spark*: Improving Self-Regulation, Executive Functions,& Social Competence in Children with Autism

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Introduction

Difficulties with executive function (EF) are frequently observed in people with autism spectrum disorders (ASD). Adult outcome in ASD is generally poor in relation to education, independence, friendship, and mental health[1]. Regulation and modulation of the demands of community settings, problems with planning, organizing, executing goal-directed activities, and a general lack of self-advocacy skills have been identified as primary challenges to adult outcome[2]. These areas all point to problems with self-regulation (SR) that could best be addressed during childhood.

SR research has yielded positive results for typically-developing children including:

- Improved cognitive processing and interpersonal skills.
- Increased likelihood to maintain close relationships, resist persuasion, and accept individual differences in other people[3].
- Improved mental health, reduced anxiety and tension, greater persistence and perseverance as well as increases in planning, impulse control, cognitive flexibility, self-monitoring, and social competence.

The Self-Regulation Program for Awareness and Resilience in Kids (spark*)[4] is an innovative approach to improving behavioral, cognitive and emotional self-regulation skills in children with ASD. spark* is informed by positive psychology, neurobiology, mediational learning, and mindfulness.

OBJECTIVES: To evaluate the feasibility, acceptability, and effectiveness of spark* in improving EF (behavioural regulation, metacognition, global EF) and social competence in children with ASD by examining preliminary data collected during pilot testing.

Materials

Unique and important innovations found in spark* include:

- A mediational approach to teaching/learning, ensuring shared participation, reciprocity and communication of meaning and purpose;
- A step-by-step method, beginning with simple motor movements, working toward progressive achievement of child independence from adult direction;
- Systematic movement from awareness of the ability to self-regulate, followed by learning about when and where they need to use these skills and the learning to become more resilient to distractions and impulses and learn ways to advocate appropriately for themselves;
- Mindfulness, or the ability to remain calm and centered in the 'here and now; and
- Metacognition, teaching the children to be explicitly aware of their actions, thinking, and emotions.

Method

PARTICIPANTS: Six 6-8-year-olds and seven 9-10-year-olds with high functioning ASD and Asperger's Disorder (AD) participated in spark* over ten 1-hour sessions.

PROCEDURE: spark* was administered by graduate students in school psychology who were trained in the spark* philosophy and methods and supervised by experienced therapists. Intervention involved teaching skills across four main phases:

- Awareness of the ability to use the skill,
- Awareness of the need to use the skill,
- Resilience in its use, and
- Self-advocacy to increase its use.

Skills addressed during sessions included:

- Behavioral SR of hands, breathing, feet, voice, and whole body; and
- Cognitive SR, focusing and sustaining attention, determining and retaining the most important/relevant information, determining expectations, and constructing meaning.

Results

Qualitative feedback on spark* indicated it is:

- Feasible in group settings (graduate student facilitators completed weekly reflections and ratings and endorsed this), and
- Acceptable (no children dropped out or refused to attend).

Pre- and post-treatment data were collected from parents on measures of EF [i.e., Behavior Rating Inventory of Executive Function (BRIEF)[5]] and social interaction [i.e., Children's Communication Checklist (CCC-2)[6]]. The data were analyzed with a series of paired-samples *t*-tests (See Table 1).

	n	Pre-Intervention *M (SD)*	Post-Intervention *M (SD)*	*p*
BRIEF indices				
Behavior Regulation Index (BRI)	8	76.38 (5.10)	70.83 (6.23)	< .05
Metacognition Index (MI)	8	71.13 (5.77)	67.25 (11.30)	> .10
Global Executive Composite (GEC)	8	75.00 (3.21)	70.00 (9.83)	< .10
CCC-2				
Social Interaction Difference Index (SIDI)	6	-13.83 (4.94)	-11.17 (3.84)	> .60

Table 1. Summary of Means and Standard Deviations for Scores on the BRI, MI, GEC, and SIDI.

In order to make straightforward comparisons on the magnitude of EF improvement, we calculated improvement scores for the BRI, MI, and GEC. These scores are shown in Figure 1 for individual participants and the group as a whole.

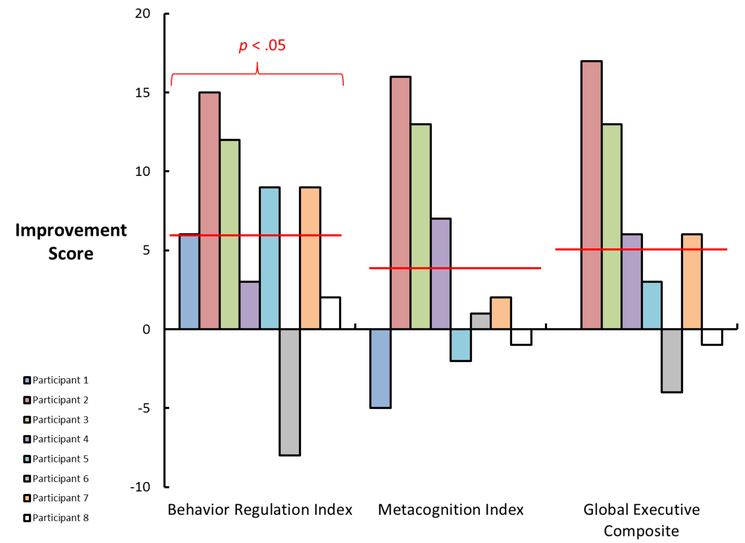

Figure 1. Improvement Scores for the BRIEF BRI, MI, and GEC. The red lines indicate the group mean for each index and individual improvement scores are indicated with bars.

Conclusions

- The spark* program is feasible in group settings and it can be conducted by graduate students in school psychology.
- The spark* program is acceptable for elementary school-aged children with high functioning ASD and AD.
- Even with relatively brief intervention (10 hours), we observed significant improvement in behavioral regulation.
- Parents reported generalization of SR skills in their children.
- Future Research: To evaluate effectiveness relative to controls; use performance measures of EF.

References: [1]Billstedt et al. (2005). *JADD*, 35, 351-360. [2]Marriage et al. *J Can Acad Child Adolesc Psychiatry*, *18*, 324-328. [3]Baumeister & Vohs (Eds.) (2004). *Handbook of Self-Regulation*. New York: The Guilford Press. [4]MacKenzie (2010). *The Autistic Child's Guide to How to Behave – Introducing spark:* * *Self-Regulation Program of Awareness and Resilience in Kids.* Winnipeg, MB: Wired Fox Publications. [5]Gioia et al. Behavior Rating Inventory of Executive Function (BRIEF) Professional Manual. [6]Bishop. Children's Communication Checklist-2 (CCC-2).

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