



COMPARING THE EFFECT OF CO-OP APPROACH AGAINST CONVENTIONAL OCCUPATIONAL THERAPY IN IMPROVING EXECUTIVE FUNCTIONS IN CHILDREN WITH LEARNING DISABILITY.

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ABSTRACT It is a common experience for every child to come across difficulties in their academic pursuits, whereas learning disabilities display unique qualities. Learning disabilities (LDs) are neurocognitive impairments that affect multiple facets of information processing, encompassing verbal and nonverbal acquisition, storage, retrieval, and utilization. Furthermore, they possess the capability to disturb higher-level cognitive functions such as organization, executive functions, time management, and social communication skills. The Cognitive Orientation to Daily Occupational Performance (CO-OP) is a client-centred problem-solving approach that emphasizes performance-based intervention. The Study was conducted to assess the level of executive dysfunction in children with learning disabilities through the utilization of the Behavioural Rating Inventory of Executive Function (BRIEF). The objective of this study is to examine the impact of the COOP approach on the executive functions of individuals in this population. The control group, received Conventional Occupational therapy, while the experimental group participated in CO-OP approach activities twice a week for a duration of three weeks. The control group nine children completed the protocol, whereas the experimental group consisted of eleven children. Following the intervention, the Control group showed significant difference in organisation & monitoring skills with $p=0.046$ & 0.034 respectively, whereas experimental group receiving CO-OP with the conventional therapy exhibited significant improvement in all components of the BRIEF score, surpassing the control group with a p-value of less than 0.05. It is important to highlight that the magnitude of the shifts in the ratings provided by parents and teachers, the observed alterations in executive functions, and the outcomes obtained from the interviews regarding academic progress collectively demonstrated the efficacy of the CO-OP approach in addressing the needs of children with learning disabilities.

KEYWORDS :

INTRODUCTION:

Every child encounters difficulties in their academic pursuits at times. However, learning disabilities exhibit distinctive characteristics. Certain individuals, even with an average or above average level of intelligence, encounter significant challenges in acquiring and applying fundamental academic skills. The requisite skills encompass those needed for proficient reading, writing, listening, speaking, and/or mathematics. Learning disability is a broad term that covers a wide array of learning challenges. Learning disabilities (LDs) refer to neurocognitive impairments that impact various aspects of information processing, including verbal and nonverbal acquisition, storage, retrieval, and utilization.¹

Learning disabilities are commonly linked to conditions such as attention deficit hyperactivity disorder.² LDs can interfere with learning basic skills such as reading, writing, and math. Learning disabilities (LDs) are brain-based difficulties that affect one or more ways that a person takes in, stores, recalls or uses verbal and nonverbal information. Learning disabilities can hinder the acquisition of fundamental skills, such as reading, writing, and mathematics.³ Some well-known examples include dyslexia, dysgraphia, and dyscalculia, among others. Additionally, they have the potential to disrupt higher-level abilities like organization, executive functions, time management, and social communication skills. Executive functions encompass our capacity to analyse intricate problems, recognize errors, and actively rectify them. Executive functions aid in the purposeful moulding and modification of our actions to achieve desired outcomes. Polatajko and Mandich define Cognitive Orientation to Daily Occupational Performance (CO-OP) as a problem-solving approach that focuses on client-centred, performance-based intervention. It facilitates skill acquisition through the use of strategies and guided discovery. CO-OP is an evidence-based intervention that has proven effective for individuals of all age groups who experience challenges in acquiring, necessary, or anticipated abilities (Rodger & Brandenburg, 2008). The primary goals of CO-OP include skill acquisition in tasks chosen by the child. The progress in the development of cognitive strategies. The process of generalizing and transferring acquired skills and strategies is typically carried out using the CO-OP approach, which consists of the steps: GOAL - PLAN - DO - CHECK. CO-OP represents a highly specialized approach that focuses on engaging individuals at the meta-cognitive level to effectively address performance problems.⁴

cognitive interventions for children with learning disabilities and their impact on Executive Functions.

The CO-OP approach prioritizes the child's needs, as they collaborate with the therapist to establish objectives and their active participation remains crucial throughout the intervention.

The scientific evidence has demonstrated that the CO-OP approach has a favourable impact on children with neurodevelopmental disorders (NDDs), particularly in relation to their engagement in activities and participation.⁵

The current study aims to assess the level of executive dysfunction in children with learning disabilities through the utilization of the Behavioural Rating Inventory of Executive Function (BRIEF) and effect of CO-OP approach on executive functions in this population. The objective of the study was to evaluate the impact of the COOP approach alongside conventional Occupational Therapy treatment on enhancing executive function in children with LD, in comparison to conventional occupational therapy alone.

METHODOLOGY

A prospective, experimental study was carried out in the occupational therapy department of the institute for the duration of 18 months between January 2020 to June 2021, was approved by the Institutional Ethics Committee. Permission was taken from the Learning Disability clinic of the Institute for conducting the study. The students referred from learning Disability clinic, meeting inclusion criterion were included in the study. Children Aged between 8-13 years referred from LD clinic, as per LD checklist scores in either of the 3 domains as follows Gross and fine motor skills: ≥ 6 Language: ≥ 26 Reading: ≥ 22 Written language: ≥ 18 Math: ≥ 22 . Socio/emotional: ≥ 22 . Attention: ≥ 16 . Others: ≥ 20 . Children from English medium school, were included in the study.⁵ Children diagnosed with intellectual sub normality, having Sensory deficits, such as Visual and/ or hearing impairment, other physical disabilities were excluded from the study. The sample size of 18 children in each group were calculated as per previous studies. The children randomised in experimental & control group using a lottery method. The acquisition of parental consent and the child's assent preceded the initiation of the intervention. Children were assessed on Behaviour Rating Inventory for Executive Function scale was used to assess Executive Function.⁶ The rating for each item ranges from 0-2 (0=never, 1=sometimes, 2= often) for each item. Higher the score more is the problem in executive functions.

The first session is one to one session between child and the therapist.

Need For The Study:

Limited literature exists in the field of occupational therapy regarding

Child was expected to attend this therapy session twice in one week for 6 weeks but due to COVID-19 pandemic the protocol was changed twice a week for 3 weeks. The ethics committee permission was taken for the same. Only 2 children followed physically, but others were given home therapy. Due to COVID pandemic, sessions were carried out via telerehabilitation using Zoom app, the sessions were conducted in home environment for 45 minutes twice in a week for three weeks. Follow up was taken after 3 weeks of therapy.

Children from control group received conventional occupational Therapy. Conventional Occupational therapy consisted of Child given activity according to his/her need levels.. Child facing issue with fine motor activity which included muscle activation and toning. Child facing issue with reading was normally made to recite the words with relation to phonics that phonics knowledge helps child to further form words. Child with balance issues was made to stand on different surfaces with help of support with other balance activities. The children who experienced difficulties in socializing and tends to isolate themselves are gradually being made more aware of their surroundings through individual sessions conducted in their home program.

The children from experimental group received the conventional occupational Therapy treatment for first 30 minutes followed by treatment as per CO-OP approach for the next 15 minutes. The Steps of COOP was to plan the preferred activity⁷, such as writing consistently & on the ruled papers gradually writing on the regular sheets etc related to his learning goals- PLAN the action – Do as planned – CHECK if action is appropriate for achieving goals. Activities for COOP approach chosen were as follows: Writing ,Cutting with scissors, Reading, Organising the cupboard ,Jigsaw Puzzles, Decoding ,Buttoning. The total duration of the therapy session was 45 minutes each for twice in a week for three weeks. after third week reassessment was done on BRIEF.

The therapy also included the parental counselling about CO-OP approach. CO-OP being client centred approach it is very necessary to keep on mind the demands of the client.⁷ In this study parents were counselled about the how COOP approach works and what exact clues to follow, while doing or planning activities for their child and help is provided to the kids through their parents.

RESULT

Table 1 Shows Age Characteristics Of The Patient Included In The Study.

GENDER	CONTROL	EXPERIMENTAL
MALE CHILD	6	8
FEMALE CHILD	3	3

38 children were screened for the study .28 met the inclusion criterion there were 14 children in each group .But 5 children from control group & 3 from experimental group dropped before sessions were started ,Thus 9 from control group 7 11 from experimental group completed the therapy sessions & they were included in the final analysis . The control group included 3 girls and 6 boys, while the experimental group had 3 girls and 8 boys. Further analysis was conducted using mann Whitney U Test to compare the improvement between the groups, Within the group comparison was used using Wilcoxon signed rank test.

The scale scores for BRIEF scales were used to compare the improvement in different components of BRIEF in the control & experimental groups.

Table 2 Shows The Improvement In BRIEF Score In Control Group As Per Parent & Teacher Rating Forms

Parent rating Form					
Groups	Components	N	Mean	Z value	p Value
Control	Pre -Inhibit	8	11.60	-0.212	0.785
	Post -Inhibit	8	11.40		
	Pre -Shift	8	16.00	-1.414	0.157
	Post -Shift	8	15.20		
	Pre -Emotional	8	14.80	-1.732	0.083
	Post -Emotional	8	14.20		
	Pre -Initiate	8	15.20	-1.890	0.059
	Post -Initiate	8	14.20		
	Pre -working memory	8	16.20	-1.890	0.059
	Post -working memory	8	15.00		
	Pre -Planning	8	15.40	-1.890	0.059
	Post -Planning	8	15.00		

	Post -planning	8	14.00		
	Pre -organisation	8	10.80	-2.00	0.046
	Post -Organisation	8	10		
	Pre -Monitoring	8	10.60	-2.121	0.034
	Post -Monitoring	8	9.40		
Teachers Rating Form					
Control	Pre -Inhibit	8	11.60	-0.535	0.785
	Post -Inhibit	8	11.00		
	Pre -Shift	8	16.00	-1.414	0.157
	Post -Shift	8	15.20		
	Pre -Emotional	8	14.80	-1.732	0.083
	Post -Emotional	8	14.20		
	Pre -Initiate	8	15.00	-2.121	0.083
	Post -Initiate	8	13.80		
	Pre -working memory	8	16.00	-1.890	0.059
	Post -working memory	8	15.00		
	Pre -Planning	8	10.80	-1.890	0.059
	Post -planning	8	10.00		
	Pre -organisation	8	10.80	-2.000	0.046
	Post -Organisation	8	10.00		
	Pre -Monitoring	8	10.60	-2.121	0.034
	Post -Monitoring	8	10.00		

'p' significant if ≤ 0.05

In parent & teacher rating forms, the control group showed only 2 components i.e organisation & monitoring showed statistically significant difference.

Table 3: Shows The Improvement In BRIEF Score In Experimental Group As Per Parent & Teacher Rating Forms

Parent rating Form					
Groups	Components	N	Mean	Z value	p Value
Experimental	Pre -Inhibit	11	11.40	-2.199	0.028
	Post -Inhibit	11	9.13		
	Pre -Shift	11	15.20	-2.220	0.026
	Post -Shift	11	11.13		
	Pre -Emotional	11	14.20	-2.832	0.005
	Post -Emotional	11	8.88		
	Pre -Initiate	11	14.20	-3.020	0.003
	Post -Initiate	11	8.63		
	Pre -working memory	11	15.00	-2.994	0.003
	Post -working memory	11	8.88		
	Pre -Planning	11	14.00	-2.822	0.004
	Post -planning	11	9.00		
	Pre -organisation	11	10	-2.638	0.046
	Post -Organisation	11	5.25		
	Pre -Monitoring	11	9.40	-2.999	0.003
	Post -Monitoring	11	5.50		
Teachers Rating Form					
Experimental	Pre -Inhibit	11	12.80	-2.558	0.011
	Post -Inhibit	11	8.88		
	Pre -Shift	11	16.25	-2.555	0.011
	Post -Shift	11	11.25		
	Pre -Emotional	11	14.38	-2.598	0.009
	Post -Emotional	11	8.75		
	Pre -Initiate	11	15.50	-2.524	0.012
	Post -Initiate	11	8.75		
	Pre -working memory	11	16.25	-2.527	0.012
	Post -working memory	11	8.75		
	Pre -Planning	11	14.00	-2.536	0.011
	Post -planning	11	9.13		
	Pre -organisation	11	10.13	-2.536	0.011
	Post -Organisation	11	5.36		
	Pre -Monitoring	11	10.60	-2.121	0.034
	Post -Monitoring	11	9.40		

'p' Significant if ≤ 0.05

In experimental group all the components of BRIEF in the parent & teacher rating forms showed the statistically significant difference in all the components of executive functions.

Then the improvement in both the groups were compared using Mann Whitney U Test

Table 4: Comparison Of Parents Rating Form Scoring On BRIEF

Parents Rating	Group	N	Mean rank	Z value	P value
Baseline Initiate	Control	8	11.60	0.541	0.589
	Experimental	11	12.25		
Initiate 3 rd week	Control	8	11.40	-0.20	0.025*
	Experimental	11	9.13		
Baseline Shift	Control	8	16	-0.599	0.549
	Experimental	11	16.25		
Shift 3 rd week	Control	8	15.20	-0.20	0.026*
	Experimental	11	11.13		
Baseline Emotional Control	Control	8	14.80	-1.931	0.352
	Experimental	11	14.38		
3 rd week Emotional Control	Control	8	14.20	-2.832	0.005*
	Experimental	11	8.88		
Baseline Imitation	Control	8	15.20	0.000	1.000
	Experimental	11	15.38		
Imitation 3 rd week	Control	8	14.20	-3.020	0.003*
	Experimental	11	8.63		
Baseline Working memory	Control	8	16.20	-0.150	0.881
	Experimental	11	16.13		
Working memory 3 rd week	Control	8	15.4	2.994	0.003*
	Experimental	11	8.88		
Baseline Planning	Control	8	15.4	-0.972	0.331
	Experimental	11	14		
Planning 3 rd week	Control	8	14	-2.882	0.004*
	Experimental	11	9		
Baseline Organising Material	Control	8	10.8	-0.801	0.342
	Experimental	11	9.25		
Organising Material 3 rd week	Control	8	10	2.638	0.008*
	Experimental	11	5.25		
Baseline Monitoring	Control	8	10.6	-0.958	0.380
	Experimental	11	10		
Monitoring 3 rd week	Control	8	9.40	-2.999	0.003*
	Experimental	11	5.50		

p's significant if ≤ 0.05

On Parent rating on Brief score all the components showed significant improvement after intervention in Experimental group as compared to the control group with $p < 0.05$

Table 5: Comparison Of Teachers Rating Forms Scoring On BRIEF

TEACHER Rating	Group	N	Mean rank	Z value	P value
Baseline Initiate	Control	8	11.60	0.618	0.537
	Experimental	11	12.38		
Initiate 3 rd week	Control	8	11.40	-2.199	0.028*
	Experimental	11	9.13		
Baseline Shift	Control	8	16	-0.599	0.549
	Experimental	11	16.25		
Shift 3 rd week	Control	8	15.20	-0.20	0.026*
	Experimental	11	11.13		
Baseline Emotional Control	Control	8	14.80	-1.192	0.23
	Experimental	11	14.38		
3 rd week Emotional Control	Control	8	14.20	-2.832	0.005*
	Experimental	11	8.88		
Baseline Imitation	Control	8	15	-0.152	0.879
	Experimental	11	15.50		
Imitation 3 rd week	Control	8	14.20	-3.020	0.003*
	Experimental	11	8.63		
Baseline Working memory	Control	8	16	-0.074	0.941
	Experimental	11	16.25		
Working memory 3 rd week	Control	8	15	-3.032	0.004*
	Experimental	11	14.25		
Baseline Planning	Control	8	18	-0.210	0.912
	Experimental	11	18.75		
Planning 3 rd week	Control	8	15	-2.994	0.003*
	Experimental	11	8.88		
Baseline Organising Material	Control	8	10	-0.547	0.584
	Experimental	11	9.38		

Organising Material 3 rd week	Control	8	14	-2.88	0.004*
	Experimental	11	9		
Baseline Monitoring	Control	8	10.6	-0.574	0.590
	Experimental	11	9.38		
Monitoring 3 rd week	Control	8	9.40	-2.999	0.003*
	Experimental	11	5.50		

*p's Significant if ≤ 0.05

On Teacher rating form on BRIEF score all the components showed significant improvement after intervention in Experimental group as compared to the control group with $p < 0.05$.

DISCUSSION:

Learning disabilities has been considered as a diversified group of disorder displayed by impacting the ability of acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. Occupational therapist has been actively working with children who have issues with executive functions, using various approaches and techniques. This study was intended for the effect of CO-OP with the conventional occupational Therapy v/s conventional occupational therapy in improving executive function in children with learning disability. In our study we evaluated 38 children, diagnosed with learning disability, between 8-13 years of age. 28 children met our criterion. There were 8 drop outs from the study. Nine children remained were in control and 11 children in the experimental group. Due to a COVID pandemic, during total lockdown the children could not be assigned for the therapy sessions & the study duration was limited for 18 months, as it was a project during the postgraduate course. So the intervention was reduced for a period of 3-weeks, after the period, when initial interaction with children was declared safe with COVID guidelines. The originally assigned duration was of 6 weeks. The effect of the intervention on both the groups was analysed after 3 weeks of therapy (Twice/week) on the executive function abilities using BRIEF scale Parent & teacher rating forms.

When compared within the groups statistically significant difference was found in control group was found in the organisation and monitoring components of BRIEF (Table no 2) for with p-value 0.046 and 0.034. Whereas there was statistically significant difference was observed in all components in the experimental group (Table 3). As observed in Table 4 & table 5, the comparison between control v/s experimental for baseline and post 3 weeks intervention for parent and teacher rating forms respectively was analysed. At the baseline as no significant difference in both the groups. But the children receiving CO-OP approach showed significant improvement in executive functions after three weeks. In a study done on two children with severe Brain injury regarding EF deficits in everyday life, according to the BRIEF, for the first child (P1), difficulties appeared to be more pronounced at home than in the classroom. However, parent and teacher ratings tended to be congruent in the post-intervention phase, with scores within age-expected norms and significant progress displayed by statistical analyses in both contexts. For the second child (P2), the teacher reported more difficulties than the parents, which has been reported previously because difficulties may be more evident in a more structured and demanding environment. P2's parents did not report any progress of the GEC score over time, closer to the normative range than those of the teacher. The teacher, initially reported more severe deficits, qualitatively perceived significant positive changes, especially at the beginning of the intervention. Overall results from their study suggested that a positive effect on both patients' daily-life EF deficits after use of COOP approach. But the effects were more prominent in the classroom activities. In our study, we also observed that teachers reported more improvement in children than parents.

The statistically significant differences were observed post intervention on the BRIEF scale between the control and experimental groups. The observation in our study aligns with the study conducted by Sara McEwen and Helena Polatajko Combined Cognitive-Strategy and Task-Specific Training Improve the executive skills & was able to transfer to Untrained Activities in Subacute Stroke. In this study, the researcher planned that the participant would work on one or more of the 3 goals set, guided by the therapist, and discover a plan to achieve the goal. If the goal was not achieved, the participant was guided to analyse the performance breakdown and modify or create a new plan. The plan-do-check process was repeated until the performance breakdown was successfully overcome, repeatedly; then, going to the next performance breakdown until all were overcome and the goal was achieved.

Our findings go in line with Krasny-Pacini et al. study, using a pediatric Goal Management Training metacognitive training (with some similarities to CO-OP), parent ratings of the BRIEF improved. However, the authors suggested that this finding could have been due in part to a questionnaire response bias rather than to pure EF improvement because BRIEF ratings might have also reflected parents' desire to be perceived as good cognitive coaches.¹⁰

We have also used the parent response form in BRIEF the parent bias while rating was not considered, but partly tried to avoid bias by considering Teacher's form of BRIEF & considered both the results while obtaining the results. The children scored statistically significant difference in CO-OP approach group, as it involves active engagement in planning, organizing and monitoring activities. As it is supported by literature wherein, exercise is the intentional engagement in the physical activity and the task like of cleaning engages the child intentionally to achieve the task. The positive changes seen in experimental group after treatment there might be a growing awareness of child's own situation and level of skills for managing various life situation independently.¹¹ The children in experimental group performed well that may be because CO-OP approach contributes to transfer of learning. Transfer of skills learned in intervention is a novel skill which is necessary to achieve optimal long-term behavioural regulation and metacognition ability of the children with executive functioning at school and at home. In CO-OP approach the child is explicitly worked upon the generalization and transfer of skills in various environment.

In a study on single-system experimental design, the findings showed statistically significant improvement in occupational performance for most (26/35) of the trained goals, this has indicated that CO-OP should be considered as an intervention option for these children. The person-centred nature of the approach, where goal setting is done directly with the children is key to acquire more motivation and promoting engagement in therapy.¹² The activity could transfer the skills in improving the task such as reading. While using COOP children were taught to follow the certain strategies while reading or writing activities. An article by Rola et al in her study collaborative strategic reading, in which child was been taught about different strategies like preview text in which child has read the paragraph, which had activated his prior knowledge, it provoked the interest about topic and facilitate making predictions next step, was during reading in which strategy like click and clunk was used later which was followed up by other strategies like vocabulary fix up, read-pause-reflect, partner retell.¹³ The similar strategies were used in our telemedicine sessions.

It is worth noting that the size of the change in the parent & teacher rating, the results from the interviews and the changes seen for executive functions all indicate that CO-OP is a powerful approach for children with learning disability. The similar results were seen in a study by Rajul Daftary, while studying the effect of COOP on handwriting performance of primary grade children.¹⁴ Studies have shown that if a person is involved in the intervention process, his or her engagement increases, and that goal-setting enhances the person's engagement in the intervention. Engagement is seen as closely related to meaningfulness and meaning, purpose, and choice are of essential importance to the value that people assign to different situations in life. In control group the activities were focusing on the fine motor activities and to recite the words with relation to phonics, whereas the activities in CO-OP approach focused on skill acquisition, cognitive-strategy use, generalisation of the activity learned to new situations, and transfer of a global strategy learned to solve new problems.¹⁵

In a replicated single-system experimental study using a randomized multiple baseline design across participants and goals was used. Three clusters of four participants (12 participants, nine males and three females, aged 8-16 years) were included. The intervention consisted of 14 individual CO-OP sessions. Each participant chose four goals; three goals were trained during the intervention sessions and a fourth goal served as the control. The Goal Attainment Scale (GAS) was used as a repeated measure to determine goal achievement, which results are For 26 of the 35 trained goals. The intervention led to statistically significant improvements in the GAS. Thus CO-OP Approach reported to be effective tool in OT toolbox¹⁶ This also matches our results, the children from experimental group chose their own academic and daily performance activities for planning in CO-OP & the performance in these activities was improved as indicated through BRIEF scores on parent & teachers rating scale.

On feasibility study about finding out the benefits of using COOP in improving daily activity participation in children with Spina bifida or Cerebral palsy, these children had shown the improvement in planning & executing the daily task in school & at home efficiently after intervention, as observed in our study.¹⁷

We designed the study considering normal situations, but the pandemic forced us to change the protocol, taking into account the safety of children and COVID-19 guidelines. So, the protocol had to be reduced & the intervention mode was switched to telerehabilitation. The investigator had visited the child's home initially for explaining the parents about the study & had got their consent for the therapy. Before shifting our focus to telehealth the investigators acquired the detail knowledge about the telehealth & did the literature review on the effects of telehealth on the children & observed that it can be effectively used in children age group of 8 years & above.¹⁸

Investigators finished baseline investigations personally meeting the child, further assessment was done online. This may have altered the outcome to some extent. The limited number of children were included due to pandemic. The study was restricted to unicentric study. The investigator's bias could not be considered, as it was single blinded study. Due to the pandemic situation, the carryover effect of intervention is not studied. Direct interaction of the therapist and child was lacking due to intermittent telerehabilitation sessions.

CO-OP is a promising approach when it comes to enabling the achievement of personal goals reading abilities and executive functions in academic activities might have potential to enhance executive functioning through functional activities. When CO-OP strategy is used in line with the fundamental core values of disability rights of inclusion, empowerment, and participation, the participation can be improved with reducing the activity limitations, as the personal barriers can overcome with the strategic planning of the activities.

CONCLUSION

Executive function is described as integrated cognitive processes that determine goal directed and purposeful behaviour and are superordinate in the orderly execution of daily life functions.

Use of detail analysis on learning disability checklist & preintervention evaluation on BRIEF helped in formulating the goals for the child pertaining to EF functions. COOP strategies used during intervention has enhanced the executive functions and academic abilities of children. The improvement was noticed during the follow up. longer duration of intervention may give good functional outcome of therapy. The COOP approach if administered carefully can reduce activity limitations pertaining to executive functions and enhance functional participation in children with Learning disability.

REFERENCES

1. Dracy A umphred, Rolando T .Lazaro ,Margaret L roller ,Gordon U Brton, Umphred's neurological rehabilitation, 6th edition, St. Louis, Mo. : Elsevier/Mosby, 3251 Riverport Lane, Maryland Heights, Missouri 63043 ;page no:379-418
2. Case smith, O Brien, Occupational Therapy for Children ,6th edition, St. Louis, Mo. : Elsevier/Mosby , 3251 Riverport Lane, Maryland Heights, Missouri 63043 ;pg.no:173-174
3. Hanten, G., & Levin, H. S. (2008). Executive functioning in children with traumatic brain injury in comparison to developmental ADHD. In D. T. Stuss, G. Winocur, & I. H. Robertson (Eds.), *Cognitive neurorehabilitation: Evidence and application* (2nd ed., pp. 487–506). Cambridge University Press. <https://doi.org/10.1017/CBO9781316529898.034>.
4. Helene J. Polatajko; Angela Mandich Enabling Occupation in Children: The Cognitive Orientation to Daily Occupational Performance (CO-OP). : CAOT Publications ACE, 2004
5. Sheldon Horowitz, (2013) ,Learning Disability Checklist ;National centre for Learning disability :NCLD
6. Gerard A. Gioia, Peter K. Isquith, Steven C. Guy, and Lauren Kenworthy, (Second Edition July 2017) Behavior Rating Inventory of Executive Function: Functioning of Pediatric Neuropsychology 3(2); DOI: 10.1007/s40817-017-0044-1
7. Jessie Wilson, Kin, Gary Williams (2016) :Cognitive Orientation to daily Occupational Performance (CO-OP) as group therapy for children living with motor coordination difficulties: An integrated literature review, Australian occupational therapy Journal, <https://doi.org/10.1111/1440-1630.12333>
8. Hélène Lebrault et al., (2024) Cognitive Orientation to daily Occupational Performance to improve occupational performance goals for children with executive function deficits after acquired brain injury: Randomized Controlled Trial Dev Med Child Neurol. 2024 PMID: 37792283 DOI: 10.1111/dmcn.15759
9. Sara McEwen¹, et al.(2015) Combined Cognitive-Strategy and Task-Specific Training Improve Transfer to Untrained Activities in Subacute Stroke: An Exploratory Randomized Controlled Trial Randomized Controlled Trial:Neurorehabil Neural Repair, 2015 Jul;29(6):526-36. doi: 10.1177/1545968314558602.
10. A.Krasny-Pacini, J. Limond, J. Evans, J. Hiebel, K. Bendjelid, M. Chevignard(2014), Context-sensitive goal management training for everyday executive dysfunction in children after severe traumatic brain injury: J Head Trauma Rehab, 29 (2014), pp. E49-2021
11. Anderson, L., Wilson, J. and Williams, G. Cognitive Orientation to daily Occupational Performance (CO-OP) as group therapy for children living with motor coordination

- difficulties: An integrated literature review. Australian Occupational Therapy Journal, 64(2), (2016). pp.170-184
12. Ms.MadhumalaM.etal (2015)"Effectiveness of co-op to improve shopping skills in children with learning disability" Indian Journal of Occupational Therapy. Sep-Dec2015;p89-96
 13. Rola Abuhasnah(2015): Collaborative strategic reading (CSR):A comprehension strategy to enhance content area learning: April 27,2015: George lucas educational foundationwww.edutopia.org
 14. Rajul Daftary, Shailaja Jaywant.(2015) To study the efficacy of cognitive orientation to occupation performance approach in improving handwriting skills in school going children. Indian occupational journal.2015- vol 47 Issueno.3 Pg 89-96
 15. Peny-Dahlstrand M, Bergqvist L, Hofgren C, Himmelmann K, Öhrvall AM.(2020) Potential benefits of the cognitive orientation to daily occupational performance approach in young adults with spina bifida or cerebral palsy: a feasibility study. Disabil Rehabil. 2020;42(2):228–39.
 16. Helen Labraut ,Rose mateny,Rumen menolov,,Celine Chavvanne (2023);Cognitive Orientation to daily Occupational Performance to improve occupational performance goals for children with executive function deficits after acquired brain injury ;Developmental medicine & Child NeurologyOctober 2023 66(4)DOI:10.1111/dmcn.15759
 17. Peny-Dahlstrand M, Bergqvist L, Hofgren C, Himmelmann K, Öhrvall AM. Potential benefits of the cognitive orientation to daily occupational performance approach in young adults with spina bifida or cerebral palsy: a feasibility study. Disabil Rehabil. 2020;42(2):228–39.
 18. Little, Lauren & Pope, Ellen & Wallisch, Anna & Dunn, Winnie. (2018). Occupation Based Coaching by Means of Telehealth for Families of Young Children With Autism Spectrum Disorder. American Journal of Occupational Therapy. 72PMID: 29426380 DOI: 10.5014/ajot.2018.024786