done Mat



Get Ready. Students are asked to gather the requisite materials that are outlined. It is important to note that in therapy and home-based sessions, students are *not given* the materials. In order to increase spatial awareness, students are required to determine or make smart guesses about where the materials are likely to be kept and found in the given space. They are then instructed to go and gather those materials independently.

1. *Essential materials:* The specific materials needed to achieve the goal are provided in the space but gathered by the student.
2. *Irrelevant materials:* The required materials are provided. However, irrelevant materials are also available, requiring the student to use conditional reasoning skills to determine if, when, and how a material would or would not be necessary to achieve the final product. For example, if a student were making the aforementioned maze, the straws, box lid, and construction paper would be provided. In addition, in the materials selection area, irrelevant materials would also be present, such as a small box, wooden dowels (could be used for the maze, but cannot be cut with scissors), ping pong ball (too large), paint, etc.
3. *Missing Materials:* To develop problem-solving skills in this third condition, requisite materials are not provided. Students are required to look at the provided materials and problem-solve a material that could be used in place of the missing item. For example, straws may not be provided. Popsicle sticks, dowels, and paper may be present instead. The student must then problem solve the benefits of the Popsicle sticks (wide and easy to glue, but tricky to cut to size) vs. dowels (narrow, but require a small saw to cut) vs. paper (can be rolled and taped to create a cylinder-shaped material similar to a straw and then easily cut to size).
4. A key vocabulary concept taught in the “missing materials” condition is the idea of “same” but “different.” Students are coached to identify the features of the required core materials and then determine which available materials are similar in feature.

Do. Using a dry erase marker on a clock with a glass face, students sketch the total “pie” or amount of time they estimate they would need to achieve the future picture. This enables students to see the volume of time available. On the clock, students also use the dry erase marker to create time markers: a starting time, an ending time, and midpoint check in. The students also mark in their plans what steps they hope to have achieved at the halfway checkpoint. Prior to initiating the plan, students are asked to use a timer as a mediator to self-monitor the passage of time. Timers can be any tool that counts down a volume of time including egg timers, easy set timers, timers on smart phones, and computer and mobile apps. The students set the timer to count down the amount of time to the halfway point, as opposed to setting the timer for the total amount of time to be spent executing the plan. When the timer is activated at the halfway point, students then have the opportunity to check in and self-monitor their performance. At the checkpoint, students compare their actual performance to their plan. Students are asked to identify whether or not they had any “time robbers” that “stole” their time. They are then coached to “*identify* and *remove* time robbers and then *re-plan*” their actions, time, or plan to sustain their actions towards achieving their future goal. Examples of time robbers would be hunting around in the class/clinic for materials to do an assignment, spending too much time texting or surfing the Internet, not having a clear focus of what an assignment is asking for, etc. By checking in at the halfway point, students are given the opportunity to self-monitor their performance and time. If necessary, they can then self-correct to achieve their plan within the allotted time frame, or they can adjust their time plan and/or expectations toward a more realistic future goal.

Done. Because students start with the end in mind, they already have a future reference for knowing when to stop and recognize when they have achieved their outcome. When finished, students are instructed to stop and “close out” the task they are working on. This includes throwing out trash, putting away unused and gathered materials, and cleaning their workspace. Depending upon the nature of the project, students can record their completed work in an academic agenda and then place their project or assignment in the appropriate folder or storage space until it has to be graded or turned in. This “Done” phase is also used as a time for the student to review the task, and their actions, and to determine: (a) What worked: these steps could be repeated, and (b) What did not work? What changes could be made to the plan when doing a similar task in the future? The maze project (Figure 6) and poster project (Figure 7) are depicted in the two sets of photos below.

Figure 6. Maze Project: Task Execution Using the GDD Model

4th
Gather Materials,
Mark the Clock &
Set the Timer
to **Get Ready**



5th
When taking Steps
to **Do** the task, Self-
Monitor Time at the
 $\frac{1}{2}$ way Checkpoint



6th
Check the Plan
with Outcome
When **Done**.



Figure 7. Poster Project: Task Management Using the GDD Model

4th
Gather Materials,
Mark the Clock &
Set the Timer
to **Get Ready**



5th
When taking Steps
to **Do** the task, Self-
Monitor Time at the
 $\frac{1}{2}$ way Checkpoint




6th
Check the Plan
with Outcome
When **Done**.



The last step includes comparing the actual final product with the plan. This student thought the poster was completed early and he was ready to stop and clean up. When he compared the actual poster with his plan, he realized that he was missing some details and he needed to continue working for several more minutes.

The GDD Model Used in the Clinic During a Social Skills Group

Table 1. GGD Model for Social Skills Group Session

3. What Materials do we need?	2. Sequence the Steps What steps do we need to take to be done? How long will each step take? How much time do we Have? How will time fill up?	1. Future Glasses: When group is over, what will we see that we have completed?
<ul style="list-style-type: none"> • iPad • Whiteboard • Dry Erase Markers 	1. Review the Steps for How to Join a Group. (5 min.) 2. Create a Storyboard for the video. (5 min.) 3. Choose Roles (actors, director and recorder). (2-5 min.) 4. Rehearse action. (5 min.) 5. Video Action. (10 min.)	 <p>We have recorded and are watching a video about how to, and how not to, join a group.</p>
4. Gather Materials	5. Sketch the time, create time markers and ½ way checkpoint. Set timer to alert ½ way point. Check in at the ½ way point and Determine if there are any Time Robbers: Identify/Remove/Replan	6. Know when to Stop. Close out the Task. Review: What worked? What did not work?

Generalization to the Home Setting

To generalize the GDD Model to the home setting, parents are instructed in how the GDD model is implemented in the therapy session. They are then coached on how to support their children using the model at home. When a child needs to complete a task or craft project at home, the parent places on the work surface a piece each of yellow, green, and red construction paper. The parent then coaches the child to start planning with the end in mind by sketching a picture or finding a photo of the future outcome. A representative object could also be used. If, for example, a student were making a sandwich, a picture of a sandwich could be sketched or a photo printed and placed on the red “Done” mat. If the student were making a smoothie, an empty glass could be placed on the red “Done” mat to represent the future outcome (Figure 8).

Figure 8. GDD Model in Home Setting- Making a Smoothie



The child identifies the steps (Do) and materials (Get Ready) to achieve the future outcome and then gathers the necessary materials (Get Ready), sketches or verbalizes the available time, and then executes the steps of the task (Do). Finally, the child closes out the task (Done) by cleaning up the workspace and reviewing/comparing the planned vs. actual outcome.

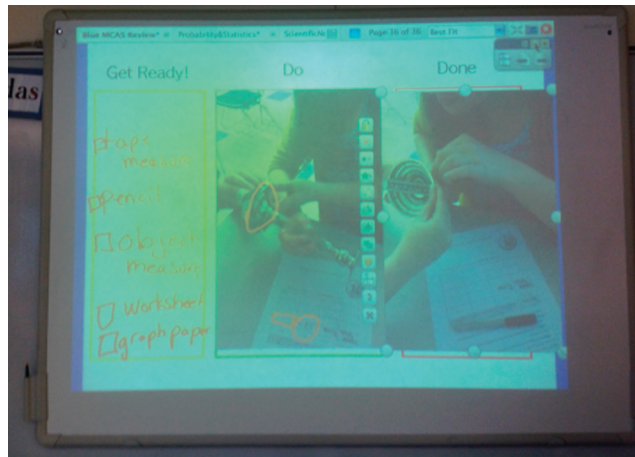
Get Ready*Do*Done at School. The GDD model has also been successfully adapted to the school setting. Teachers are instructed on how to use the model, but implement it only when students need to focus on and complete an in-class assignment or task. Kindergartners were learning the sound/letter correspondence for the letter “M,” so the students participated in a craft project and made a moose out of construction paper (Figure 9).

Figure 9. GDD Model in the Classroom



In a seventh grade special education classroom, co-taught by a speech-language pathologist (SLP), the class needed to complete a worksheet on calculating radius. The GDD model was presented on an active board as a ready reference for the students, and they successfully executed the task within the allotted time frame (Figure 10).

Figure 10. GDD Model in the Classroom—Calculating Circumference, Diameter, and Radius of a Circle



Preliminary Results

Performance results and efficacy of our clinical model are just beginning to be examined. Although our findings cannot be judged by standardized measures, descriptive analysis by clinicians, parents, and teachers suggests that the students who utilized the GDD model demonstrated an increase in task independence and an ability to plan, sense the passage of time, self-monitor, and self-evaluate performance. Students using the GDD model report and demonstrate a confidence in their ability to complete tasks efficiently, a greater feeling of autonomy, and a deeper appreciation for planning and monitoring time.

The GDD model offers clinicians a clinical tool with which to teach the process of task execution. As clinicians who, on the service delivery grid of an individualized education plan (IEP), are asked to consult with classroom teachers or to co-teach in the classroom, SLPs can now use this model as a useful tool to help teachers translate their curricular demands into an executive function intervention that will increase students' planning skills and time spent on-task. For teachers with large class sizes and an increased number of students on IEP's whose goals must be met, the GDD model will likely decrease the amount of one-to-one support a child with poor planning typically requires. For example, teachers using the GDD model report that students more readily initiate, ask fewer questions about what they are being asked to do, complete tasks with greater independence, and quantitatively spend more time on-task.

For clinicians with large caseloads, who typically have limited time with students (often only one hour or less per week, per student), the GDD model helps them to prioritize their interventions. They can now address specific communication goals, while at the same time teach an executive control process that increases a student's ability to attend, follow directions, understand what is being presented, sense the passage of time, and self-monitor.

Summary

For SLPs to teach EF skills in the clinical, school, and home settings, it is critical to understand EF as a self-regulatory process that requires students to demonstrate situational awareness, and then activate nonverbal (visual forethought) and verbal working memory (self-directed talk) in order to achieve a predicted outcome. Preliminary observations, descriptions, and findings suggest that our GDD model is a promising clinical intervention that can be implemented to foster independent task completion within allotted time frames. This model

scaffolds for students a method of self-regulation that helps them develop an appreciation for the *complexity* of tasks, while at the same time giving them an understanding of the *simplicity* of task execution when visualizing an outcome and then breaking that forethought into manageable parts.

Based on teacher and clinician feedback in school, therapy, and home settings where this model has been implemented, students have demonstrated a notable increase in self-esteem and autonomy using the GDD model. Programs and methods to develop EF skills are critical, not only when technology is swiftly changing the way students think and behave, but also at a time when the American educational system is increasingly stressing standards-based test performance. Opportunities have plummeted for imaginary play, trial by error learning, and allocated time to do tasks that allow for the students to “plan-execute-review-try again.” Paul Pintrich, an educational leader and legacy of research on self-regulated learning, defined self-regulation as “an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation and behavior, guided and constrained by their goals and the contextual features in the environment” (Pintrich, 2000). As research has shown that a student’s academic skills and abilities do not always account for achievement, integrating explicit instruction in self-regulation and motivation into the core curriculum may mean the difference between mere performance and actual learning. If EF truly is self-regulation, then using the GDD model in the clinic, school, and home settings shows great promise of clinical utility in developing the core EF skills for lifelong achievement in planning, time management, organization, motivation, and metacognition.

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