

Working memory training in children with MBID and neurodevelopmental disorders, the role of coaching

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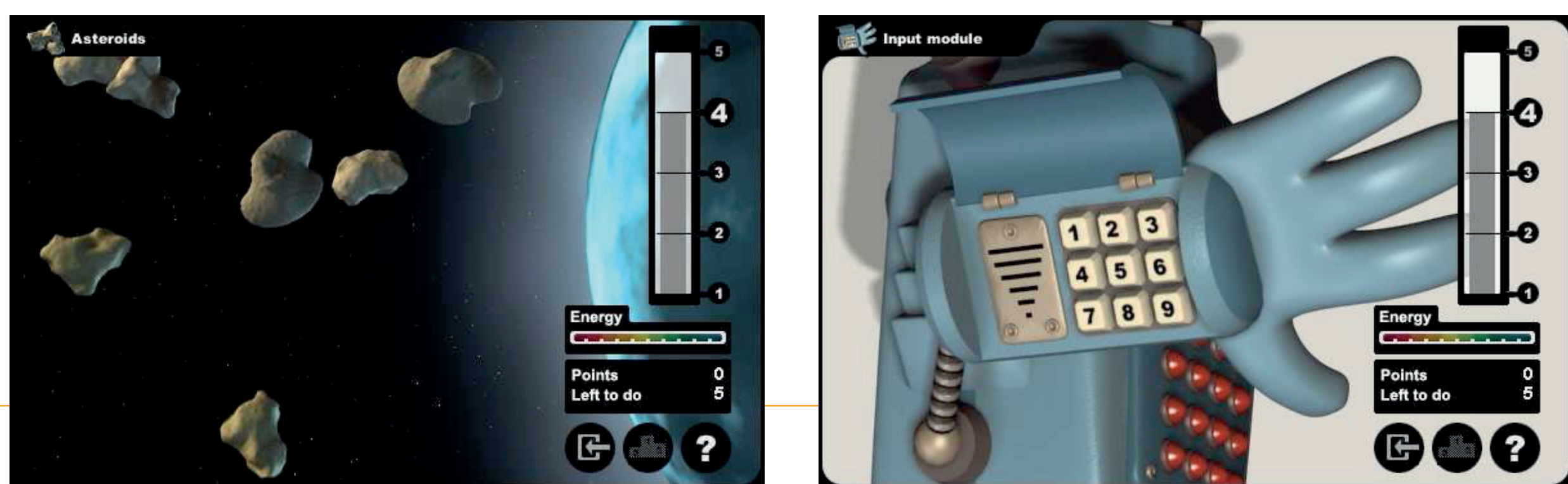
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Background

Working memory training (WMT) can offer therapeutic benefits to patients with neurodevelopmental disorders (NDD) and mild to borderline intellectual disability (MBID). However, consistent evidence for treatment benefits of WMT over placebo training is missing. So far, participants in double-blind research designs did receive non-specific coaching, whereas active coaching based on individual training results might increase the efficacy of WMT. Furthermore, the intensity and duration of WMT is often too stressful for these children.

Objective

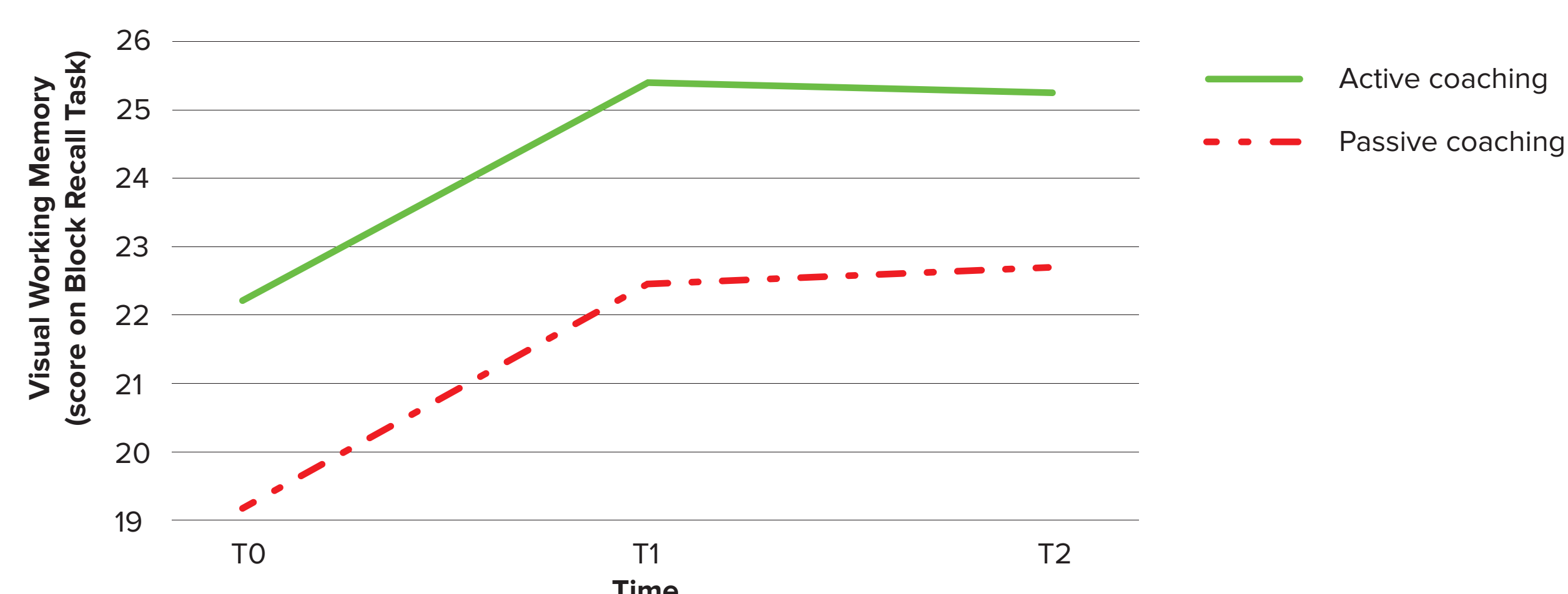
This study investigated whether a less intensive but more prolonged WMT, with active personalised coaching and feedback, would reduce behavioural symptoms and improve neurocognitive functioning and academic achievements in children with NDD and MBID.



Results

- The results did not show any differences between the effects of active, personalised coaching and feedback and general non-personalised coaching and no feedback on changes over time regarding the primary outcome measures (visual WM).
- No additional effects in favour of the active coaching group were found on changes over time regarding any of the secondary (verbal WM, sustained attention, response inhibition and goal-directed behaviour, arithmetic and reading) or tertiary (behavioural measures) outcomes.
- Results did show a main effect of time for several of the outcomes, suggesting an increase in performance for both groups, indicating that all children improved in working memory performance and other neurocognitive and academic outcomes.

Figure 1: Effect of Coaching on Visual Working Memory over Time



Note. Changes over time regarding visual working memory (measured with the Block Recall Task) are shown for both conditions.

Method

Participants

40 Children aged 10;0-13;11 (mean 11.3 ±1.1 SD) with MBID (mean IQ 71.3 ± 7.8 SD) and ADHD and/or ASD.

Design

A double-blind randomised controlled trial

Intervention

A less intensive but prolonged version of The original Dutch version of the Cogmed WMT (version R/M; Klingberg et al., 2002); 30 min a day, 4 days a week, 8 weeks in total. Difficulty level adjusts automatically to match the WM span of the child.

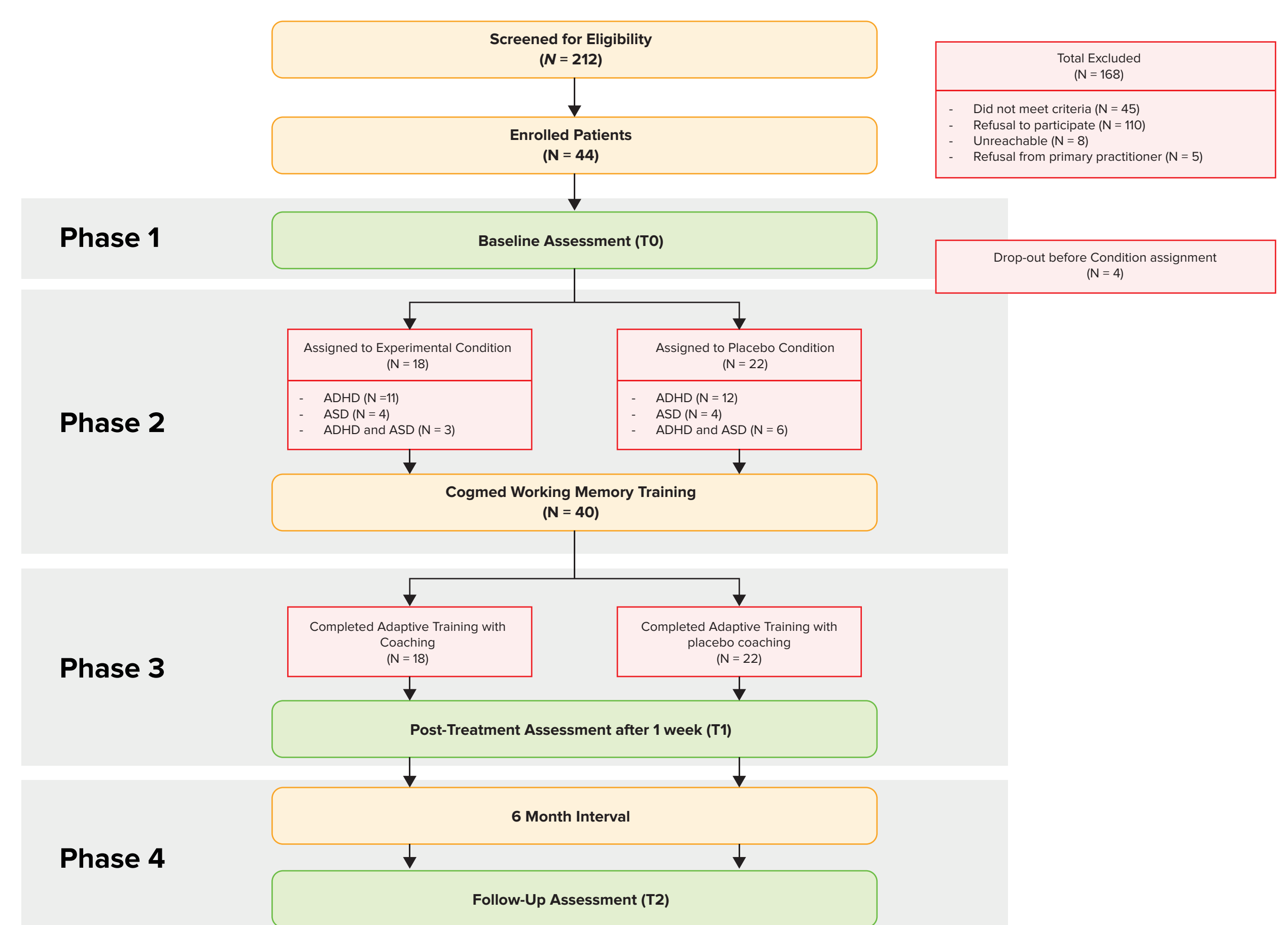
Condition 1: active, personalised coaching and feedback, based on their actual individual performance during training.

Condition 2: general non-personalised coaching for the same amount of time.

Measures

Executive functioning, academic achievements and several behavioural measurements were administered, before- and after training, with a 6 months follow-up.

Figure 1: Study flow chart



Note: ADHD, attention-deficit hyperactivity disorder; ASD, autism spectrum disorder.

Discussion

This study was unable to document superior effects of active personalised coaching and feedback compared to general non-personalised coaching and no feedback in an adaptive WMT in children with MBID and NDD. The objectively documented changes over time suggest that for these vulnerable children a regular, structured and structural contact with a coach and adapted exercises is enough to develop therapy fidelity, boost motivation and improve neurodevelopmental task performance. Further research is needed to examine which possible subgroups within this heterogenic group of children profit more from WMT compared to other subgroups.

References

- Klingberg T., Fernell E., Olesen P.J., Johnson M., Gustafsson P. & Dahlström K. et al. (2005). Computerized training of working memory in children with ADHD: a randomized, controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry*, 44(2), 177-186. <https://doi.org/10.1097/00004583-200502000-00010>
- Roording-Ragetlie S., Klip H., Buitelaar J., Slaats-Willemse D. (2017). Working memory training in children with neuropsychiatric disorders and mild to borderline intellectual functioning, the role of coaching; a double-blind randomized controlled trial (study protocol). *BMC Psychiatry* 17:114.