

Executing Planful Behavior depends on early Sensory Motor development and Praxis

Executive behavior is what we would like to see in all children; to have a goal, to plan towards it, to complete it in a timely manner without undue frustration or emotional upheaval. The ability to plan activities in a step sequence requires both motor and cognitive functions. While the mind sweeps forward to set a step-by-step action in place, the body keeps up with the know-how of what a step sequence would feel like. In order to better understand this development, we will need to break down the different components of executive skill through the use of case profiles.

The ability to initiate a task

We frequently observe Sally being slow to “get going” on projects and we have to either repeat an instruction or encourage her. Sometimes we may think that she has an attention difficulty causing her to be distracted from starting a task. But *Task Initiation* requires the ability to begin a task without undue procrastination, in a timely fashion, which implies that she would have to have an innate sense of timing in place to respond adequately. Each new task will bring the challenge of the “new and novel”, which would be difficult for her as she struggles with motor planning deficits and would have to reorganize all her systems to accommodate this new learning. As she struggles with developmental delay, she has also learnt to pre-anticipate when tasks will be too hard, deciding to avoid the task demand based on memory alone.

Planning

This involves the ability to manage current or future tasks by setting goals and developing appropriate steps ahead of time. Again, being able to understand a step sequence and time lapsing are crucial skills for delivering this skill. It provides Sally with the ability to create a roadmap to reach a goal or to complete a task. We assume she sees what we see, but for her the next step in planning is a big black hole where all the ideas are floating away, not gaining solid ground to enter into the functional process. Planning also involves being able to make decisions about what is important to focus on and what is not important. This requires of the brain to really need inter-hemispheric organization, because she cannot become so immersed in the detail that she forgets the “whole” of the idea she was planning towards.

Organizing materials

What is needed to accomplish a task can influence the planning potential. This requires the ability to establish and maintain a system for arranging or keeping track of important items. Systems are tough for Sally. Once she is in the moment, putting a structure together, she can perhaps follow her own strategy, but a week later the same system appears to be non-existent as it never related to the level of integration required to make it permanent. Structure is important for her, but she frequently requires consistent supervision in order to maintain the structure. Once routine is established and have been

repeated several times, she can learn to rely and cope with the structure in place, but the skill is not generalized over into other new and novel areas she encounters in every day life, unless someone imposes another structure to organize by. When Sally is left to her own devices, she is not able to keep track of information or materials.

Timing / Time

Noooo!!! It is going to be forever!!!! I am never going to be able to do what I want to do!!!!

Time is an elusive skill for Kayla as she struggles with developing her executive functioning skills. As a baby she had to learn to understand different cycles of sleep and wake as well as night and day. This had to develop into the understanding of yesterday, today, and tomorrow. This develops into a sense of the passage of time. Kayla struggles with impulsivity and finds it difficult to wait for someone to finish their thought before she jumps in with her own contribution. She is unable to relate the passage of time into delayed gratification, and she frequently struggles with the ability to bring past experiences into the present, remaining in the moment, considering only the here and the now. Our own internal sense of timing lies within these concepts, as well as our own body's ability to anticipate timing. After we develop body timing, the intricate process of integrative timing starts to build. Our ability to look at the teacher, while listening to him at the same time, the ability to listen to kids in the background play, yet still to continue focusing on a task at the same time, both relies on the integration of our different senses and their ability to work together in a timely way.

Another layer to consider would be reading decoding. Dr. Keith Raynor's research stated that a good reader would scan lexicon on paper for about 11 to 18 character letters at a time in one saccadic eye movement before fixation takes place. During this visual fixation, phonics kicks in within 5 to 20 milliseconds, and this enables us to decode unfamiliar words in a fairly even way. The timing between the visual and auditory system is important for decoding to become rapid and automatic. Frequently programs focus on one or the other skill, but it is timing them together that makes the difference to reading fluency.

When Kayla has to write an essay, she has to think a thought, plan the sequence of events as well as her sentence construction with language pragmatic skill, while she also has to negotiate her penmanship and grammatical rules in constructing her thought. All the while she has to keep her main idea in mind, while she also pays attention to the detail of her writing. Written expression is likely the most intricate of all in timing different systems to work together in an efficient manner. Therapy that targets integration as a goal is not complete until this process of timing have also been included and addressed.

Timing and rhythm goes together in assisting Kayla to keep pace with her peers. It is an innate sense that transpires into a timely production of task in the time allotted for it. She develops her own sense of pace due to understanding timing and rhythm in her own body

while keeping track of time. It simply does not help to ask her to work at a faster pace, because even though she understands your words, she does not have the ability in her body to create an adaptive response to the command. It leaves her feeling frustrated that her mind is willing, but her nervous system cannot comply. Her anxiety builds as she continues to struggle with the “unknown”.

Kayla will frequently be found to ask the same questions over and over. Questions starting with “when” is especially frequent, as we commonly use words such as “in a moment” or “in 5 minutes” or “after dinner”, none of which makes any sense to her. For her, these responses in the space of time could mean “now” or “forever”. The insecurity of this loss of a sense of time leaves her feeling vulnerable and exposed as she cannot affect closure and anxiety reigns. For her it is as if she has been left in mid-air. This is difficult for us as adults to understand as we take this ability in ourselves for granted.

One more aspect to cover with regards to time is how difficult it would be for Kayla to be interrupted. Her parents and teachers frequently struggle with transitioning her from one activity to another, especially if the first activity was the preferred activity. If her parent tells her that it will be quick and she will be right back to her video game, two major areas are going to come into play. Firstly, since she has a limited concept of time, taking her from her preferred activity would be “forever!” and the word “quick” was not attuned to. Secondly, Kayla may be in the middle of a plot that she is focusing on and knows that when she is interrupted, for however small amount of time, she would have to renegotiate much of what she had already gone through to pick up the thread where she has left off. Even though timing is not the only aspect involved in this, it certainly is part of the equation. Kayla has to develop the ability to be busy with a task that she has allotted a certain amount of time for, being interrupted by the teacher or another student, and being able to make a quick calculation in her mind with regards to how and when she will be able to make up for the time lost.

Paying Attention

Shane is sitting in his classroom, and the teacher is explaining a new math problem and the steps to solving it. He loves math and is really trying to listen. He looks away out of the window to other kids playing outside while he keeps listening to the teacher. His teacher notices this and requests of him to look at her as she is explaining this more complicated issue. Shane knows he has to look at his teacher, though finds it really difficult to do and after a while, he starts to fidget and move around in his chair and gains another comment from his teacher to stop fidgeting. As far as the teacher is concerned, Shane must have ADHD. He always appears distracted and constantly has to fidget in his seat. For Shane it is a different story.

There are many varied to consider when faced with this type of situation. Firstly, it could simply be that Shane has not integrated attentive primitive reflexes such as the ATNR (Asymmetrical Tonic neck Reflex) or STNR (Symmetrical Tonic Neck reflex) or others, and the seated position causes discomfort because of this. Secondly, it could be that

Shane does not have sufficient balance between his postural extension and flexion systems in order to maintain this seated position for prolonged periods of time. A third option could be that there may be a processing speed delay in either his visual or auditory system, causing him to prefer the stronger of both in order to capture some of the instruction. Or it could be that he is not able to time the visual and auditory instruction together in his brain, causing him to need to look away so at least he can use his listening skill to capture as much as he can and assume (or guess) the rest.

His teacher feels rightly so that further steps need to be taken in getting Shane in a better position to learn from her teaching environment. In completing the Connor's Rating Scale, we could determine that Shane is at risk for attention deficits. The truth is that if we answer the questions on a Connor's rating scale and compare this with the answers we gain from completing a Sensory Profile (Winnie Dunn), we will also find a sensory explanation to the very same questions. Sensory processing, postural control, praxis (dyspraxia) does not carry an official medical diagnosis in the DSM-5, and pediatricians feel obligated to place him in some category and ADHD appears to be a good fit.

Shane has no other body to compare himself to. He has no sense of comparison what it may feel like for his peers. All he knows is what he is experiencing. The other kids appear to cope fine; therefore he has to find a way. He compensates, he copes through cognition and long term memory, he tries it all, but as the grades and performance demands increases, his coping strategies become less effective and soon other behaviors start, impulsivity and daydreaming increases. It is not willful, but rather an outflow of a boy who is not in charge of his system, but does not know why.

With this writing we have barely scratched the surface, merely requesting the reader to indulge in multi-causal thinking as what seems obvious rarely is. In addition to this writing, discussing the intricacies of working memory would be an essential piece to understanding executive functioning. Sensory motor development, together with praxis and timing are essential building blocks in affecting executive skill. The prevalence of performance anxiety is very high amongst school students with varying capacities to overcome. We have to "chase the why" in order to best plan our intervention strategies, especially considering typical development as the base from which to think and reflect.

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