

# AI-Augmented Cognitive Rehabilitation For People with Dementia And Mild Cognitive Impairment: Findings From A Clinical Case Series

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## Introduction:

Structured cognitive interventions can improve cognitive and everyday outcomes for people living with or at risk of dementia<sup>1,2</sup>, yet their reach is limited by cost, clinician availability, and how often they can realistically be delivered<sup>3</sup>. Conversational AI opens opportunities to deliver cognitive interventions in a frequent, scalable, and personalized way, while treatment sessions with a trained human clinician provide a therapeutic context. We combined the two and examined preliminary outcomes in 24 patients treated under clinical supervision.

## Methods:

Twenty-four patients (12 dementia, 11 mild cognitive impairment, 1 other cognitive symptoms not-classified) (9 males; Mean age: 77.7, SD=10.9, Mean education:16.0, SD=2.7) have been treated with the NewDays blended intervention approach and have undergone evaluations at baseline and at 3-12 months. Assessments were delivered via telehealth and included measures of global cognition (ACE-III), verbal memory (WMS-IV Logical Memory I & II), metamemory (MMQ Satisfaction and Ability), depression (GDS-15), and anxiety (GAI). For patients with dementia, expected change in ACE-III Total scores without treatment was estimated based on Martyr et al. 2024<sup>4</sup>. To address personalised goals, patients were seen via telehealth by trained clinicians every two weeks while cognitive stimulation and training exercises were delivered daily through conversational AI.

## Results:

During the study period (a mean of 215 days apart, SD = 99; range 95–392), patients completed on average 14.8 therapy sessions (SD= 5.4) over telehealth with a trained clinician and engaged in 60-120 minutes per week with the AI-assistant. Relative to baseline scores on the ACE-III (Mean= 70.25, SD = 15.39), patients' cognitive performance following treatment (Mean = 74.50, SD=15.89) significantly improved ( $t(23) = 4.20$ ,  $p < 0.001$ ,  $d=0.86$ , **Figure 1**). Against the published no-treatment trajectory (a 5.45-points/year decline specific to dementia), the expected change over the mean of 245 days (SD=99) for the 12 dementia patients was a decline of -3.66 points (SD=1.47). This subgroup therefore exceeded its expected trajectory by +8.24 points (SD = 3.96; 95% CI +5.72 to +10.76), a large and significant effect ( $t(11) = 7.21$ ,  $p < 0.001$ ,  $d= 2.08$ ). All 12 patients with dementia performed better at follow-up relative to the expected trajectory without treatment (**Figure 2**).

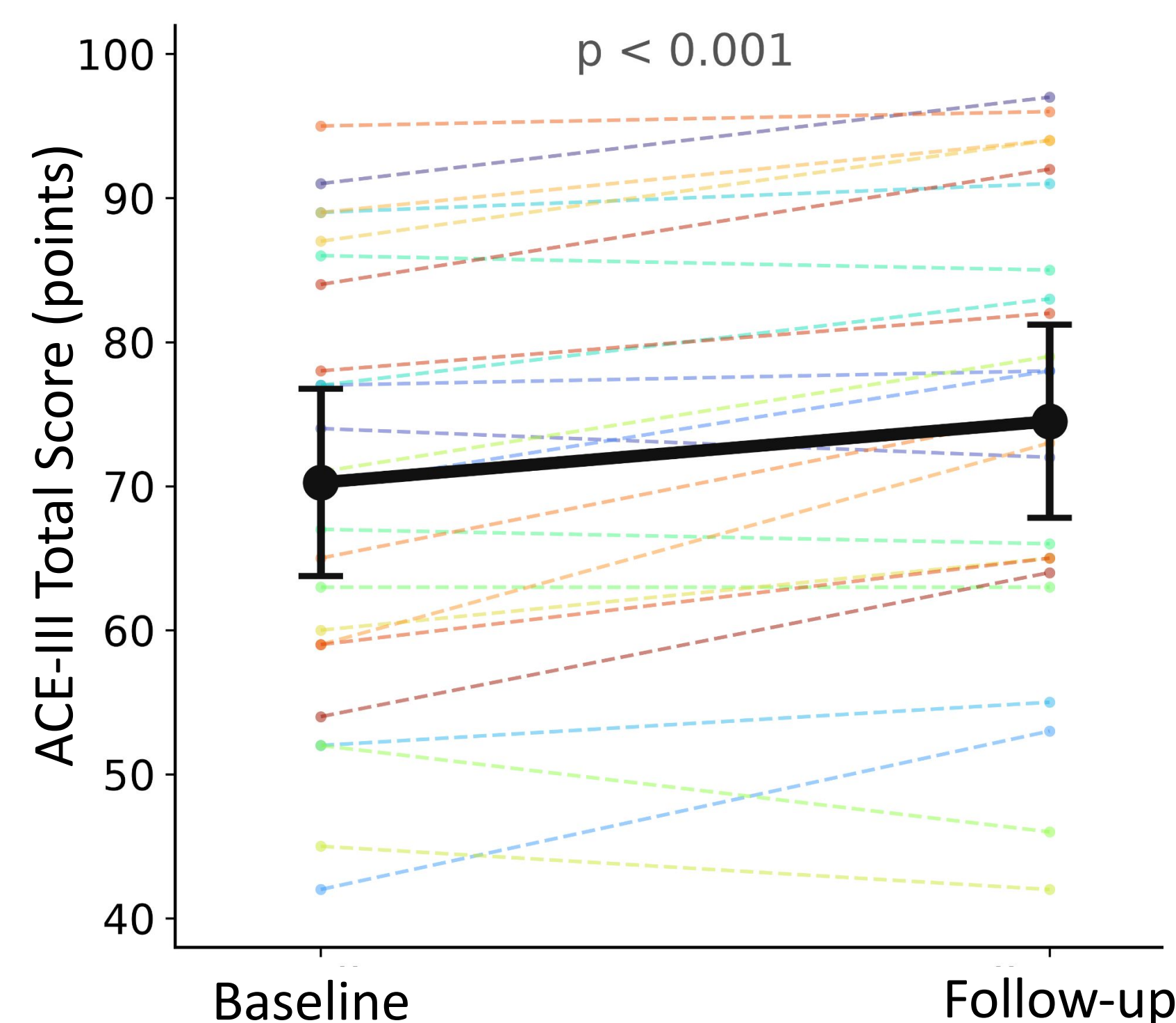


**Figure 1:** Change in global cognition (ACE-III Total Score, 0–100) from baseline to follow-up. 18 of 24 patients improved (mean +4.25 points;  $t(23) = 4.20$ ,  $p < 0.001$ ). Each thin line is an individual patient; the bold line shows the group mean  $\pm$  95% CI.

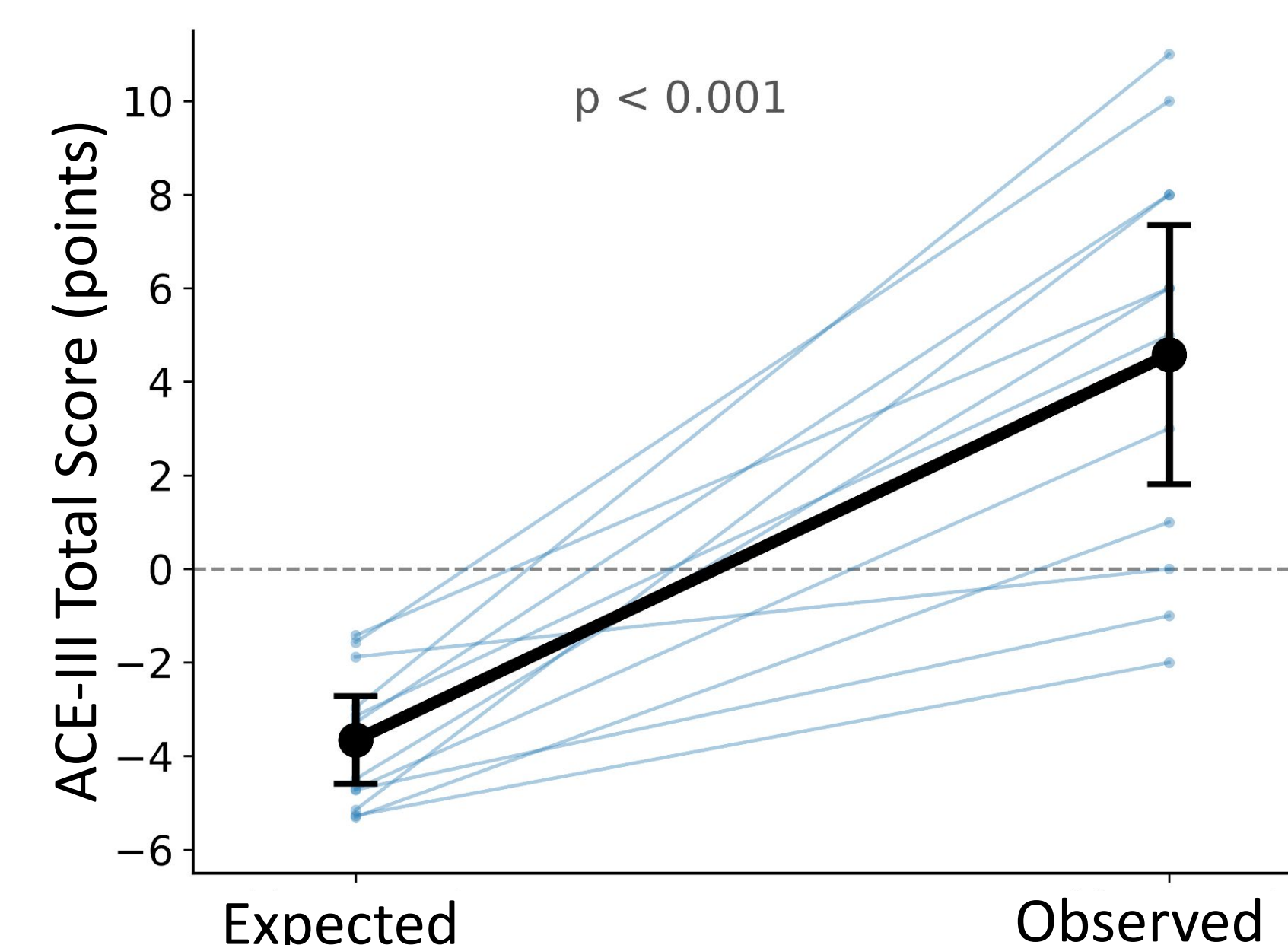


**Figure 2:** Observed (treated) versus expected no-treatment ACE-III change in the dementia subgroup (N = 12). The treated group improved by +4.58 points while the modeled no-treatment change was -3.66 points, exceeding expectation by +8.24 points ( $p < 0.001$ ), so about 1.5 years of cognitive function was preserved. All 12 dementia patients beat their expected trajectory.

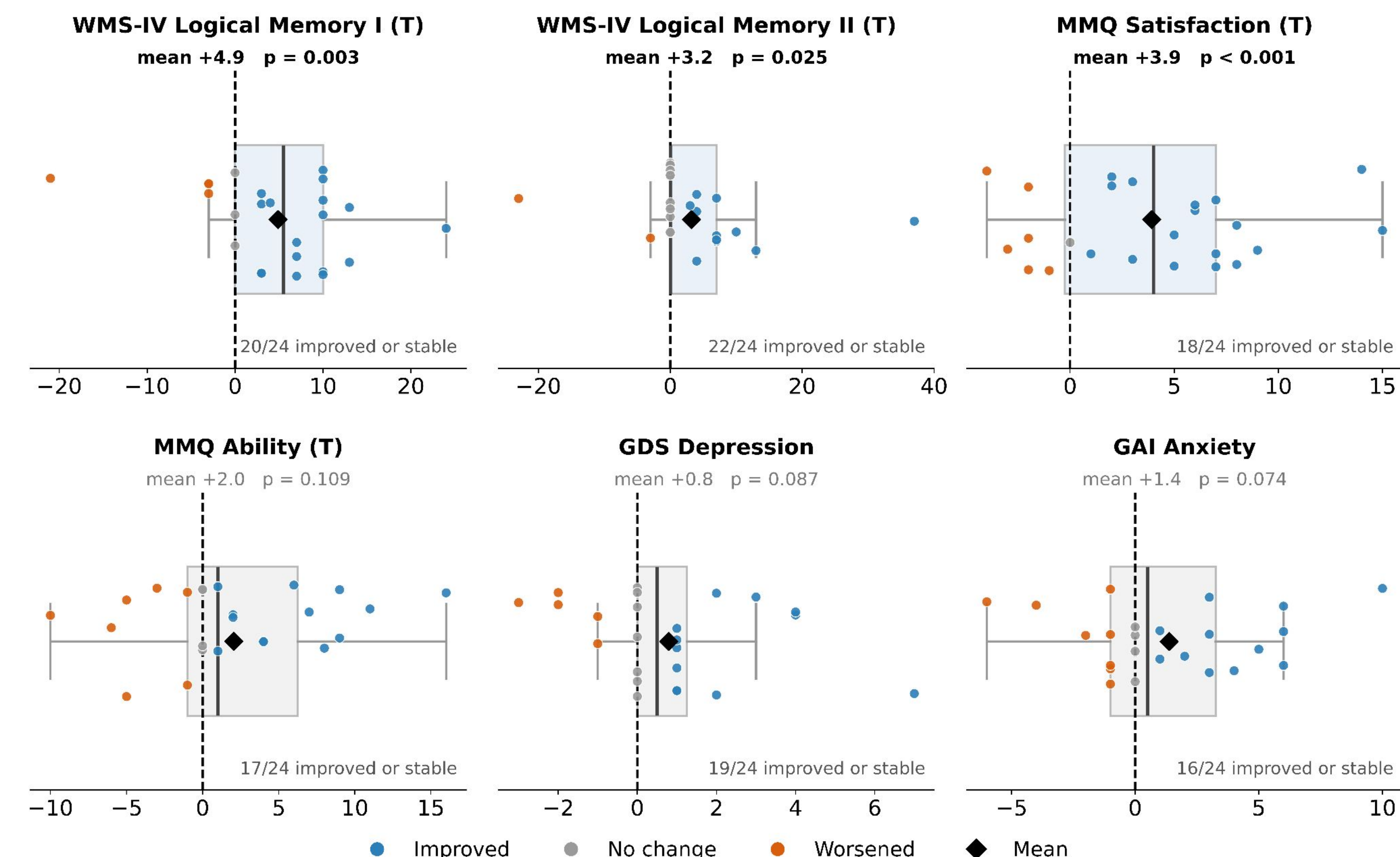


**Figure 3:** Distribution of per-patient change on the secondary measures (N = 24). Significance was tested per measure by its distribution (paired t-test, or Wilcoxon signed-rank for the non-normal Logical Memory measures). Verbal memory (Logical Memory I & II) and MMQ Satisfaction improved significantly ( $p = 0.003$ ,  $0.025$ ,  $< 0.001$ ), while depression (GDS-15,  $p = 0.087$ ) and anxiety (GAI,  $p = 0.074$ ) trended toward improvement without reaching significance.

## Discussion:

In this case series, a blended model combining daily conversational-AI cognitive stimulation, training and rehabilitation paired with biweekly clinician-led telehealth rehabilitation was feasible in older adults with cognitive impairment, and was accompanied by gains beyond what is typically seen in this population. Rather than the decline expected over the observation period, global cognition improved on average. Among patients with dementia, this gain was equivalent to roughly 1.5 years of cognitive function relative to the published no-treatment trajectory. Gains were also seen on measures of verbal episodic memory and self-reported memory functioning, while changes in measures of mood trended favorably.

These results are consistent with cognition-oriented treatment models, in which sustained, personalized, goal-directed engagement shapes both measured performance and subjective experience. While the small sample size, lack of a control condition, and limited follow-up preclude definitive causal inference, these findings provide a signal that AI-augmented approaches may help address longstanding barriers to the access, intensity, and scalability of evidence-based cognitive interventions. A randomised controlled trial (NCT07474038) currently underway will provide critical insights regarding a range of efficacy measures and moderators of treatment response.

## References

1. Bahar-Fuchs et al. (2019). Cochrane Database Syst Rev. 2. Gavelin et al. (2020). Neuropsychol Rev.
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