Research Paper

Regulating Impulse Control using Cognitive Behavior Strategies with Eye to I© Model for children with Autism Spectrum Disorder

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ABSTRACT

Impulsion is the tendency to respond quickly and without reflection. A classic definition of impulsion includes 1) short reaction times to social presses, 2) quick, intuitive behavior, 3) emotional drive, 4) lack of forethought and 5) readiness to begin work without a carefully constructed plan (Buss and Plomin, provided by Murray 1938). Aim The present case study looks at effectiveness of training for regulation of Impulse Control by integrating Cognitive Behavioral Intervention Strategies with that of the Eye to I© Model for children with social communication deficits. Method The present work is a qualitative research with a 5 years old boy clinically diagnosed with Autism receiving special education thrice a week as part of an early intervention program. Evaluation was done by comparing baseline and progress in task performance at the time of joining Special Education services with progress at eight months of intervention. The observations and comparisons were made for task initiation, visual scanning use, choice making and response for task accuracy, inhibiting impulse to perform on basis of visual information rather than given instruction and task completion. Maintaining and monitoring monthly goal plans along with baseline comparisons helped evaluate program effectiveness and learning. Imposed Delay, Modeling, Reward Contingencies, Prompting and Self-Instructional training with the strategies of Eye to I model viz., Narrations, Self-Talk and Parallel Talk were used as techniques for delivering targets of Early Education. Result Said cognitive behavior strategies were instrumental in training for impulse regulation. This training functionally translated into improved engagement with learning processes as well as quicker acquisition and learning from special education and early intervention programs.

Keywords: *Spirituality, gratitude, demographic variables, students*

Understanding of Autism Spectrum Disorders has undergone changes over the years. Until present day definitions, earlier accounts given by Kanner in his paper titled 'Autistic Disturbances of effective contact' refined the understanding of ways social interaction and communication difficulties manifest in children on the autism spectrum. In this paper, Kanner highlighted important features of Classic Autism viz., autistic aloneness,

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desire for sameness and islets of ability. Today, the DSM V characterization of autism highlights social interaction deficits along with restrictive and repetitive behaviours. Importantly, DSM V describes that the onset is essentially during the "early developmental period" but "may not become fully manifest until social demands exceed limited capacities or may be masked by learned strategies in later life."

Over the years, various theories and explanations have been put forward to explain these deficits. Amongst these, Theory of Mind (Baron-Cohen, S., 1995), Weak Central Coherence (Happe, F., & Frith, U. 2006) and Executive Function deficits have been variously viewed and experimented with, both to understand the deficit profile, as well as a basis for planning intervention. For example, Narzisi et.al, (2013) investigated the neuropsychological strengths and weaknesses of children with autism with aim of better describing their cognitive abilities and to hence design appropriate interventions. They observed deficits in Attention and Executive Functions, Language, Learning and Memory, Sensorimotor Processing and Theory of Mind difficulties in verbal tasks.

The notion that behavioural and social difficulties faced by those with autism are influenced by integration of these weak functions and processes is further supported by Martos-Pérez J, Paula-Pérez I., 2011. Their paper states:
 "The psychological hypothesis of executive dysfunction plays a crucial role in explaining the behavioural phenotype of persons with autism spectrum disorders (ASD), along with other hypotheses such as the deficit in the theory of mind or the weak central coherence hypothesis. Yet, none of these hypotheses are mutually exclusive and behaviours that have their origins in one of these three hypotheses are also shaped and upheld by other processes and factors."

Looking at the current literature, it would then seem ideal to plan an intervention program targeting deficits from all of the three perspectives (Executive Function, Theory of Mind/Language & Sensorimotor Processing) mentioned above (taking individual differences into account).

Eye –to-I © is an integrated model delivering intervention through social communication and play skills, special education, sensory integration and speech therapy. (Gupta. P, Schuchert. S, Kukreja. S, 2015) During the development of the said model, an attempt was made to incorporate aspects of these three psychological theories into its program. The special education-based intervention, being more structured, was a likely place to explore and train in executive function skills, and is the focus of the current paper.

Robinson et al. (2009) conducted a study to understand executive function in children with autism spectrum disorders. It is reported that the behaviours proposed to be accounted for by the theory of executive dysfunction include; a need for sameness, a strong liking for repetitive behaviours, lack of impulse control, difficulty initiating new non-routine actions and difficulty switching between tasks (Robinson 2009; Hill, 2004; Rajendran & Mitchell, 2007).

Impulsivity has been variously defined as a swift action without adequate forethought or conscious judgment. However, there is no single definition of impulsivity that captures every aspect of impulsive behavior. Common themes from self-report questionnaires that measure impulse control include decreased inhibitory control, intolerance of delay to

rewards and quick decision-making due to lack of consideration, as well as more universal deficits such as poor attentional ability (Winstanley et al, 2006). Impulsivity has been alternatively defined as encompassing a "a range of actions which are poorly conceived, prematurely expressed, unduly risky or inappropriate to the situation and that often result in undesirable consequences" (Daruna & Barnes, 1993). The literature does not support a composite list of "impulsive" behaviours in general descriptions of autism spectrum or social communication difficulties. However in order to effective devise intervention goals, the behavioural manifestation of "impulsivity" needs to be defined and measurable. To this end, we have reviewed the literature and found that co-occurrence of ASD and ADHD related symptoms has been verified by various studies showing shared biology as well as behavioural traits. (Reiersen, et al 2007; Mayes et al, 2012). For example, Manouilenko et al., 2013 found that even though ASD and ADHD can be described as distinct categories, autistic traits and ADHD-symptoms were associated with common neural substrates. These researches indicate the possibility of similar manifestations of the impulse control dimension of executive dysfunctions in children with autism as with children with ADHD, where the behavioural manifestations are far better defined. Some children with ASD simply cannot control their impulses sufficiently to remain seated long enough to complete a teaching session (https://www.special-learning.com/article/inattention_overactivity_and_impulsiveness_in_autism_spectrum_disorder) In order to increase the child's access to the lesson content, impulsivity needs to be reduced. The present case study borrows from the literature on impulsivity and ADHD to define impulsivity and target impulse control skills for the child with ASD. This study highlights the effectiveness of Cognitive Behavioural techniques and Eye to I© narration strategies as part of special education delivery for children with autism spectrum disorders.

METHODOLOGY

Aim - The present case study looks at the integration of Cognitive Behavioral Intervention strategies with strategies from the Eye to I© Model as an effective method for training regulation of Impulse Control in children with Autism Spectrum Disorder.

The subject of this study is a non-verbal 5 years old boy, clinically diagnosed with Autism. Special Education frequency was three sessions per week for the duration of eight months (135 minutes per week) as a part of an early intervention program.

Progress was monitored by conductive pre-intervention observations, monthly monitoring and post-intervention observations. This monitoring was done on two broad skill areas: *Skills leading to participation in educational tasks* and *Difficulty in waiting between tasks*.
1. *Skills leading to participation in educational tasks*
    1. Task initiation
    2. Choice making
    3. Visual scanning skills
    4. Response rate for task accuracy

These skills can be inhibited by behavioural excesses (behaviors that are considered maladaptive and potentially harmful whenever they occur http://www.american.edu/cas/ctrb nsci/research.cfm that get in the way of learning). These 'excesses' were addressed by the intervention program described in the following sections.

2. *Difficulty waiting in between tasks.*
Difficulty with this skill area can manifest as self-stimulatory actions or use of task material for sensory need fulfillment.

When attempts at delaying gratification for high interest, non-task objects occur a common behaviour could be out of seat -running to get alternative, desirable 'non-task' material or crying & screaming for the same material.

Skills in both of these broad areas were scored by maintaining and monitoring monthly goal plans along with baseline comparisons to evaluate program effectiveness and learning in the following format:

Skill	1	0	3	4	5	6
Task Initiation						
Choice Making						
Visual Scanning						
Response for Task Accuracy						

1 = Present, 0 = Absent, 3 = With support, 4 = Emerging, 5 = Sustained, 6 = Mastered

For the above, three kinds of tasks were chosen:
1. High Interest Activities
2. Medium Interest Activities
3. Low Interest Activities

Over the last eight months the following five strategies of Cognitive Behavior Interventions were used: Imposed Delay, Modeling, Reward Contingencies, Prompting, and Self-Instructional Training - as defined in the Eye to I© Model.

1. Imposed Delay signifies imposing an extended delay period before allowing the child to respond
Application: Between task waiting and delaying gratification for high interest object were targeted, where time lag was incrementally and systematically increased. Looking at the concrete nature of learning in children with ASD, this time lag was introduced by number of counts, speed of counting, silent counting while highlighting the social cue that marked the end of the waiting period. Sustenance in low-medium interest tasks was also increased by initially exposing to an extra trial in a medium and low interest activity. Gradually, the delay increased to two trials, three trials, and proceeded to one extra low interest activity. At present, the child can tolerate an imposed delay of two activities when expecting delivery of a high interest object.

2. Modeling Used to help acquire task initiation, choice making and reduce each of the behavior excesses.
Application: During table top activities the therapist modeled actions and behaviours required for on-task behaviour ('sitting time', 'hands on table', 'listening time' and 'work time'). Modeling was reinforced with symbolic visual rule-cards. Gradually, use of the visual cards was reduced and the child showed response to verbal reminders alone resulting in the desired on-task performance.

3. Reward Contingencies Were used to target each of the mentioned targets including skills to be acquired, as well as control of behavioural excesses.

Application: Secondary reinforcers were used with the subject after each activity viz., giving images of star, lollipop, burger, smiley and so on at the subject's hand. Gradually, a reward notebook was maintained where activity was written and the reward was made in front of it. This was later rehearsed with the subject at home in order to enhance his motivation level and sense of achievement.

4. Prompting A prompting approach of least to most and most to least was followed for each of the target areas chosen.
Application: Initially, the child was given full physical prompt. Gradually, as the child's skills increased (and consequent impulse control developed), the intensity of prompt faded to partial physical prompt to gestural prompt to verbal prompt.

5. Self-Instructional training The Eye to I© Model uses several therapeutic strategies of self-narration to help individuals develop self awareness, social interaction skills and behavioral self-control - all of which can contribute to impulse control skills. The role of self-statements in guiding human behaviour and problem solving skills has been in the literature throughout the development of CBT (Meichenbaum 1977).
Application: Similar to above, used to reach independence in execution of each targeted skill as well as control of behavior excesses. E.g., 'I look at all the cards, pick the right card and give to maam and then keep hands back on the table'.

In adjunct, the following techniques (as used in Eye to I© Therapy) were also used:
Parallel Talk Parallel talk is a technique in which the adult describes what the child is doing or seeing. She watches the action and describes to the child without expecting a response. The educator/ therapist does not ask questions during parallel talk. An example of parallel talk as used in sessions: 'oh wow! You are sprinkling glitter over the fevicol and the effect looks so beautiful. It looks so shiny and glittery'. This was not only helpful in understanding the task output or the end product, but also helped in creating increased interest in the task itself.

Self-Talk is a strategy in which adult describes what he or she is doing. The adult provides the words to describe her actions, without expecting the child to respond. Usually, these were used coupled with modeling. Some examples of self-talk used within the session are as follows:
'I am matching same to same objects in my notebook'. 'I am making sleeping/slanting/standing line with blue color sketch pen in my notebook'. 'I am tearing yellow paper. I press and paste it in the mango drawing gently'.

Narrations Narrations are preparation to the child about an activity prior to its onset. This powerful tool establishes expectations from the child in a particular social setting or task. Narrations help bring the child's focus toward the current context and the expectations that emerge from that context. For example:
- *What is happening around?*
- *What will the concerned person do?*
- *What are others supposed to do?*
- *What will the child do?*

The above mentioned strategies were rehearsed during conceptual skill attainment of various pre-academic tasks including identification, matching, sorting, pre-writing tasks, visual performance tasks such as puzzles and independent work tasks. Each of these was further presented with different degrees of material concreteness from objects to line drawing cards increased number of options requiring higher discrimination, kept in visually complex and disorganized presentations (e.g. in neat row of two or many kept in a basket)
Hence, requirement for visual scanning in order for task accuracy was targeted.

RESULTS

Results highlight that cognitive behavior strategies were instrumental in training for impulse regulation. This training functionally translated into improved engagement with learning processes as well as quicker skill & conceptual acquisition in the learning from special education and early intervention program.

During initial observations, the child displayed similar skills on the scored aspects for each task, with no apparent interest in any task. He was preoccupied with searching for any material he could use to engage in self-stimulatory behaviours (shaking cards or similar textures and watching them from the corner of his eyes; scooping small objects, such as puzzle pieces, with both hands and dropping them from a height). These were present despite approved readiness for intervention and no observed sensory needs from the Sensory Integration Therapist. The behavioral excesses were the only predominant behaviours at the time resulting in compromised engagement in any task. Hence, there were same scores without differentiation for activities based on interest levels.

Entire performance in the tasks was with full prompts by the therapist.

Table 1: Pre-Intervention – Informal Assessment depicting absence of task initiation and choice making. Responses for task accuracy and use of visual scanning were done with support.

Intervention thus began with narrations regarding the expectations from the child within the session. These narrations displayed to the child, the therapist's understanding of his intense interest in 'his play things' but the need to stop that momentarily to observe the therapist. Narrations also included encouragement and talk of therapist's trust in the child's ability to do the expected behaviours and tasks. Self-talk, along with modeling, was used to show hands-on-table body position, sitting, listening and single trial, 'put-in' tasks. Prompting was done for tasks where child showed *any* form of 'reaching out' for the task material. Reward contingencies followed, initially for simply task engagement and 'letting go' of the play

objects regardless of task accuracy. The contingencies were gradually revised to include task accuracy as above skills began emerging.

As intervention progressed, there began emerging choices and preferences with different interest levels in activities. In every task overall there was enhancement of skills of initiation, use of visual scanning as a tool for response selection and accuracy. Use of scanning for more accurate performance was a mastered skill for every interest level task. The results are represented in tables 2-4.
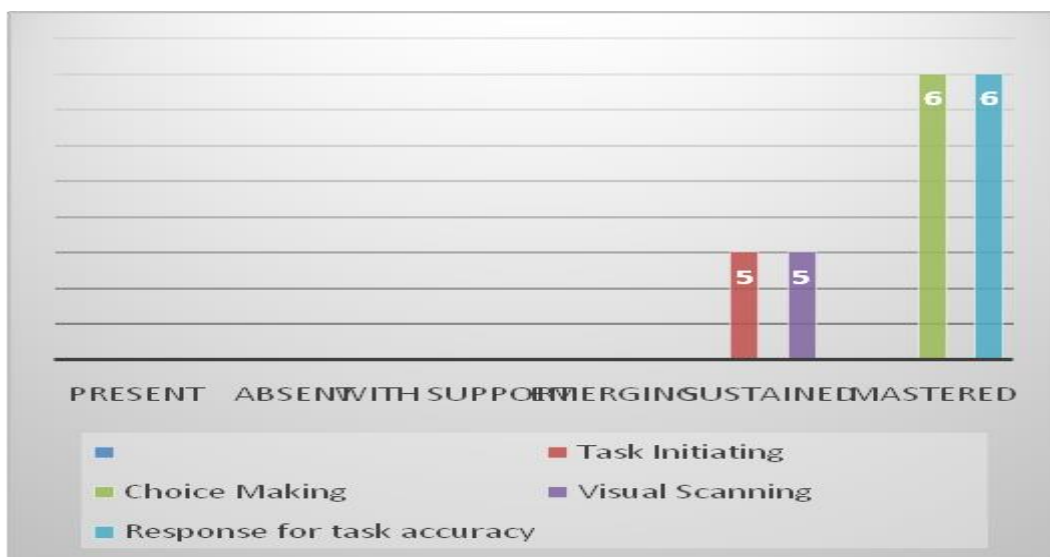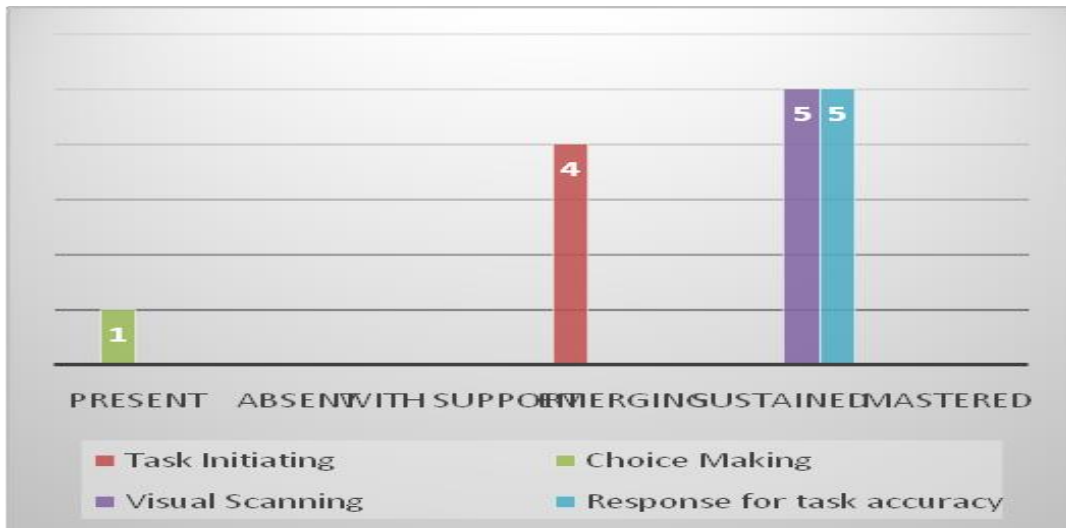

Table 2: Post – Informal Assessment (High Interest Activities) depict Sustained Task Initiation & Visual Scanning and Mastered Response for task accuracy & Choice Making.
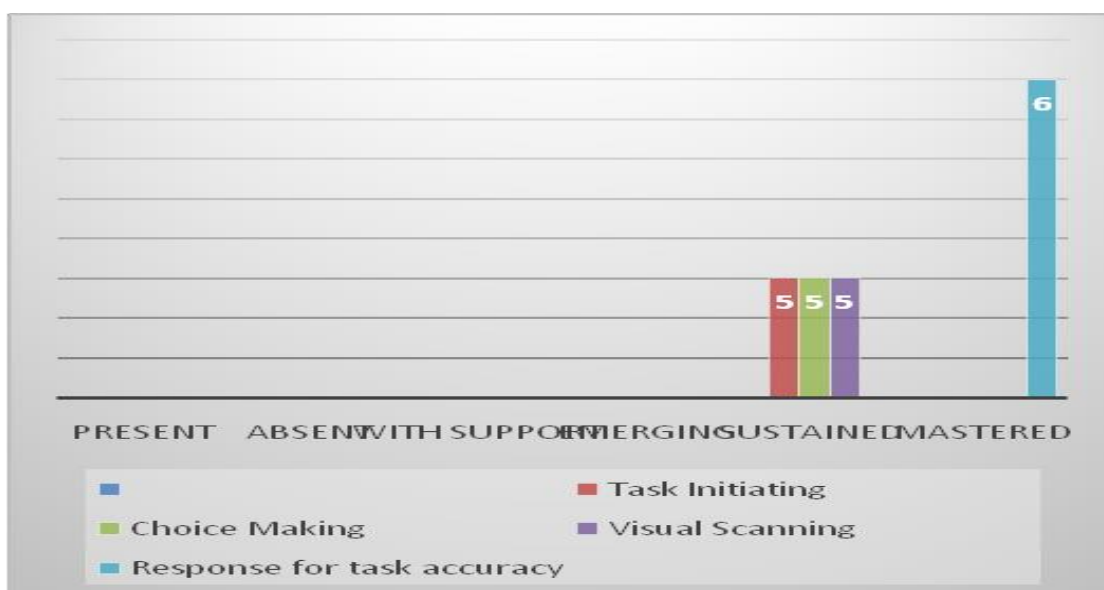
Table 3: Post – Informal Assessment (Medium Interest Activities) depict sustained task initiation, choice making & usage of visual scanning and mastered response for task accuracy.

Table 4: Post – Informal Assessment (Low Interest Activities) depicts task initiation at emerging level, presence of choice making, and sustained usage of Visual Scanning & Response for Task Accuracy.

During Post – Intervention evaluation, after consistent rehearsals of Integrated CBT Strategies with that of Eye to I© model the child displayed lower instances of behavioral excesses with regulated impulsivity through completion of higher number of tasks and increased on seat time besides task initiation and performance accuracy. Sub-skills that were observed, which contributed to above included:

- Increased in-seat waiting in between tasks.
1. Understanding difference between "task-related" materials and permissible play materials.
2. Ability to restrict the self-stimulating play to the permissible material only, that too when given to the child by the therapist in between tasks (variable ratio).
3. Enhanced listening skills.
4. Using 2-point eye gaze for requesting high interest object from educator.
5. Trying to use sounds for requesting object like 'eee' for eating, 'paa' for water (*paani*) drinking, movie for rhyme time to communicate for the same during the session as against crying in the past.

Use of cognitive behavior techniques for teaching specific skills (Applied Behaviour Analysis, Verbal Behaviour Analysis) has been well documented. Our case-study highlights the use of same techniques for executive function training, including impulse regulation as an important intervention area to facilitate and accelerate both intentional and incidental learning.

SUMMARY AND CONCLUSION

The role of CBT in autism has been explored mostly in those children with high functioning autism and Asperger's - with a particular focus on anxiety (Ho, Stephenson, Carter 2014) and social skills training (Cappadocia and Weiss, 2011). The role of CBT and coordinated strategies of Eye to I© as a means to address impulse control in the general ASD population has very little empirical research and with this case study we hope to contribute to a new body of research that will elucidate an integrated CBT approach.

REFERENCES

Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA; London: The MIT Press.

Cappadocia M.C., and Weiss J.A. (2011) Review of social skills training groups for youth with Asperger Syndrome and High Functioning Autism. *Research in Autism Spectrum Disorders* Volume 5, Issue 1, January–March 2011, Pages 70–78

Daruna J.H., Barnes P.A. (1993) A neurodevelopmental view of impulsivity. In: McCown W.G., Johnson J.L., Shure M.B., (eds). The impulsive client: Theory, research and treatment. American Psychological Association; Washington, D.C.: 1993. p. 23.

Gupta. P, Schuchert. S, Kukreja. S, 2015. Co – Creating Communication: Case Study Using Eye to I Interventions, In Kumar N. & Sultan S. (Eds) *Multi Disciplinary Health Care*, (pp 281-296). New Delhi Publishers

Happe, F., & Frith, U. (2006) The weak coherence account: Detail-focused cognitive style in autism spectrum disorders. *Journal of Autism and Developmental Disorders, 36*(1), 5-25.

Hill, E. L. (2004). Evaluating the theory of executive dysfunction in autism. *Developmental Review*, 24, 189–233

Ho, B. P., Stephenson, J., & Carter, M. (2014). Cognitive-behavioral approach for children with autism spectrum disorders: A meta-analysis. *Review Journal of Autism and Developmental Disorders, 1*(1), 18-33.

Manouilenko I., Pagani M., Elander S.S., Odh R., Brolin F., Hatherly R., Jacobsson H., Larsson S.A., Bejerot S. (2013). Autistic traits, ADHD symptoms, neurological soft signs and regional cerebral blood flow in adults with autism spectrum disorders. *Research in Autism Spectrum Disorders.* Volume 7, Issue 5, May 2013, Pages 566–57

Martos-Pérez J, Paula-Pérez I. (2011). An approach to the executive functions in autism spectrum disorder. *Rev Neurol.* 2011 Mar 1;52 Suppl 1: S147-53.

Mayes S.D., Calhoun S.L., Mayes R.D., Molitoris S. (2012) Autism and ADHD: Overlapping and discriminating symptoms. *Research in Autism Spectrum Disorders*, 6 (2012), pp. 277–285

Narzisi A, Muratori F, Calderoni S, Fabbro F, Urgesi C. (2013). Neuropsychological profile in high functioning autism spectrum disorders. *Journal of Autism and Developmental Disorders. 2013* Aug;43(8):1895-909. doi: 10.1007/s10803-012-1736-0.

Rajendran, G., & Mitchell, P. (2007). Cognitive theories of autism. *Developmental Review*, 27, 224–260.

Reiersen A.M. and Todd R.D. (2008), Co-occurrence of ADHD and autism spectrum disorders: Phenomenology and treatment, *Expert Review of Neurotherapeutics*, 8 (2008), pp. 657–669

Reiersen A.M., Constantino J.N., Grimmer M., Martin N.G., Todd R.D. (2008) Evidence for shared genetic influences on self-reported ADHD and autistic symptoms in young adult Australian twins. *Twin Research and Human Genetics*, 11 (2008), pp. 579–585

Robinson S., Goddard L., Dritschel B., Wisley M. & Howlin P. (2009). Executive functions in children with Autism Spectrum Disorders. *Brain and Cognition*. 71 (2009) 362–368

Sze, Karen M., and Jeffrey J. Wood. "Enhancing CBT for the treatment of autism spectrum disorders and concurrent anxiety." *Behavioural and Cognitive Psychotherapy* 36.04 (2008): 403-409.

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Winstanley C.A., Eagle D.M., and Robbins T.W. (2006). Behavioral models of impulsivity in relation to ADHD: Translation between clinical and preclinical studies. *Clinical Psychology Review*. 2006 Aug; 26(4): 379–395. Doi: 10.1016/j.cpr.2006.01.001