

Preliminary Executive Functions and Psychopathology Symptoms Outcomes in an Open Treatment Trial of Psychological Intervention for Adolescents Diagnosed with Learning Disorders - I Can Succeed (ICS)

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INTRODUCTION

Executive functions (EFs) refer to higher-order cognitive functions such as inhibitory control, working memory and planning, all of which serve the purpose of maintaining future goals (Welsh, 2002). Given the role executive function deficits play in the diagnosis and treatment of Learning Disorders (LD), particular attention should be paid to skills such as goal-setting and organization.

I Can Succeed (ICS) is a manual-based psychological intervention aimed to address both emotional and academic-executive functions aspects of LD. It consists of acute phase (13 once a week sessions) and follow-up phase (6 sessions over 18 months). ICS focuses on developing intrapersonal skills (e.g. self awareness, goal setting, organizational skills), interpersonal skills (e.g. communication, problem solving) and school/community skills (i.e. strengthening the family-school relationship) (Kopelman-Rubin et al., 2011). A central feature of ICS is the identification, understanding, and conceptualization of the unique nature of the adolescent's LD. This includes conceptualizing the academic-executive functions as well as the emotional and interpersonal aspects of LD. This conceptualization serves as the starting point for the intervention. Goal setting and organizational skills modules are thought to improve the academic-executive functions, while the self-awareness, communication, problem solving and parents training modules target the emotional and interpersonal ones. Psychoeducation, self advocacy and school staff modules are assumed to improve both.

The treatment has been shown to reduce psychopathology on both the internal and external scales of the Child Behavior Checklist (CBCL) (Achenbach, 1991), (Kopelman-Rubin, in press). The current analysis will examine the intervention's preliminary impact on the executive functioning of the participants. In addition, we will examine the differences pre and post intervention in the various subscales of the internal and external CBCL.

METHOD

Participants:

Participants were 39 junior high school students (ages 11-15 years) with various kinds of Learning disabilities (Reading Disorder (66.7%); Disorder of Written Expression (61.5%); Mathematics Disorder (28.2%); 79.49% had more than one LD. Participants had high frequency of other co-morbid psychiatric disorders: ADHD (51.28%); Anxiety Disorder (33.3%); Major Depression Disorder (28.2%); Oppositional Defiant Disorder (7.7%); 20.5% had more than one psychiatric disorders. The majority of the adolescents came from an average socio-economic level (12.5% below average, 67.5% average, 20% above average) and fairly well-educated families (mean education level of mothers and fathers was 14.18 + 2.46; 13.73 + 2.98, respectively). Inclusion criteria were LD diagnosis, normal range IQ and regular class attendance. Exclusion criteria included psychosis and severe suicidal ideation or behavior.

Procedure:

A computerized neuropsychological assessment (Standardized Brain Resource Cognition Assessment, "IntegNeuro," (Clark et al., 2006) was conducted for all adolescents before and after ICS intervention. Parents completed the CBCL about their adolescents before and after ICS intervention. The ICS intervention is manual-based and was delivered in an open treatment trial in an outpatient psychiatric clinic by nine therapists (who were trained in a 6 separate day long workshops). Bi-weekly group supervision led by the first author, an expert educational psychologist was used to enhance adherence.

Instruments:

The Standardized Brain Resource cognition assessment, "IntegNeuro," (Clark et al., 2006). Specifically, the Stroop task, Span of Visual Memory, Verbal fluency, Maze task and Continuous Performance Test (CPT). Child Behavior Checklist (CBCL) (Achenbach, 1991).

STATISTICAL ANALYSIS

In order to examine the intervention, mixed models (ANOVA analyses) were conducted, with time as a "within subjects" variable (Pre and Post intervention), and change of medication treatment during intervention as a "between subjects" variable (change vs. no change).

RESULTS

Pre-post outcomes indicated significant improvement in performance of executive tasks. Specifically there was a significant increase in the number of correct answers of the Stroop task, in the Span of Visual Working Memory and in Verbal Fluency. In addition, there was a significant decrease in the path of learning times in the Maze task. However, there was no significant change in CPT (Chart 1). In addition, analysis of the CBCL subscales revealed significant decrease in adolescent's Attention problems, Social Problems, Anxious/Depressed, Aggressive problems, Somatic complaints, Withdrawn behavior, Thought problems, Delinquent behavior, CBCL Externalizing problems scale and CBCL Internalizing problems scale (Chart 2).

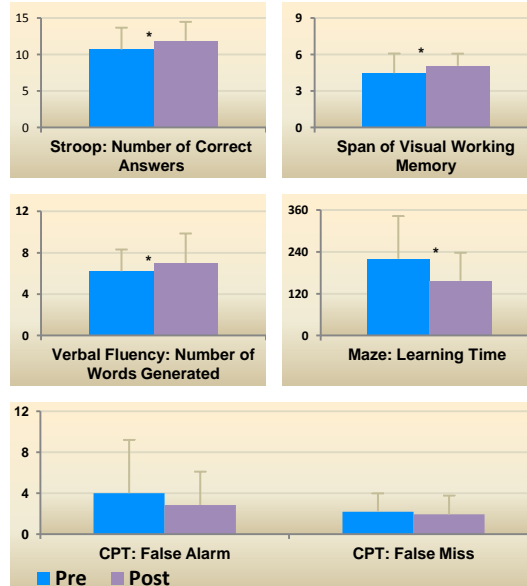


Chart 1: Changes in BRC Test, pre & post intervention, controlling for medication: significant improvements in Stroop task: $F(1,37)=6.17$ $p<0.05$ $\eta^2=.14$, Span of Visual Memory: $F(1,36)=4.75$ $p<0.05$ $\eta^2=.12$, Verbal Fluency: $F(1,37)=4.53$ $p<0.05$ $\eta^2=.11$, Maze task: Path learning time: $F(1,37)=32.16$ $p<0.01$ $\eta^2=.47$. No significant improvements were found in Continuous Performance Test (CPT).

Further information regarding this study can be request from
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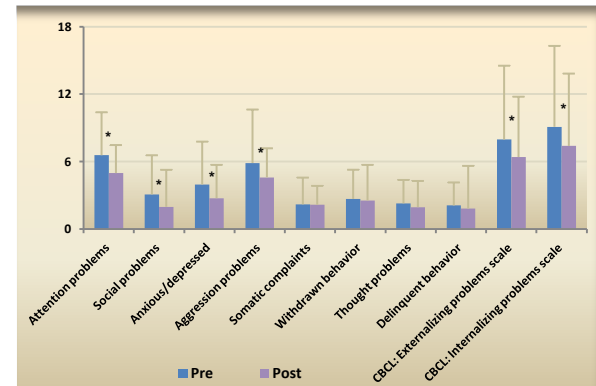


Chart 2: Changes in psychopathology, pre & post intervention, controlling for medication. Significant decrease in Attention problems: $F(1,35)=7.1$ $p<0.05$ $\eta^2=.17$, Social problems: $F(1,35)=7.13$ $p<0.05$ $\eta^2=.17$, Anxiety/Depression: $F(1,35)=12.14$ $p<0.01$ $\eta^2=.26$, Aggressive Behavior: $F(1,35)=4.94$ $p<0.05$ $\eta^2=.12$, CBCL Externalizing Problems Scale: $F(1,35)=5.1$ $p<0.05$ $\eta^2=.13$, CBCL Internalizing Problems Scale: $F(1,35)=3.97$ $p<0.05$ $\eta^2=.1$.

CONCLUSIONS

ICS has indicated preliminary improvement in various aspects of the participant's executive functions as well as psychopathology symptoms. The ICS treatment attempts to target both academic-executive functions and the emotional and interpersonal aspects of LD. These results strengthen the basic assumption of the intervention that both aspects need to be included in order to help the adolescent. It is therefore important that the treatment plan for each adolescent includes a decision about which specific strategies should be emphasized. This therapeutic process targets the co-morbid psychiatric symptoms as part of the adolescent's LD. This is different than treating the LD and the co-morbidity as two separate entities. Our findings are limited by the small number of participants. Moreover, since the treatment was delivered in an open clinical trial rather than a randomized controlled trial, future RCT is needed to examine effectiveness of the intervention. Future research can further examine the possible mechanisms of change in each of the two domains: academic-executive functions and emotional/interpersonal.

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