Enabling Performance Success through CO-OP

CO-OP is ...
“a client-centred, performance-based, problem solving, approach that enables skill acquisition through a process of strategy use and guided discovery”

Rationale for CO-OP
- Client’s need to succeed
- Performance focused
- Evidence-based
- Practice context
- Contemporary motor theories

CO-OP ...
• Originally developed to enable skill acquisition in children with developmental coordination disorder (DCD)
• Founded on theory
• Supported by evidence originally from studies of children with DCD and now several other child and adult populations

An excellent DCD resource is:
http://canchild.ca/elearning/dcd_workshop/index.html

CO-OP ...
- Four major objectives
  1. Skill acquisition
  2. Strategy use
  3. Generalization
  4. Transfer

CO-OP ...
engages the client at a meta-cognitive level in an iterative process of dynamic performance analysis and solution creation and evaluation
-International CO-OP Academy Executive, 2014
Foundations of CO-OP

The CO-OP Approach™

Key Features

CO-OP: DPA

Why Use Strategies?

• Dynamic performance analysis (DPA)
  – Objectives
    • To identify performance problems
    • To identify potential strategies to enable performance

• Learners should know more about how to manage their own cognitive strategies, and how to analyse themselves and the situational demands in order to improve learning and performance
Why Use Strategies?

ABILITY → SKILL

STRATEGY

CO-OP: Cognitive Strategies

Types

• Global Strategy
• Domain Specific Strategy (DSS)

GPDC: Problem Solving Framework

GOAL - What do I want to do?
PLAN - How am I going to do it?
DO - Do it (carry out the plan)
CHECK - Did I do my plan; did it work?

- Self-interrogation
- Self-monitoring
- Self-observation
- Self-evaluation

CO-OP: Strategy Use (Mandich et al., 2001)

Task Knowledge
- Domain Specific Strategies: VGBATs For 2Vs
  - Body position
  - Attention to task
  - Task specification/modification
  - Supplementing task knowledge
  - Feeling the movement
  - 2Vs: Verbal motor mnemonic
  - Verbal rote script

Key Features

Guided Discovery...

A means of providing both instruction and feedback during the learning process in which the learner is encouraged to solve problems independently, but is guided by a knowledgeable instructor who questions, coaches, cues or hints
Instructor Control Continuum

Try to do it out on your own – but I will help you if you get stuck.

Low:
Discovery Learning

Mid:
Guided Discovery

High:
Explicit Instruction

I will tell you what to do!

CO-OP Key Features:
Enabling Principles

- Make it fun
- Promote learning
- Work towards independence
- Promote generalization and transfer

Key Features

Make it obvious!
Coach, don’t adjust!
Ask, don’t tell!
One thing at a time!

Guided Discovery

CO-OP: The DCD Evidence

Since 1994
- Early exploration of cognitive approach (Polatajko et al., 2001)
  - 10 single case experiments (Witocz, 1994)
  - 4 systematic replications (Marks, 1994)
  - Informal 2 yr. follow-up (Polatajko et al., 1994)
  - Domain specific strategies (Mandich, 1997)
  - Informal replications (Polatajko et al., 2001)
- CO-OP trial (Miller et al., 2001)
- In-depth interviews with parents (Segal et al., 2002)
- In-depth interview with families and children (Mandich et al., 2002)
  - Self-regulation (Jokic et al., 2013)

CO-OP: DCD The Evidence

Since 1994...
- Secondary analyses
  - Strategy use (Seagster et al., 2005)
  - Self-efficacy (Mendes & Polatajko, 2004)
  - Compared with task specific (Corcoran et al., 2005)
- Independent studies
  - Strategy use (Rodger & Liu, 2008)
  - Group (Green, Chambers, & Sugden, 2008; Thornton et al., 2016)
  - Parents’ group (Chan, 2007)
  - Meta-analysis (Chen et al., 2003)
  - Self-regulation (Jokic et al., 2013)
  - Summer camp (Zwicker et al., 2015)
CO-OP: The Evidence

Studies with other populations
- Pre-schoolers (Taylor, Fayed, & Mandich, 2007; Ward & Rodger, 2004)
- TBI (Samonte, Solish, Delaney, & Polatajko, 2004)
- Asperger’s Syndrome (Rodger et al., 2007; Rodger & Branderburg, 2009; Rodger et al., 2008)
- CP (Jansone et al., 2009)
- Child ABI (Fiduccia et al., 2009)
- Adult ABI (Jansone et al., 2009)
- Adult ABI – via Internet (Ng et al., 2010)
- Adult Stroke (Fiduccia et al., 2009a, 2009b, 2010; McEwen et al., 2011; Polatajko et al., 2011, 2012; Polatajko et al., 2012)
- Drooling (Senecal, 2012)
- Adult stroke RCT (Polatajko et al., 2011)
- Older adults with subjective cognitive complaints (Dawson et al., 2014)
Can the CO-OP Approach™ be beneficial for young adult’s with spina bifida or cerebral palsy?

Marie Peny-Dahlstrand, University of Gothenburg, Sweden
Ann-Marie Öhrvall, Karolinska Institutet, Sweden

ProDo Research team
Marie Peny-Dahlstrand project manager, PhD, reg.OT
Queen Silva’s Children’s Hospital and University of Gothenburg
Ann-Marie Öhrvall PhD, reg.OT Karolinska Institutet, Stockholm
Lena Bergqvist PhD-student, reg.OT, Habilitation Västra Götaland and University of Gothenburg
Caisa Holgren PhD, neuropsychologist, Habilitation Västra Götaland and University of Gothenburg

The study was financially supported by Promedica, The Folke Bernadotte Foundation, The RBU research foundation, The Sunnerdal foundation and the Norrbacka Eugenia foundation

Why CO-OP for young adults with cerebral palsy (CP) or spina bifida (SB)?

When thinking about difficulties for person’s with CP or SB the issue is often about the lack of experience. However, a person cannot have experience for every life situation – the importance is to be able to solve problems

Spina bifida
Difficulties in planning, initiation and problem-solving are described as the most hindering factors in daily life, regardless of IQ level, more hindering than their motor dysfunctions.


Cerebral Palsy
Growing evidence shows that executive functions often are affected such as problem-solving, decision making, self-regulation which influence the completion of everyday novel, goal-directed and complex activities.

Widngham et al 2013, Weierink et al 2013
Pilot - study

To investigate if the CO-OP approach is effective for achieving self-identified goals and improvement in self-perceived community participation and executive functions for young persons with Spina Bifida or Cerebral Palsy in a Swedish context.

Methods and participants

A multiple case, pilot study with an embedded design (SB and CP), using mixed methods.

- 10 young persons 16-28 years old
  - 5 with Spina Bifida
    - 3 men, 2 women
  - 5 with Cerebral Palsy, MACS I-II
    - 3 men, 2 women

Study flow-chart

Did the CO-OP Approach fit the young adults or were adaptations needed?

- Few minor adaptations; reminders and significant others
- The participants expressed a wish for follow up sessions
- The chosen goals had high complexity

Was CO-OP the right way?

YES!

Preliminary results

Goals chosen by the participants with SB (15 goals)

- Hygiene
- CI – procedure in due time
- Bowel emptying
- Educational related – goals
- Orientation - finding my way
- Cooking meals
- Structure of the day
Goals chosen by the participants with CP (15 goals)

- Work related goals
- Cooking meals
- Structure of the day
- Structure of my home

Preliminary results

High level of goal achievement

- COPM performance scale - the median of the ratings increased 5 levels on a 10-level scale
  - before and post intervention
  - before and 6 months follow-up
  - 29/30 goals improved 2 or more points (14/15 SB)

- COPM Satisfaction - the median of the ratings increased 6 levels on a 10-level scale
  - before and post intervention
  - before and 6 months follow-up
  - 29/30 goals improved 2 or more points (14/15 SB)

A difference of 2 points is a meaningful clinical difference

Preliminary results

Was participation affected?

Self rated participation in everyday occupations
- The majority did not change significantly but 33% of the participants rated higher everyday participation both direct after and 6 month after the treatment period compared to baseline.
- Response shift?

Activity Performance skills (AMPS)
- a tendency to increased process skills but only 2/10 changed more than 2 SEM

Preliminary results

Gains in executive functions/groups

Spina Bifida group
- All improved in DEX

Cerebral Palsy group
- 3 out of 5 improvement in DEX, 2 did experienced more executive problems Response shift??
- All improved in Tower test
- 4 out of 5 improved in Tower test

Preliminary results

How did the participants perceive the CO-OP Approach™

- All the participants found CO-OP meaningful
- After 6 month 8/10 expressed that they use the global strategy when they encounter new performance problems.

- 40% found it hard work but 100% expressed that it was worth the effort

Preliminary results

Qualitative interview

The participants experiences of the intervention with CO-OP Approach

CO-OP enhanced my self-efficacy

- CO-OP – a different way of learning
- CO-OP – supports my way of thinking and doing
- CO-OP – sometimes put a strain on me
- CO-OP – boosts me
CO-OP
• working towards a goal was the same as in other treatments, but
  the way of doing it was extremely different

CO-OP
• Global strategy was crucial
  Thinking before
  Thinking while
  Thinking after
• Global strategy use - a part of me
• The global strategy use support the problem-solving

CO-OP
• Physically and mentally challenging
  ..........but worth it

CO-OP
• The changed thinking was not just a changed mindset but a whole new dimension, not thought of before......It was the thinking about thinking and this
  boosted them

CO-OP
• The CO-OP Approach™ improved the participants problem-solving in daily life by using meta-cognitive thinking skills.
• Using COOP Approach™ in daily life increased their confidence about their own ability, which enhance their self-efficacy.

If I have trouble doing something, it is not a failure, I just make a new plan

Conclusions
• CO-OP Approach™ is feasible for adolescents and young adults with spina bifida and with cerebral palsy, to achieve personal goals.
• CO-OP Approach™ can improve planning and problem-solving ability as well as self-perceived executive function and increased self-efficacy
• Limitation: small scale pilot study
• Larger RCT-studies are needed and planned, with start 2017 (younger age groups)
References

CO-OP in cerebral palsy and brain injury

Michelle Jackman
Iona Novak
Natasha Lannin
Elspeth Froude
Laura Miller
Claire Galea

Functional hand splinting and CO-OP in cerebral palsy and brain injury: a randomised controlled trial

METHOD

Randomised Controlled Trial

COPM
GAS
Box & Blocks
ROM

2 weeks of intervention

Splint only [n=15]
CO-OP only [n=15]
Splint + CO-OP [n=15]

SPLINTING | Body Structures & Function
CO-OP | Activities

FUNCTIONAL HAND SPLINTING

TOP down

BOTTOM up

Support joint/s
Worn during activities to improve function

ICF - Body structures intervention/environmental factor

RESULTS

A functional hand splint, when combined with CO-OP was no more effective than CO-OP alone (COPM Performance p=0.807)

© Jackman, Novak, Lannin, Froude, Miller
CO-OP in cerebral palsy and brain injury

Results

CO-OP is more effective than being provided with a splint and practicing goals at home (GAS p=0.010)

CO-OP might be effective for CP & BI

The dose is low

CO-OP = 15hrs? Other task training = 40hrs?

Splints did not provide additional benefit to CO-OP

Splints did not provide additional benefit to CO-OP (CDPM p=0.807, GAS p=0.870)

Best RESPONDERS

- Standard perquisites for CO-OP: Cognitive and language skills
- Able to set own goals
- Able to communicate with the therapist
- Females
- No comorbidities

Physical Disability Severity does NOT predict OUTCOME

PARENT experience

I think the big thing is, she's walking away with an acronym. A skill: goal, plan, do, check. That's a big skill.

Enjoyment

Transferable

Global Strategy

© Jackman, Novak, Lannin, Froude, Miller
CO-OP in cerebral palsy and brain injury

**THEME | INTENSITY**

- I think the consistency of it was what made it work
- Tiring
- Hard work

**THEME | MOTIVATION**

- The child's personality makes a difference!
- Setting specific and "just a few" goals
- Focus on function – things that are real to kids
- Handing control over to the child

**THEME | STEPPING BACK**

- Not giving him the answers was good... I think he felt he had made all those achievements on his own
- I like it. I made me just take that step back and think about things a little differently
- We've been trained as parents to basically step in and do everything for our kids

**THEME | GROUPS**

- I don't think you can discredit what a group can do for the kids

© Jackman, Novak, Lannin, Froude, Miller
Augmenting deep brain stimulation with a cognitive approach

2 series of N-of-1 trial with replications across children with hyperkinetic movement disorders

Hortensia Gimeno
NIHR Clinical Research Fellow
Institute of Psychiatry, Psychology and Neurosciences. King’s College London
Complex Motor Disorders Service. Evelina London Children’s Hospital

What is Dystonia

Dystonia is a movement disorder characterised by sustained or intermittent muscle contractions causing abnormal, often repetitive, movements, postures, or both. Dystonic movements are typically patterned, twisting, and may be tremulous. Dystonia is often initiated or worsened by voluntary action and associated with overflow muscle activation.

Albanese et al. 2013

Dystonia and other HMD

Current management options include

Surgical
Deep Brain Stimulation
Intrathecal Baclofen

Medical
Pharmacological
Botulinum Toxin

Functional targeted intervention potentially available as an adjunct but paucity of evidence available

CO-OP Approach™

Cognitive Orientation to daily Occupational Performance

CO-OP Approach™

Cognitive and Motor Learning Theories
Meta-cognition

Everyday activities

CO-OP Approach™

Functionally targeted intervention
Client Centred
Cognitive Strategies
Functional goals
CO-OP Approach™

- Generalisation
- Transfer

Functionally targeted intervention
Client Centred
Cognitive Strategies
Functional goals

Methodology

Inclusion Criteria
- HMD post DBS
- 6-21 years
- MACS I-IV
- problems with activities of daily living

Primary Outcome Measures
- Assessment of motor and process skills (AMPS)
- Performance Quality Rating Scale (PQRS)
- Blind rated

CO-OP and DBS in HMD

Feasibility

Single Case Experimental Design/
N-of-1 trials

Single Case Experimental Design/
N-of-1 trials
SCED/N-of-1 trials

REPLICATION

n-of-1 + 3 4
+ 5 +6

PROOF OF CONCEPT

FEASIBLE

ACCEPTABLE

EFFICACY

BASELINE (Pre CO-OP)
DURING CO-OP INTERVENTION
POST CO-OP INTERVENTION
3M FOLLOW UP (AFTER CO-OP)

Chosen goals
Client-centred
Motivation

Gross Motor/ Exercise
Manual Function
Refined movements

Chosen goals
Client-centred
Motivation

MACS I-IV
GMFCS I-IV
Inherited/Idiopathic/ Acquired
Dystonia/Choreoathetosis/ Myoclonus
DBS < 1month
Chosen goals
Client-centred
Motivation
Self-efficacy

Gross Motor/
Exercise
Manual Function
Refined
movements

Changes in negative signs of self-efficacy

Changes in positive signs of self-efficacy

Does occupational therapy work?

CO-OP Approach™

Stage 1 Single Case Experimental Design

Proof of concept

1 OT
More than 1 baseline
10 Rx sessions
Multiple variables

STAGE 1
Expert Therapist
N-of-1 with replication
EFFICACY

STAGE 2
Occupational Therapists
EFFECTIVENESS

Roy et al. Under preparation

Roy et al. Under preparation
Cognitive Control of Motor Performance

CO-OP Approach™

- Can we augment DBS outcomes?
- What are the key active ingredients of the intervention?
- DBS & CO-OP multi-centre trial?

Can we augment other neuro-modulation techniques?

CO-OP without DBS?

hortensia.gimeno@kcl.ac.uk