CRITICALLY APPRAISED PAPER (CAP)

FOCUSED QUESTION
Can cognitive-functional (Cog-Fun) intervention help improve executive function in daily life, achieve occupational goals, and improve self-efficacy of children with attention deficit hyperactivity disorder (ADHD)?


CLINICAL BOTTOM LINE:
The effectiveness of cognitive-functional intervention protocol to improve the executive functions of children with ADHD was investigated. The aim of the study was to determine if the participants would gain executive function skills and improve performance in both targeted and untargeted occupations. The intervention protocol involved teaching the participants specific executive strategies (Stop, Plan, Review) in the context of achieving occupational goals. One parent attended each session to learn about the intervention so that positive strategy use could be reinforced at home.

The results indicated that the participants showed a significant improvement on the outcome measures and most of the gains were maintained at the 3-month follow-up. The authors hypothesized that the positive outcomes of this study were due to a combination of the metacognitive skills training that the participants received, the clinical setting that fostered motivation and engagement in therapy, and parental involvement. Though most intervention gains were maintained, clients did not make further gains. Therefore, booster sessions may be a beneficial addition to the protocol and should be further studied. The authors recommended that a randomized control trial be conducted to further assess the effectiveness of this intervention.

RESEARCH OBJECTIVE(S)
List study objectives.

The objective of this study was to determine if the Cog-Fun intervention assists children with ADHD in making improvements in the following areas:
1. Meeting personalized occupational goals
2. Utilizing executive functions in daily occupations
3. Improving self-efficacy.
DESIGN TYPE AND LEVEL OF EVIDENCE:

| Level III: Uncontrolled, one-group, preintervention-postintervention pilot investigation |

Limitations (appropriateness of study design):
Was the study design type appropriate for the knowledge level about this topic? Circle yes or no, and if no, explain.

| YES/NO | The authors indicated that the previous studies addressing occupational therapy–based cognitive approaches for children have been case studies. Therefore, a one-group, one-treatment pilot study design was appropriate to conduct prior to a randomized control trial. |

SAMPLE SELECTION
How were subjects selected to participate? Please describe.

The research coordinator at a local ADHD clinic referred participants who met the inclusion criteria to the first author of the study.

Inclusion Criteria
Children ages 7–8 who had met the DSM-IV-TR criteria for ADHD, had occupational performance deficits, and were educated in a regular classroom environment could be referred for the study.

Exclusion Criteria
Children could not have additional psychological or neurological disorders or an IQ less than 80

SAMPLE CHARACTERISTICS
N = 14

<table>
<thead>
<tr>
<th>% Dropouts</th>
<th>1 (1%) participant did not complete 3-month follow-up due to beginning medication after post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>#/ (%) Male</td>
<td>#/ (%) Female 9/64% 5/36%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>NR</td>
</tr>
<tr>
<td>Disease/disability diagnosis</td>
<td>Attention deficit hyperactivity disorder</td>
</tr>
</tbody>
</table>

Check appropriate group:

| <20/study group ✓ | 20–50/study group | 51–100/study group | 101–149/study group | 150–200/study group |

INTERVENTION(S) AND CONTROL GROUPS
Add groups if necessary
| Brief Description | The Cog-Fun intervention protocol is based on the theoretical foundations of Toglia’s Dynamic Interaction Approach (DIA). Clients are taught metacognitive strategies, such as self-evaluation and self-monitoring, to be applied in varying contexts. In this study, the intervention included 10 1-hour weekly sessions and transfer work by the parents at home. Each child/parent pair selected an occupational goal to work on in the home environment, at school, or in the schoolyard. They were allowed to select up to three goals. To achieve the occupational goals, task-specific strategies were used for defining the goal, inhibition, planning, and review. The use of strategies was reinforced at home by the use of a timer to help the child stop and focus on the goal one time per day. A daily planner also was used to help the child plan their goals and assess their goal achievement. In order to promote strategy reinforcement at home, one parent observed each session. Parents kept track of their child’s transfer of the strategies at home in a Parent’s Notebook. |
| Setting | Intervention sessions took place at an ADHD community clinic. Parents also reinforced training in the home setting. |
| Who Delivered? | An experienced occupational therapist |
| Frequency? | 1 time per week, 1-hour sessions |
| Duration? | 10 weeks |

**Intervention Biases:** *Circle yes or no and explain, if needed.*

- **Contamination**
  - **YES/NO** There was one group, one intervention in this study.

- **Co-intervention**
  - **YES/NO** Four participants were taking medication during completion of the intervention sessions; however, no medication changes were made throughout the intervention sessions or prior to the 3-month follow-up. One participant did have to be terminated from the study due to initiation of medication during the Cog-Fun intervention.

- **Timing**
  - **YES/NO** No control group was used in this study and intervention was not over a significant period of time (10 weeks, 3-month follow-up) to result in natural maturation.

- **Site**
  - **YES/NO** The intervention sessions conducted by the therapist were carried out in a clinic setting; however, the parents also engaged in home programming. While the clinic environment was always the same, the home environment where the programming took place was different for each child.
Use of different therapists to provide intervention

**YES/NO** One occupational therapist administered the performance measures initially, conducted all intervention sessions, and administered the performance measures at the 3-month follow-up.

**MEASURES AND OUTCOMES**
Complete for each relevant measure when answering the evidence-based question:
Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article – yes/no/NR [not reported]), and how frequently the measure was used.

**Behavioral Rating Inventory of Executive Function (BRIEF)**
- Outcome measured: Executive functioning
- Reliability/Validity: Strong internal consistency, test–retest reliability, and discriminant validity for people with ADHD
- Frequency: Completed by parents and teachers at pre-intervention, post-intervention, and follow-up

**Tower of London-Drexel University (TOL)**
- Outcome Measured: Executive function, specifically planning
- Reliability/Validity: Strong test–retest reliability, criterion validity, and construct validity for children with ADHD
- Frequency: Administered to participants by the occupational therapist at pre-intervention, post-intervention, and follow-up

**Canadian Occupational Performance Measure (COPM)**
- Outcome Measured: Measured participant’s self-efficacy
- Reliability/Validity: Strong validity, test–retest reliability, standardized
- Frequency: Completed by participants pre-intervention, after each goal was established, post-intervention, and at follow-up. Parents completed at pre-intervention, post-intervention, and follow-up

**Measurement Biases**
Were the evaluators blind to treatment status? *Circle yes or no, and if no, explain.*

**YES/NO** There was one intervention group and the same evaluator completed all measurements; however, the evaluator also provided the intervention.

Recall or memory bias. *Circle yes or no, and if yes, explain.*

**YES/NO** The BRIEF and COPM have self-report components that could lead to recall or memory bias.
**RESULTS**

List results of outcomes relevant to answering the focused question

Include statistical significance where appropriate (p<0.05)
Include effect size if reported

In the area of executive functioning, there was a significant difference between pre and posttest scores on the Parent BRIEF (p = .002) and the Teacher BRIEF (p = .007) on the Global Executive Composite, on both indices and on four of the eight subscales. For the Parent BRIEF, the largest effect size was found for the Plan-Organize subscale.

Though the scores on the Teacher BRIEF were similar to the Parent BRIEF, the effect sizes were slightly smaller, and when assessed at follow-up, the scores were slightly worse when compared to post-intervention scores.

In the area of planning, there was a statistically significant improvement post-intervention when examining the scores on the TOL. The effect sizes were also large. There was an improvement in the number of total moves (p = .018), rule violations (p = .012) and total time (p = .012). When comparing follow-up scores to post-intervention scores, it was found that the scores were slightly worse, except in the area of total time.

According to the COPM measure of performance on goals, it was found that there were statistically significant improvements in both parents’ ratings (p = .001) and the children’s ratings of their own performance (p = .001) after intervention. The effect sizes were also large. In the area of transfer of goals, it was found that there were statistically significant improvements in the parents’ (p = .017) and children’s ratings (p = .014).

Was this study adequately powered (large enough to show a difference)? *Circle yes or no, and if no, explain.*

**YES/NO** With only one group, power analysis is not applicable.

Were appropriate analytic methods used? *Circle yes or no, and if no, explain.*

**YES/NO** The sample size in this study was less than 30, so the use of non-parametric statistics (Wilcoxon signed-ranks test) was appropriate. The effect size was computed using Hedge’s g due to the small sample size. Data were analyzed using SPSS Version 16 at a 0.05 significance level.

Were statistics appropriately reported (in written or table format)? *Circle yes or no, and if no, explain.*

**YES/NO** The statistics were reported in terms of statistical significance in the text and a table format also was provided.

**CONCLUSIONS**

State the authors’ conclusions that are applicable to answering the evidence-based question.

The authors concluded that the pilot intervention resulted in improvements in executive
functions and occupational performance for children with ADHD who received cognitive-functional occupational therapy intervention with parental involvement. The authors further concluded that the improvements may be related to the use of cognitive and motivational strategies for performing daily occupations that require the use of executive functions. If similar findings can be shown through completion of a randomized controlled trial, it is suggested that this intervention may be a feasible, useful, and cost-effective complementary intervention to pharmacological treatment of children with ADHD.

This work is based on the evidence-based literature review completed by Shea Willert, OTS, and Sarah Nielsen, PhD, OTR/L, Faculty Advisor, University of North Dakota.


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