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ASD Newsletter Feature Article: Executive Functions & Academic Achievement

One of the most influential perspectives on autism spectrum disorder (ASD) in recent years may be that many social and nonsocial difficulties associated with the condition result from deficits in *executive functions* (Happé, et al., 2006). Executive functions (EF) are a set of processes that all have to do with managing oneself and one's internal resources in order to achieve a goal (Cooper-Kahn & Dietzel, 2008). It is an umbrella term for a variety of neurologically-based skills involving mental control and self-regulation such as inhibition, cognitive flexibility, initiation and persistence, working memory, self-monitoring, and planning and organizing. Deficits in these areas have implications for almost all aspects of daily living, academic achievement, and socialization. At a clinical level, the hypothesis that problems with EFs contribute to symptoms of ASD seems plausible as rigidity, repetitive behaviors, and excessive reactions to change are diagnostic features of the disorder. However, an obvious limitation to this hypothesis is that children with other conditions (e.g., attention-deficit/hyperactivity disorder; nonverbal learning disorder, Tourette's syndrome) also demonstrate significant EF-related deficits.

One way of reconciling the apparently poor specificity of EFs is to note that it is a broad term that encompasses a set of dissociable skills. In support of this observation, several groups of researchers have identified three distinct domains of executive function: (a) planning/working memory, (b) flexibility, and (c) response selection/inhibition (e.g., Hughes, 1998; Miyake, et al., 2000; Ozonoff, 1997). Individuals with ASD seem to have particular difficulty with EF tasks involving planning and flexibility domains (Hill, 2004). Evidence for autism-related deficits in response inhibition is more equivocal. However, this aspect of functioning might be the area of most striking impairment in ADHD.

Facilitating the development of planning/working memory and flexibility is critical even when motivation and intellectual abilities are high for students with ASD as academic performance is significantly affected when executive functioning is poor. One of the first steps for teachers in supporting students with EF challenges is to identify levels of impairments. In order to do this, review the student's ability to implement work and organizational systems by examining completed work assignments and work places, such as desk and lockers. The most important thing is to assess whether the student has a good sense of what needs to be done to complete a particular work assignment. More specifically, where the assignment needs to be done, how to do it, the steps involved and the time needed for each step, and what is expected of the student after the work is finished. Once you have a good sense of the types of planning, organizing and monitoring skills currently in place, you can then provide supports to utilize student's strengths and reduce the impact of the executive function challenges. Some examples of effective EF supports include: visual schedules, concrete written or pictorial lists, visual reminders of necessary materials, clearly defined work spaces, and explicit time allotments for task completion.

Communication Corner:

Students with ASD often exhibit deficits in the area of executive functioning. If parents and educators are able to recognize how these deficits might be influencing a student's behavior then they are better equipped to develop and implement strategies to assist our students in improving these skills. Two areas that are commonly observed with students with ASD are difficulties with flexibility and difficulties with emotional/self-regulation. Difficulties in these areas are likely to interfere with their development in the area of social relationships.

Students who have difficulties with flexibility might become anxious when plans or expectations change and might have difficulty changing from one activity to another. Social interactions are dynamic and the members of a group might suddenly change their plans. Students with ASD often adhere to strict rules while playing a game and have difficulty shifting expectations.

Students who have difficulties with emotional regulation might display a larger emotional reaction than expected for a given situation. These reactions often seem out of proportion. Losing a game and making a mistake are situations when we commonly see these out of proportion reactions.

In recent years several programs have been developed to help address these issues. These include:

- (a) The Incredible Flexible You (R. Hendrix, et al, 2013) is a dynamic, developmental, Social Thinking® and social emotional learning curriculum for children ages 4-7.
- (b) The Zones of Regulation (Leah Kuypers, 2011) provides tools to support self regulation.

Occupational Therapy Corner: Sensory Modulation and Self-Regulation:

Sensory modulation and self-regulation are closely related processes, even more so in individuals with an ASD. The same way problems with executive functions contribute to symptoms of ASD (such as rigidity, repetitive behaviors, and excessive reactions to change); sensory modulation challenges can impact executive functions and cause self-regulation difficulties.

Sensory modulation can be understood as the ability to manage and organize reaction to sensation. It is a process that occurs on both a neurophysiological level and a behavioral level (McIntosh, Miller, Shuy & Hagerman, 1999). To understand sensory modulation we need to be familiar with three components: the threshold to sensory input, the rate of recovery from sensation, and the amount of time an individual can remain in an optimal zone of responsiveness. Sensory threshold varies both between and within individuals. It is influenced by a number of factors, including the individual's pre-existing internal physical and emotional state, previous sensory experiences, and motivation. It does not refer to the perception of a single sensory input, but rather consists of the central processes through which multiple sensory experiences are combined over time and space. In other words, sensory modulation allows us to take in and balance all incoming sensory information, so that our response (degree, intensity and quality of response) matches the ongoing requirements of an evolving situation across time and space. The outcome of sensory modulation is alertness, attention, and to some extent a sense of emotional well-being. When sensory modulation is efficient, individuals tend to be more flexible, adaptable, and recover more easily from unpredictable events. When the sensory modulation process is altered, as frequently seen in ASD, difficulties to achieve and maintain appropriate/functional states of alertness, attention and activity level can be observed, as well as emotional/behavioral dysregulation.

Similarly, Dr. Stuart Shanker describes self-regulation as "the ability to manage your own energy states, emotions, behaviours and attention, in ways that are socially acceptable and help achieve positive goals, such as maintaining good relationships, learning and maintaining wellbeing". In this respect, self-regulation involves dealing effectively with sensory and emotional stressors. Keeping this in mind, the influence of an individual's sensory profile (e.g.: under/over responsive, sensory seeker/avoider, etc.) on the effectiveness of his/her self-regulation skills can be easily observed and understood. For example, initiation, planning, organizing and persistence is more difficult to achieve when the individual is under responsive to sensations; inhibition and self-monitoring is challenging when a person is over alert because environmental sensations are perceived as aversive; working memory can be impacted by anticipatory sensory stress; etc.

Therefore, as individuals with ASD frequently present with sensory modulation challenges, which impact their ability to self-regulate and their responsiveness to the complex features of their human and physical environment, it is important to review, as a team, the personal and environmental factors involved in the situation to best intervene; namely facilitate the sensory modulation process, support emergence/maturation of executive functions and self-regulation of our students.

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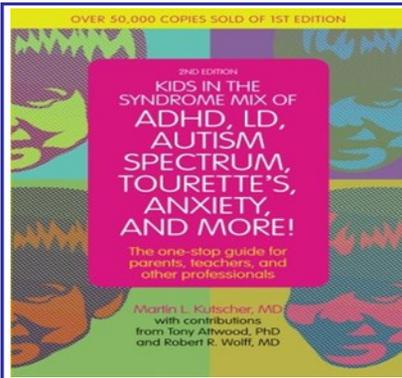
Reference: Williamson G.G. & Anzalone M.E. (2001). *Sensory Integration and Self-Regulation in Infants and Toddlers: Helping Very Young Children Interact With Their Environment*. ZERO TO THREE: National Center for Infants, Toddlers and Families.



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Our team is composed of professionals with a variety of specializations. Designated as a Centre of Excellence within the province, our mandate is to assist LBPSB schools in the implementation of best practices for the inclusion of students with ASD and to serve as a resource to the other English school boards in Quebec. Our team provides assistance to students and families and works to support educational personnel in augmenting their capacity to meet a wide range of needs in the classroom. We do this through direct intervention, coaching, consulting, professional development, and the sharing of materials.

We're on the web! <http://coeasd.lbpsb.qc.ca>



Read all about it!

This revised addition to *Kids In the Syndrome Mix of ADHD, LD, Autism Spectrum, Tourette's, Anxiety and More!*, is a guide for parents, teachers and professionals that addresses a comprehensive range of comorbid neuro-behavioral disorders in children. It includes information on causes, symptoms, interactions between comorbid conditions and treatments in terms of behavioral strategies and current medication options. Additionally, this book includes recent changes in the DSM-5, and correspondingly, a revised chapter on Autism Spectrum Disorder by Dr. Tony Attwood.

**Behavior Tip:
 Teaching How to Ask for Help**

Executive functioning allows us to interpret and manage information that we come across. Because of the limitations in this area among ASD students, some of the resulting challenges include how to approach and complete a task. One of the skills that supports students to cope with these challenges is the ability to ask for help.

The first step in developing the skill of asking for help is teaching the student to recognize WHEN they should be asking for help. A worthwhile exercise would be to sit down with the student and help them list, visually, their strengths and weaknesses. Point out that we all have things that we are good at and things that we need help with. Of the things that the student needs help with, try to focus on the school items and then point out that, whenever they encounter any of those specific difficulties, the strategy to use would be to ask an adult for help. Once they understand which scenarios may require help, you can list strategies, again visually, on HOW they can ask for help for each item. For example, some situations will require the student to raise his hand in class; others may require that they seek someone out in the school, if they are in the hallway or outside.

In teaching students how to ask for help, we are not only providing them with a coping strategy but also a valuable life skill.

Try this:

Executive Function

The brain's ability to take in information, interpret this information, and make decisions based on this information.

Planning

Organizing

Shifting Attention

Multi-Tasking

Challenges

- How to Systematically Approach a Task
- How to Break Down a Task into Smaller Steps
- How to Manage and Organize Time
- How to Complete a Task



Executive Function



Strategies

- Teach How to Ask for Help
- Give One Instruction at a Time
- Point Out the Important Information
- Use Clear and Direct Language
- Prioritize by Importance
- Create a reasonable Time Line or Due Dates
- Know what Works for Your Student and Stick with it

Adapted from:
Asperger Syndrome and Adolescence
 By Brenda Smith Myles, Diane Adreon