

The impact of participation-based interventions on body functions among youth with physical disabilities

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INTRODUCTION

- Personalized 'top-down' participation-based interventions are considered recommended practice (Law & Darrah, 2014; Novak et al., 2013; 2019).
- It is unclear, however, whether enhancing participation can simultaneously improve both body functions and activity performance — key outcomes of rehabilitation programs.

STUDY'S OBJECTIVE

To examine the effectiveness of youth engagement in a self-chosen 8-week community-based activity (e.g., swimming, playing piano) on 3 relevant body functions:

- Motor
- Cognitive
- Affective

as well as on the performance of the selected activity.

METHODS

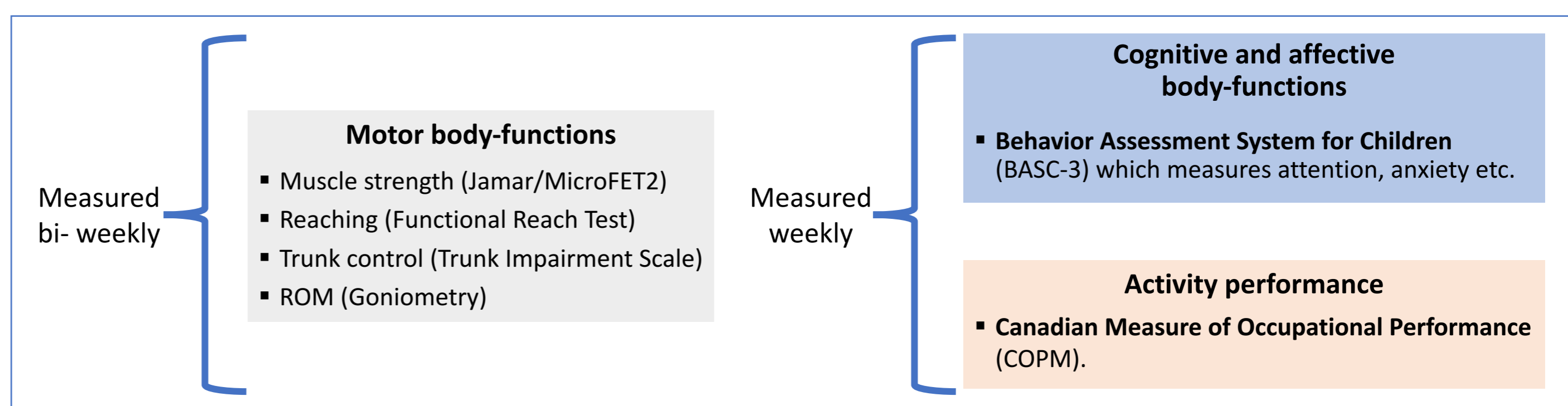
- A 20-week individual-based interrupted time series design with multiple baselines across youth was employed.
- Seven youth (4 males) with physical disabilities aged 15-25 (median=18) participated in an 8-week self-chosen activity.
- Number of functional issues ranged from 1 to 8 (median 3); the most common being difficulties moving around (5/7) followed by using hands to do activities and managing emotions (4/7).

Intervention and Procedure

- Using the PREP approach (Anaby et al., 2018):
 - Solution-based strategies for removing environmental barriers were used to engage the youth in the chosen community activity.
 - Each activity was analyzed using the "Activity Analysis" approach.
 - Relevant body functions were identified and matched with appropriate assessments and were measured repeatedly.



Assessment Kit



- Linear and mixed-effects models were used.

RESULTS

- Significant improvements in at least one aspect of affect (5/7 youth), cognition (3/3 youth), motor (6/6 youth) and performance (7/7 youth) were observed.
- The intervention has a moderate to large effect on attention (0.57) and hyperactivity (1.45) with a smaller effect on anxiety (0.21) and inadequacy (0.21). A notable effect size for activity performance (4.61) was observed.
- Average change across motor outcomes was substantial, (3.7 SDs from baseline), yet non-significant.

Table 1. Specific body functions that improved significantly following the intervention in each youth

| ID | Activity | Body Function Outcomes | | | Performance Outcome |
|----|-------------|--|--|------------------------------------|---------------------|
| | | Motor | Affective | Cognitive | |
| 1 | Programming | NA | • Anxiety ✓ | • Attention ✓ • Hyperactivity ✓ | ✓ ✓ |
| 2 | Drawing | • Strength (R/L Wrist Ext) ✓ | — | NA | ✓ ✓ |
| 3 | Guitar | • Strength (R Lateral Pinch) ✓ • Trunk Control ✓ • Strength (R Elbow Flex) ✓ • ROM (R Wrist UI) ✓ | • Anxiety ✓ | • Attention ✓ | ✓ ✓ |
| 4 | Swimming | • Strength (R/L Elbow Flex/Ext, R Shoulder Abd) ✓ • ROM (R/L Shoulder Abd) ✓ • Reach (L/R sitting/standing) ✓ • Trunk Control (coordination, dynamic sitting) ✓ | — | • Hyperactivity ✓ | ✓ ✓ |
| 5 | Swimming | • Forward Reach ✓ • PROM (R/L Hip Flex, L Hip Abd) ✓ • ROM (R Hip Flex) ✓ | • Self-Esteem ✓ | NA | ✓ ✓ |
| 6 | Walking | • Strength (R/L quad, R/L ham, R/L calf) ✓ | • Anxiety ✓ • Sense of Inadequacy ✓ | NA | ✓ ✓ |
| 7 | Piano | • Strength (R/L Grip, R/L Thumb Abd, R Wrist Ext) ✓ | • Self-Esteem ✓ • Inadequacy ✓ | NA | ✓ ✓ |

LEGEND:
 ✓ Statistical significant improvement; ✓ ✓ Statistical and clinical significant improvement; — Stable;
 ROM = Range of Motion; PROM = Passive Range of Motion; Strength = Muscle Strength;
 NA=Not Applicable

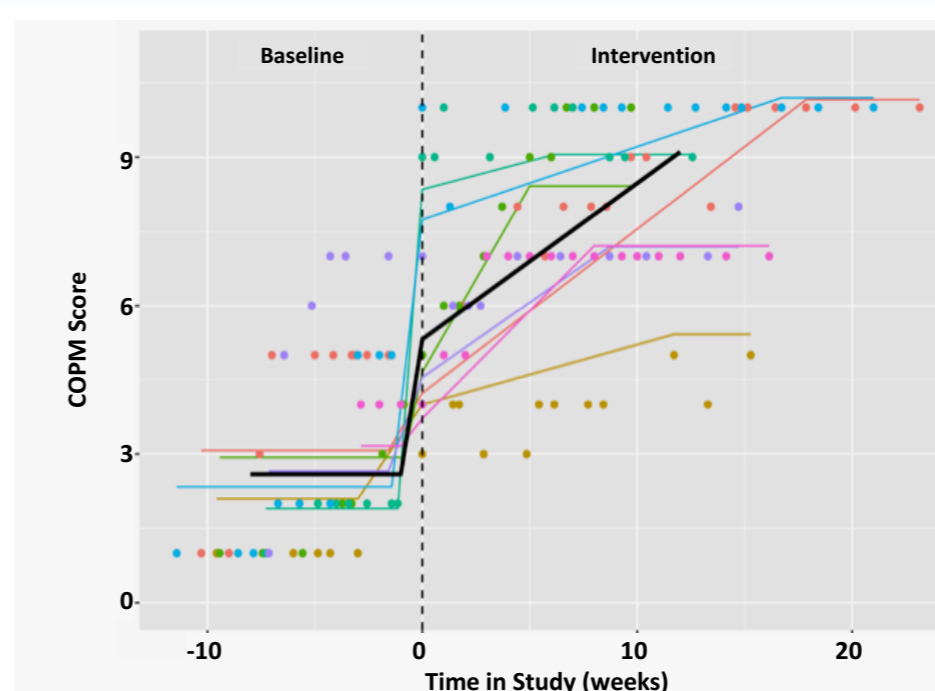


Figure 1. Trajectories of change in Activity performance (COPM scores)

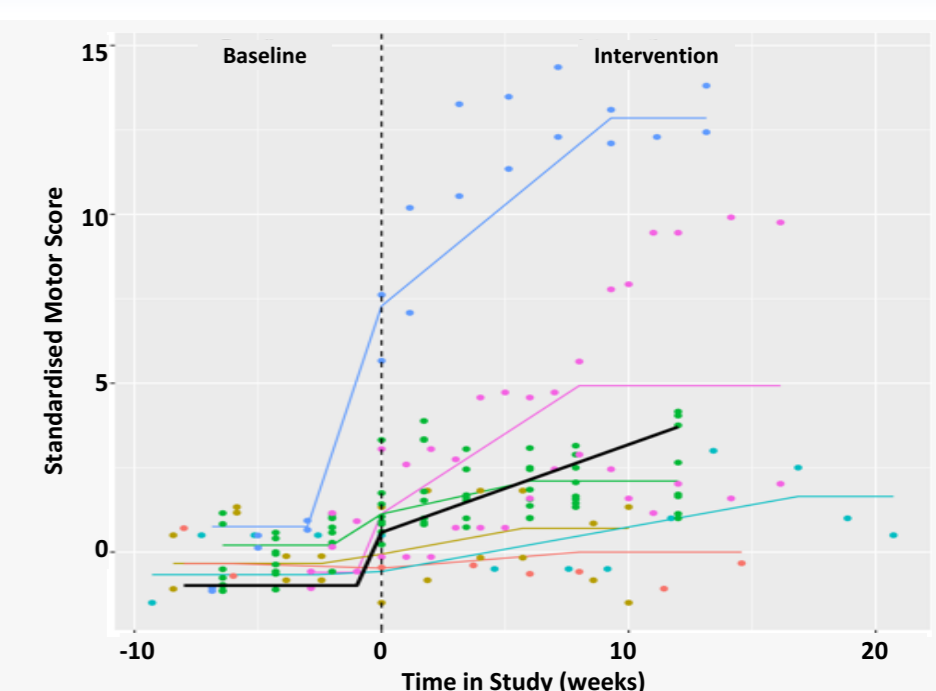


Figure 2. Trajectories of change in Motor body-functions

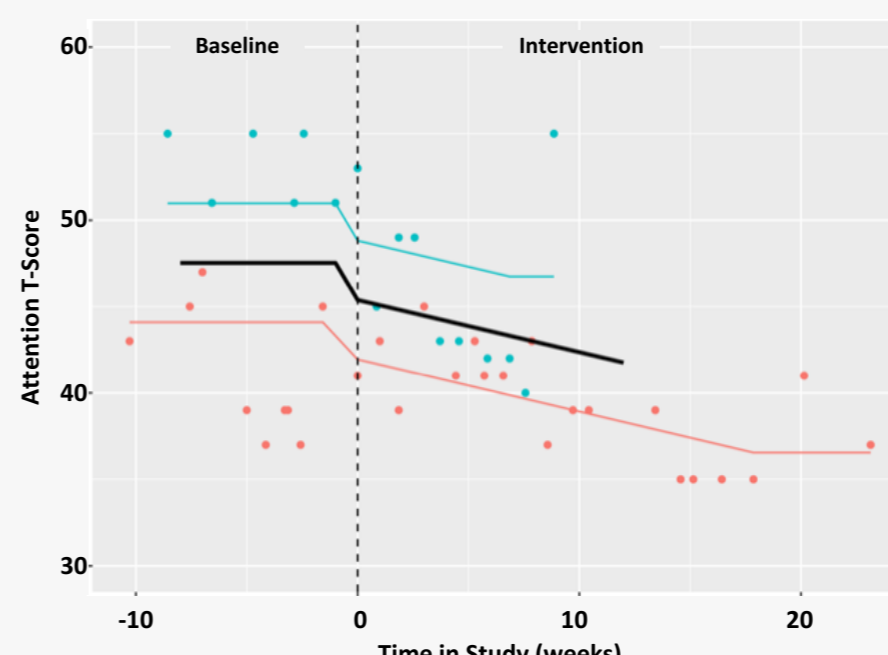


Figure 3. Trajectories of change in Attention problems (BASC-3 scores)

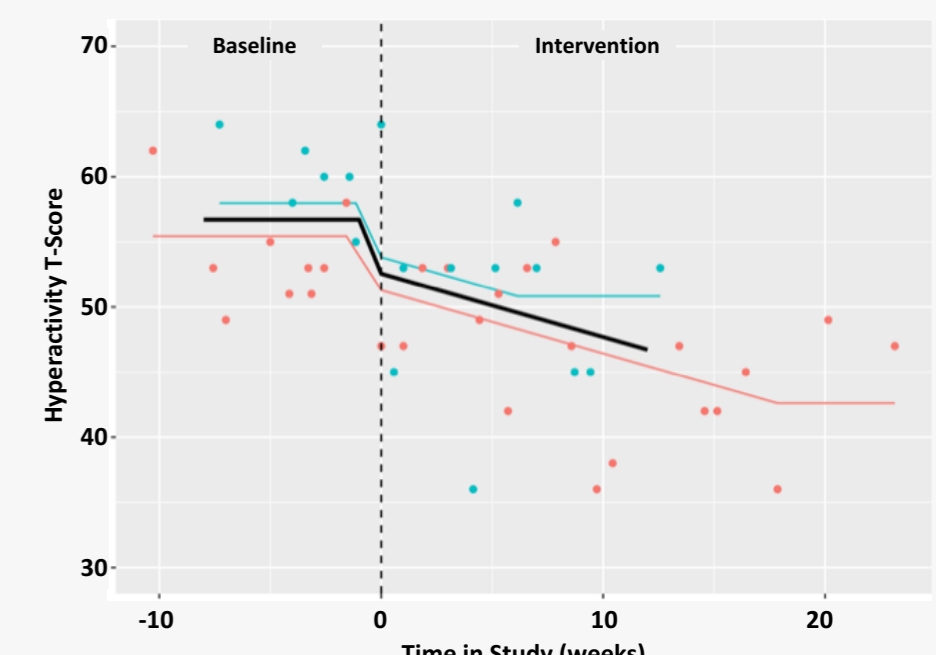


Figure 4. Trajectories of change in levels of Hyperactivity (BASC-3 scores)

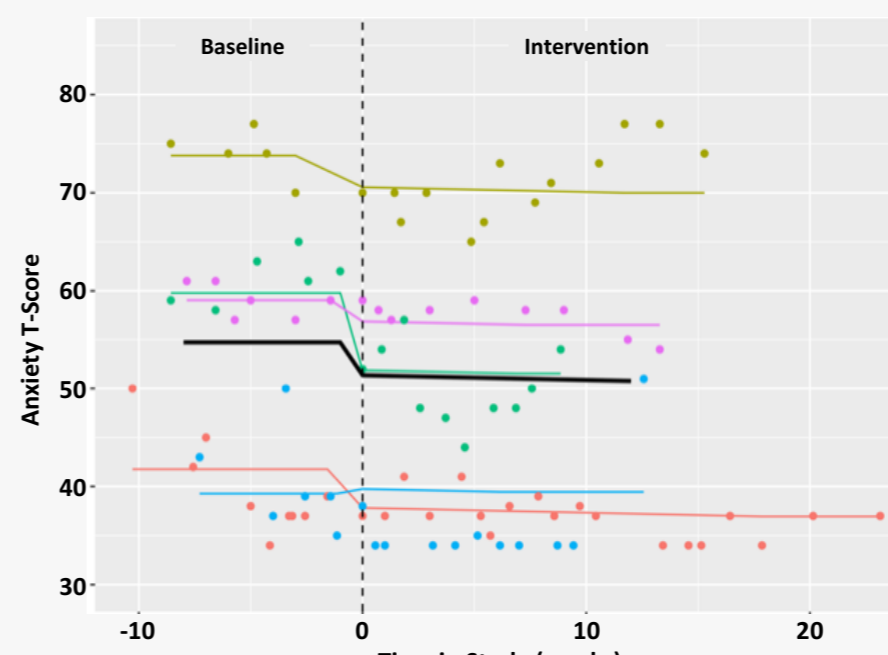


Figure 5. Trajectories of change in levels of Anxiety (BASC-3 scores)

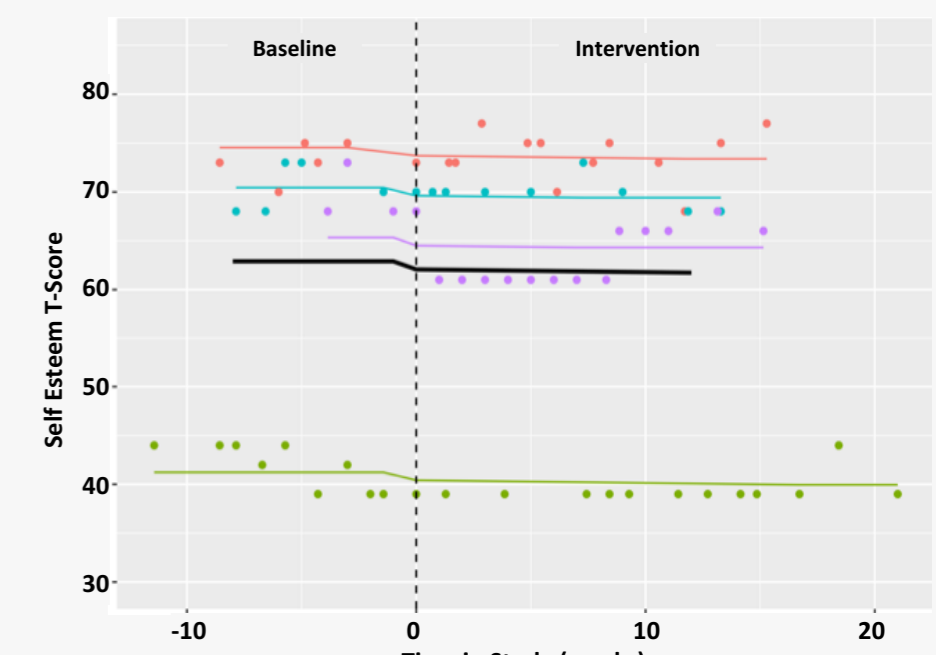


Figure 6. Trajectories of change in Self-esteem (BASC-3 scores)

CONCLUSIONS

- Participation-based interventions can impact **body-function level outcomes**.
- Findings emphasize the merit of personalized and meaningful 'real-life' youth-engaging therapies.
- The **environment** is key to children's participation and can serve as an effective target of **intervention**.

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