

Is Virtual Reality accepted as part of interventions for children with attention deficits?

Results from a feasibility and acceptability study

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Introduction

Children with attention deficits experience difficulties in various areas of their everyday life and their parents often experience higher levels of parenting stress relative to parents of typically developing children (1,2). Therefore, it is essential for these families to receive specialized supportive services.

Behavioral Parent Training (BPT) and cognitive-behavioral treatment (CBT) are considered evidence-based interventions for this group, but they seem to have some limitations, especially regarding the cognitive training of attention (3,4).

Immersive Virtual Reality (iVR) technology is an emerging tool for supporting these interventions, which gives the opportunity to train children's cognitive skills (e.g., attention, memory, etc.) and seem to have positive effects in improving sustained attention, short-term memory and in some studies, impulsivity of participants (5,6).

Aims of the study

- The integration of iVR technology in an intervention program for children with attention deficits and the pilot implementation of parents' psycho-educational program concurrently.
- The initial implementation and evaluation of the intervention program (parent training and child training).

Methods

Participants:

- 5 children (M age = 9.58, ± 1.44, 1 female)
- 10 parents/carers (M age = 44.30, ± 11.21)

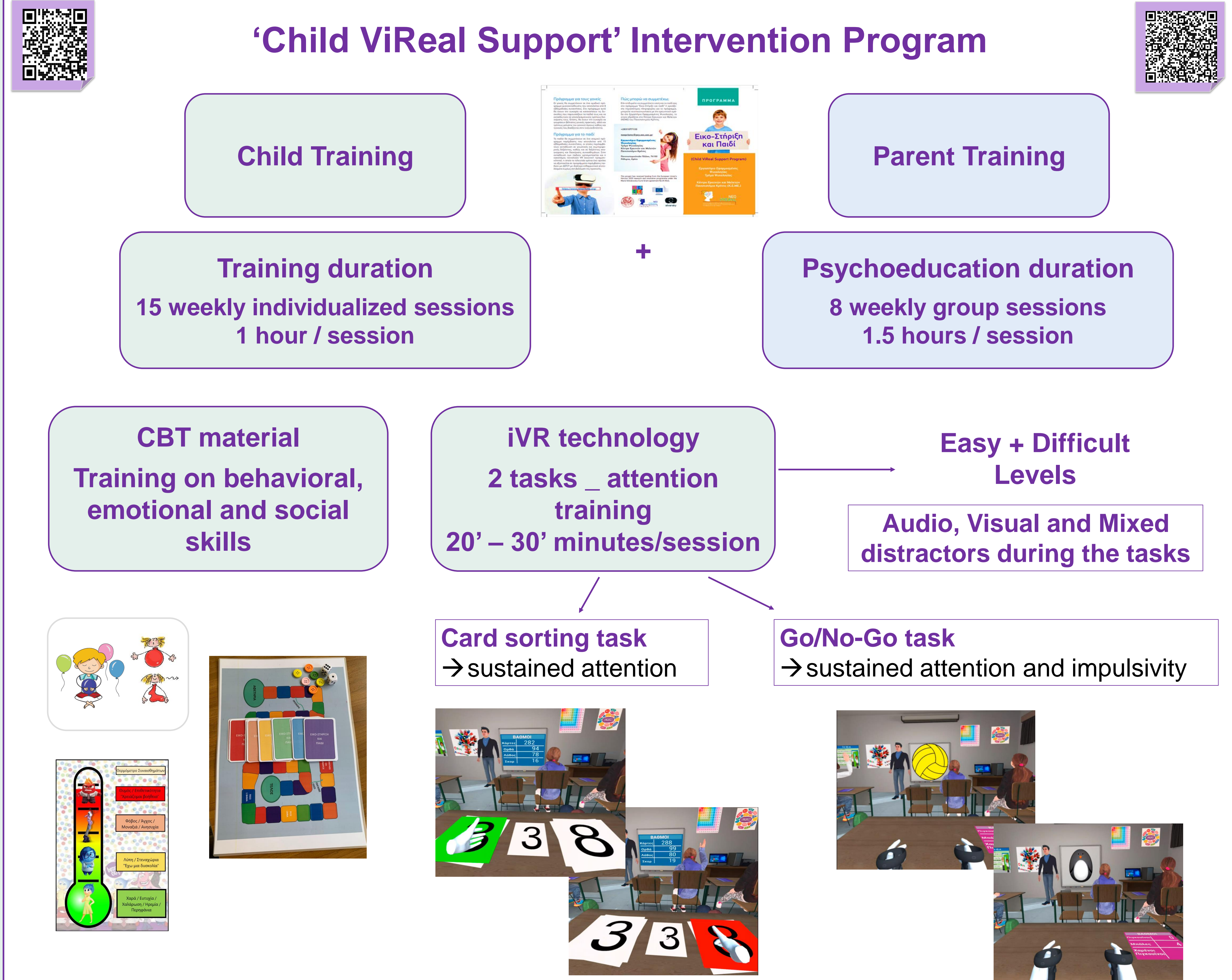
Materials:

Assessment of every session	a. Cybersickness-related side effects (7 Q) b. Enjoyment of/ Engagement in iVR task (4 Q) c. Satisfaction from session (4 Q)
Assessment of the program Final	a. Relationship with therapist (6 Q) b. Benefits from intervention (8 Q) c. Feasibility and Usability of program (6 Q) d. Acceptance of program (5 Q)
Assessment of the VR experience (tasks and equipment) Final	a. Cybersickness-related side effects (7 Q) b. Sense of Presence in virtual environment (10 Q) c. Enjoyment of/ Engagement in iVR tasks (5 Q) d. Ease of use (VR equipment, 8 Q)



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'Child ViReal Support' Intervention Program



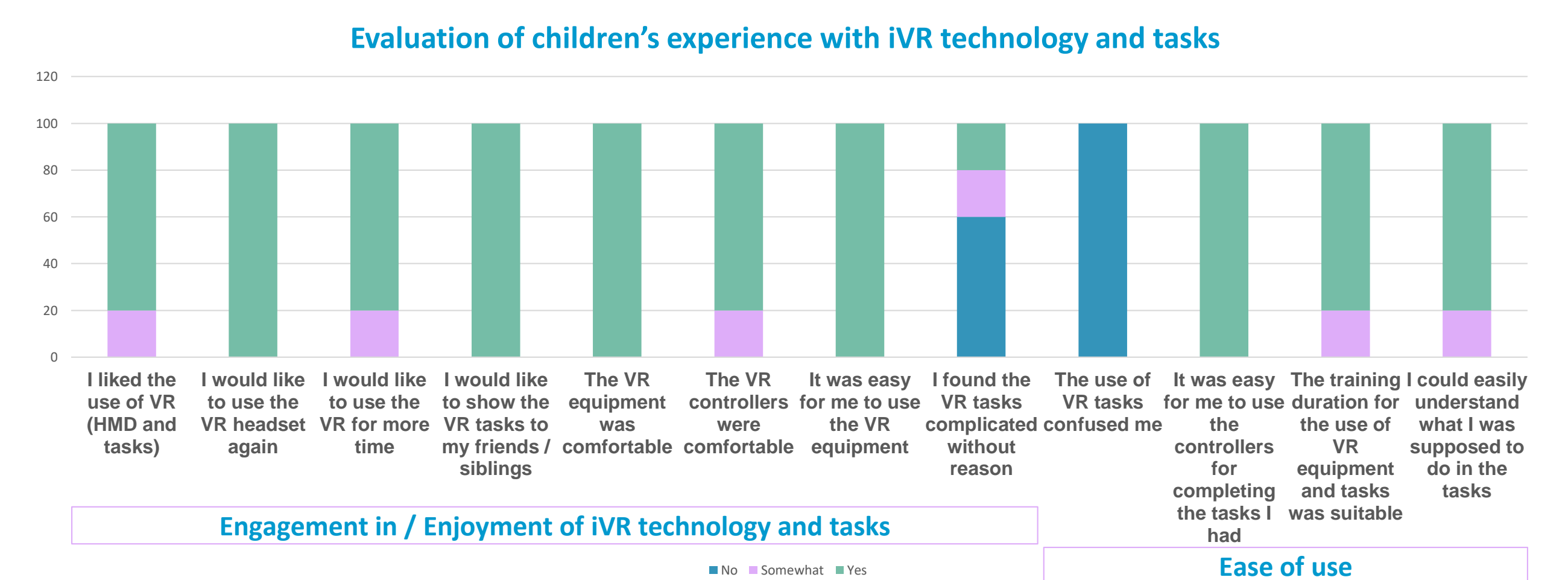
Evaluation of the Program		
	Mean	SD
iV_ Engagement/ Enjoyment	8.20	1.09
iVR_Sense of Presence	13.20	3.03
iVR_Usability	14.80	2.16
Relationship with Trainer	17.80	.447
Benefits from the program	23	2.23
Satisfaction from the program	38.80	4.60
Usability of the program	12.20	4.43
Acceptance of the program	19.40	1.34

None of the children presented cybersickness-related side effects

Some comments from children:

- "I really liked the sessions and the use of VR."
- "I wish I could continue coming even though the program is over."
- "I really liked the board games [part of the cbt material], our conversations and the VR tasks."

Results



Some preliminary results from primary and secondary measures:

- A trend of means' increase in:
 - Correct hits (Go/No-Go task)
 - Working memory and processing speed measures (from WISC-VR) and planning measure (Tower)
 - Children's Social and Emotional adequacy measures (Psychosocial Adjustment Test)
 - Parenting sense of competence (fathers and mothers)
- A trend of mean' decrease in:
 - Omission and commission error rates and reaction times for correct hits (Go/No-Go task)
 - Total Score and subscale scores of ADHD-RS (fathers and mothers)
 - Parenting stress (fathers and mothers)

Discussion

- Children rated iVR technology and tasks **positively** → they liked the iVR technology and tasks and some of them would like to use VR for longer time, while all would like to demonstrate the technology and tasks to their friends/siblings
- Based on trainer's and children's comments during the feasibility and acceptability study:
 - Changes in **audio, visual and mixed distractors** in virtual environment
 - Changes in iVR tasks → **addition of more levels for Go/No-Go task** (different images of Go/No-Go trials in each level) and **specific time of using VR for attention training** in every session
 - Changes in **some sessions' material** (e.g. session 4, session 8) and **addition of 1 more session**
- Innovative technologies **should be considered to be part of interventions** for children with attention deficits and support intervention programs
- **A RCT study is in progress** to examine the efficacy of this multimodal intervention program in cognitive and behavioral measures of children's attention, planning, psychosocial adjustment, parenting stress and parenting sense of competence

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