

Multi-domain Digital Endpoints For Decentralized Alzheimer’s Trials: Experience From The CNS-101 Study (NeuLogiq®)

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UNIVERSITY OF
CAMBRIDGE

James B Rowe¹, Laura Rueda-Delgado², Florentine Barbey², Alison Buick³, John Dyer³, Hugh Nolan³, Brian Murphy².
¹University of Cambridge, UK, ²Cumulus Neuroscience Ltd, Dublin, Ireland, ³Cumulus Neuroscience Ltd, Belfast, UK.



As clinical trials move earlier in disease, new methods for tracking functional progression are required. Multimodal assessments allow us quantify core aspects of disease (eg. memory impairment) and broader drivers of quality of life (e.g. speech, sleep). EEG provides objective measures of AD pathophysiology (e.g. hyperactivity or changes in connectivity). For such new methods to scale to later phase clinical trials, and take advantage of repeated sampling, they need to be easy to deploy, and used consistently by patients in non-clinic settings. CNS101 evaluated the feasibility of this approach, and the comparative power of resulting endpoints to detect cross-sectional differences, and longitudinal change.

Methods

We compared NeuLogiq’s at-home digital tools to standard endpoints for AD trials (e.g. ADAS-Cog).

We recruited people with mild AD-dementia (n=59, 60<ACE-III≤88) and controls (n=60, ACE-III>88) at 7 sites in the UK.

NeuLogiq sessions were repeated in 23x3-day bursts over 12months, lasting ~25 minutes on a mobile tablet (total 8 assessments). Home-based EEG was recorded on all sessions. ADAS-Cog13 was collected at 0, 6, 12months.

Progression was modelled with linear mixed-effects to estimate group-by-time interactions. With high retention rates for NeuLogiq, and high sensitivity, we estimated cost- and time-saving projections for clinical trials.

Results

Patients were typical of early AD-dementia, with elevated pTau217, GFAP and ADASCog13, and reduced ACE-II and memory. Adherence was high (Figure 2, ~80% across months 3-12), despite variation in prior use of technologies. Both cognitive (e.g. psychomotor speed, associative memory) and EEG markers (e.g. alpha, beta coherence) from NeuLogiq demonstrated sensitivity to disease and progression (Figure 3). At-home digital endpoints provided higher statistical power than ADAS-Cog (Figure 4). NeuLogiq scores were sensitive to pTau217 status in patients and control groups (Figure 5). Compared to ADAS-Cog13, using NeuLogiq would enable leaner trial designs by reducing sample size, cost and study duration.

Descriptive	Controls N=60	Dementia N=59
Male:female	29:31	37:22
Age	71.2	73.8
pTau-217 (pg/mL)	0.51	0.88
GFAP (pg/mL)	118.97	161.82
NfL (pg/mL)	19.60	24.59
ADASCOG	8.88	25.07
NART	41.4	36.20
ACE III	94.85	77.59
V paired assoc [†]	26.35	12.20
GDS	1.09	3.50

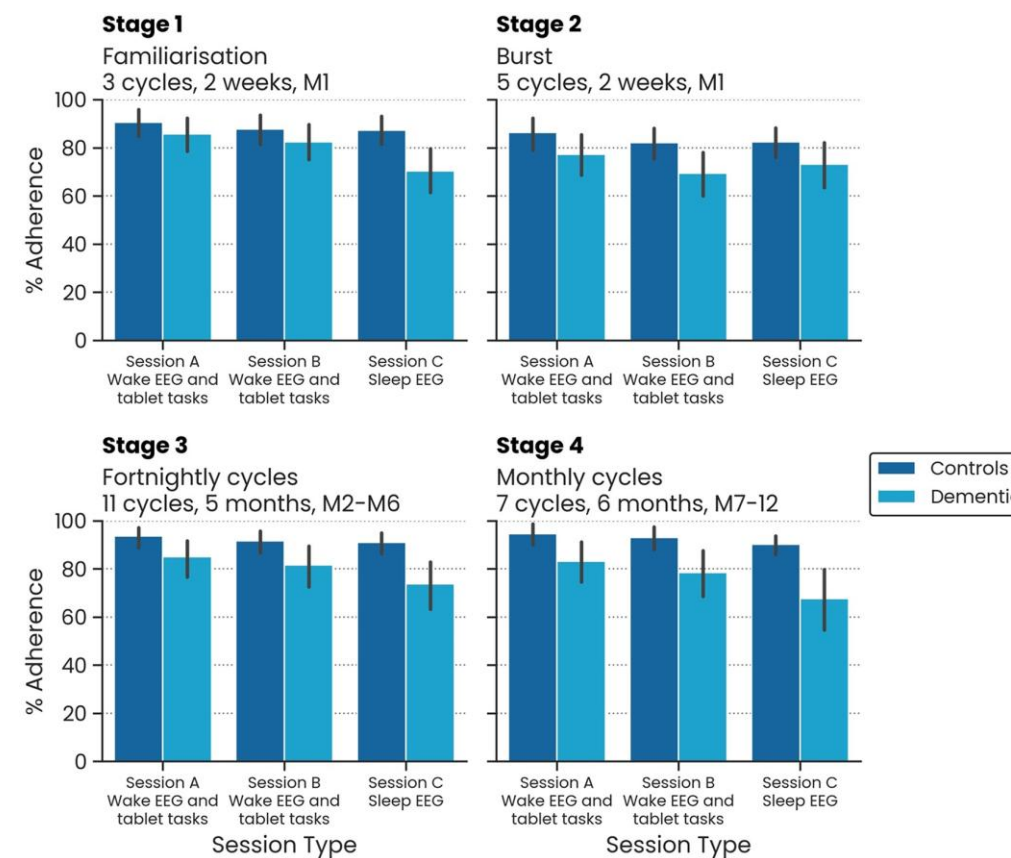


Figure 2. Adherence by stage, session type, and group
Error bars 95% CI. Taken from Diggin et al. (2026).

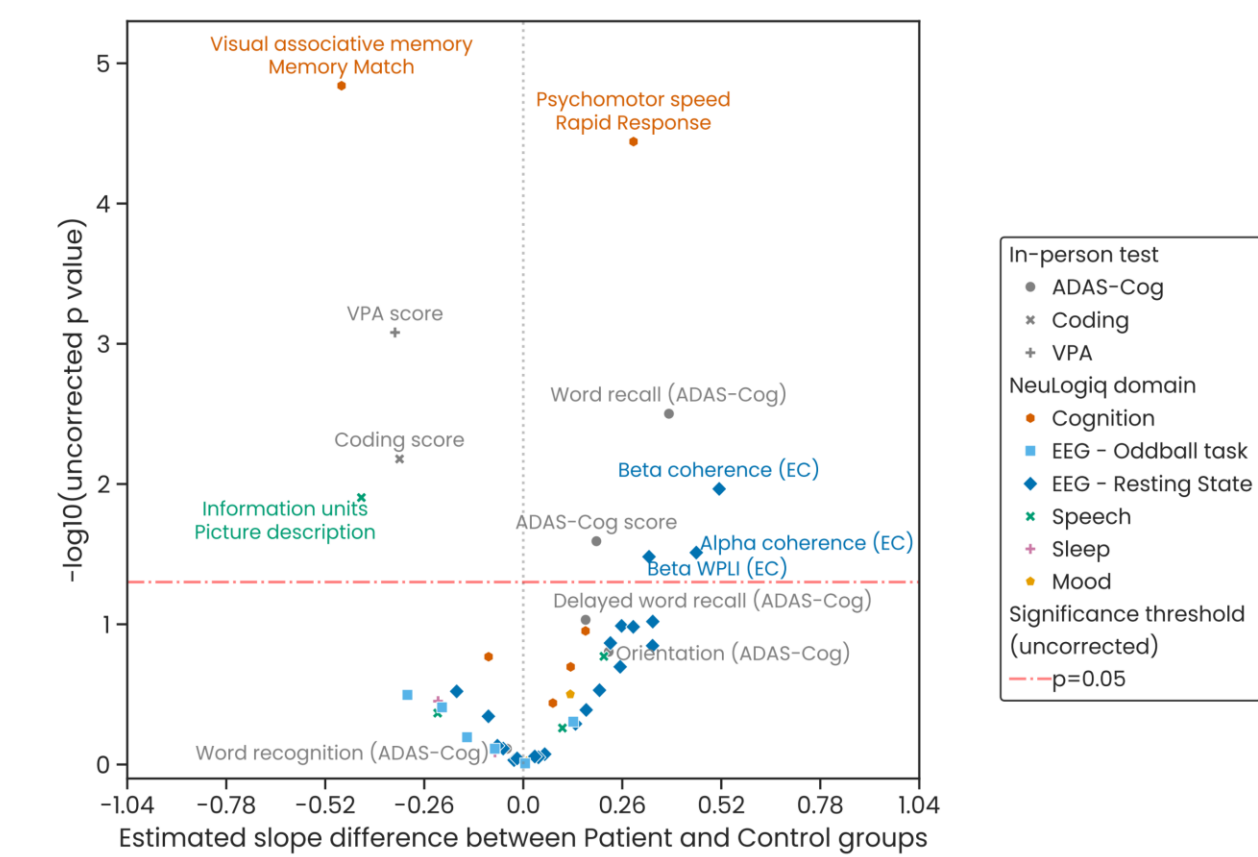


Figure 3. Volcano plot of group-x-time interactions, in LMM, showing increased effect size and power to detect change (in AD vs controls).

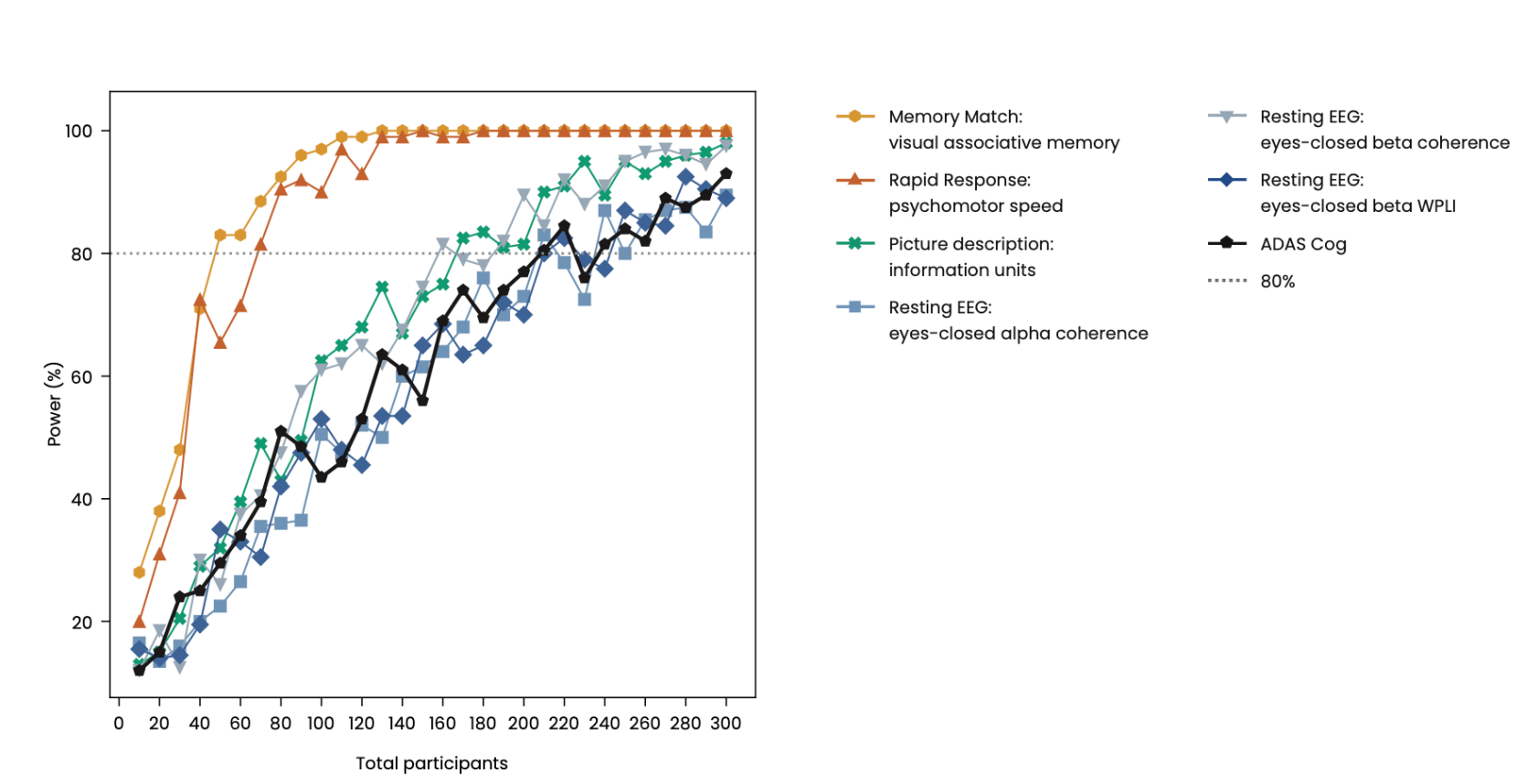


Figure 4. The use of NeuLogiq cognitive and EEG measures as longitudinal change outcomes increases power relative to ADAS-Cog

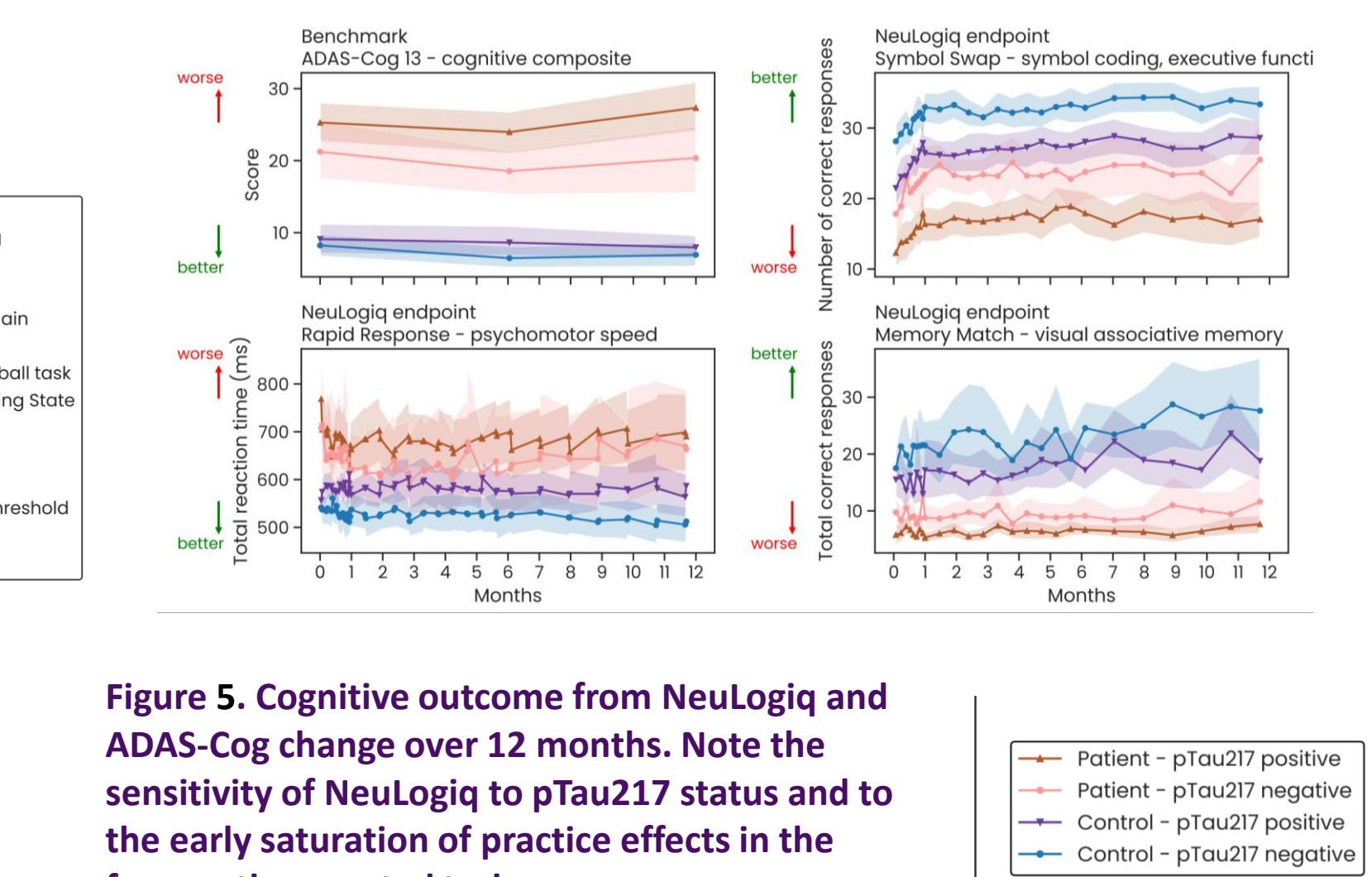


Figure 5. Cognitive outcome from NeuLogiq and ADAS-Cog change over 12 months. Note the sensitivity of NeuLogiq to pTau217 status and to the early saturation of practice effects in the frequently repeated tasks.

Conclusion

The CNS-101 study demonstrates the potential for home-based digital cognitive endpoints for Alzheimer’s clinical trials.

NeuLogiq’s cognitive tests showed greater sensitivity to change than ADAS-Cog 13.

Passive EEG markers are similarly in sensitivity to ADAS-Cog13, while being shorter and providing pathophysiological insights.

NeuLogiq’s cognitive measures were also sensitive to the biological severity of AD as indicated by pTau217.

Both cognitive and EEG assessments were well tolerated, and their sensitivity could enable smaller, more efficient trials - reducing patient burden, time and cost.

References

Diggin S, et al. (2026) A real-world feasibility study: at home longitudinal use of the Cumulus NeuLogiq® platform for electrophysiological and neurocognitive measures in patients with mild Alzheimer's Disease dementia. Front. Digit. Health 8:1840966. doi: 10.3389/fdgth.2026.1840966

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