

# Assessing Technology Use in Aphasia

Examining levels of technology use in individuals with severe aphasia using a novel & accessible technology questionnaire

## What is Aphasia?

Aphasia is a language disorder which occurs in approximately one third of people who have strokes. Aphasia affects language comprehension and production. Severe cases can virtually eliminate speech, understanding, reading and writing.

## Aphasia and Technology

People with aphasia commonly report difficulties in accessing technology – even for technologies they have made regular and confident use of prior to their stroke.

## Previous Research

There is no previous research into technology use in people with aphasia. However, research with the wider population has shown that:

- People in the typical stroke age range (aged 60 – 91) use technology less than their younger counterparts (aged 18 – 59)<sup>1</sup>
- Poor cognitive skills, e.g. in working memory, visualisation and inference making, are associated with reduced technology use<sup>1</sup>
- 30% of people with disabilities have never used the internet<sup>2</sup>

## Aphasia Accessible Technology Questionnaire

Previous technology use measures<sup>1,2</sup> rely upon relatively complex written and/or verbal material - precluding access to users with aphasia.

The current study reports a novel and accessible technology use questionnaire:

- Developed for individuals with severe aphasia – even those with very limited understanding of spoken or written language, and little or no ability to produce spoken language.
- Comprises 18 items presented via picture and simple text label, one page at a time (figure 1).
- Administered by a speech and language therapist
- Separate score sheet for results - completed by the speech and language therapist.
- Participants receive a composite score of up to 18 points – with one point awarded for each item they report using.
- Composite score reflects two subtotals of 9 non-computer items 9 computer items.

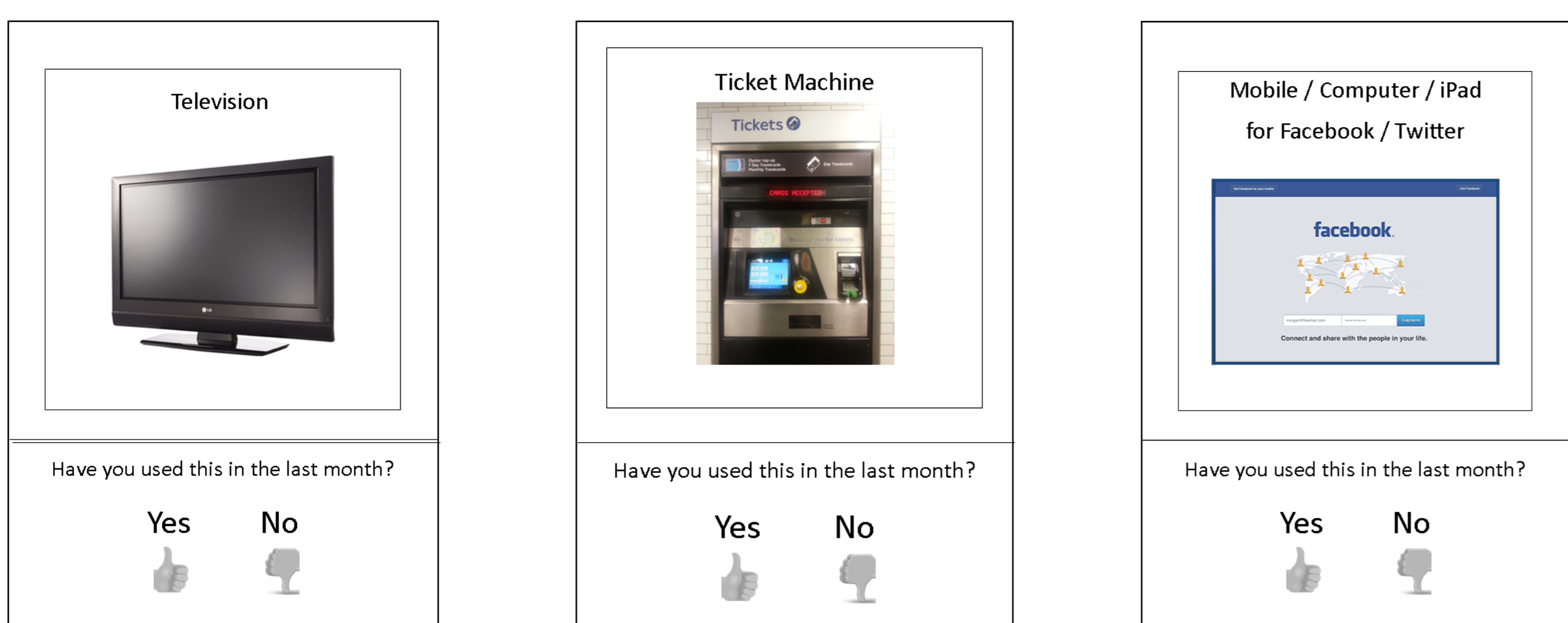


Figure 1. Aphasia Accessible Technology Questionnaire

## Methods

The questionnaire has so far been completed by 16 adults with severe aphasia. It is being used with the same group to capture change in technology use over time and following completion of a specialised program of computer gesture therapy<sup>3</sup>. All participants have additionally complete assessments of visuospatial cognition, limb praxis and tests of single word reading comprehension.

## Participants

16 Participants (6 female).

Average age: 67 years (range 46 to 87).

In formal language assessments, all participants demonstrate severe difficulties with spoken language output and varying levels of difficulty with spoken and written language comprehension. On tests of visuospatial cognition, 8 participants demonstrate severe impairment and 2 demonstrate moderate impairment. The remaining participants demonstrate mild to no impairment.

## Number of participants with severe aphasia reporting use of given technology (out of 16)

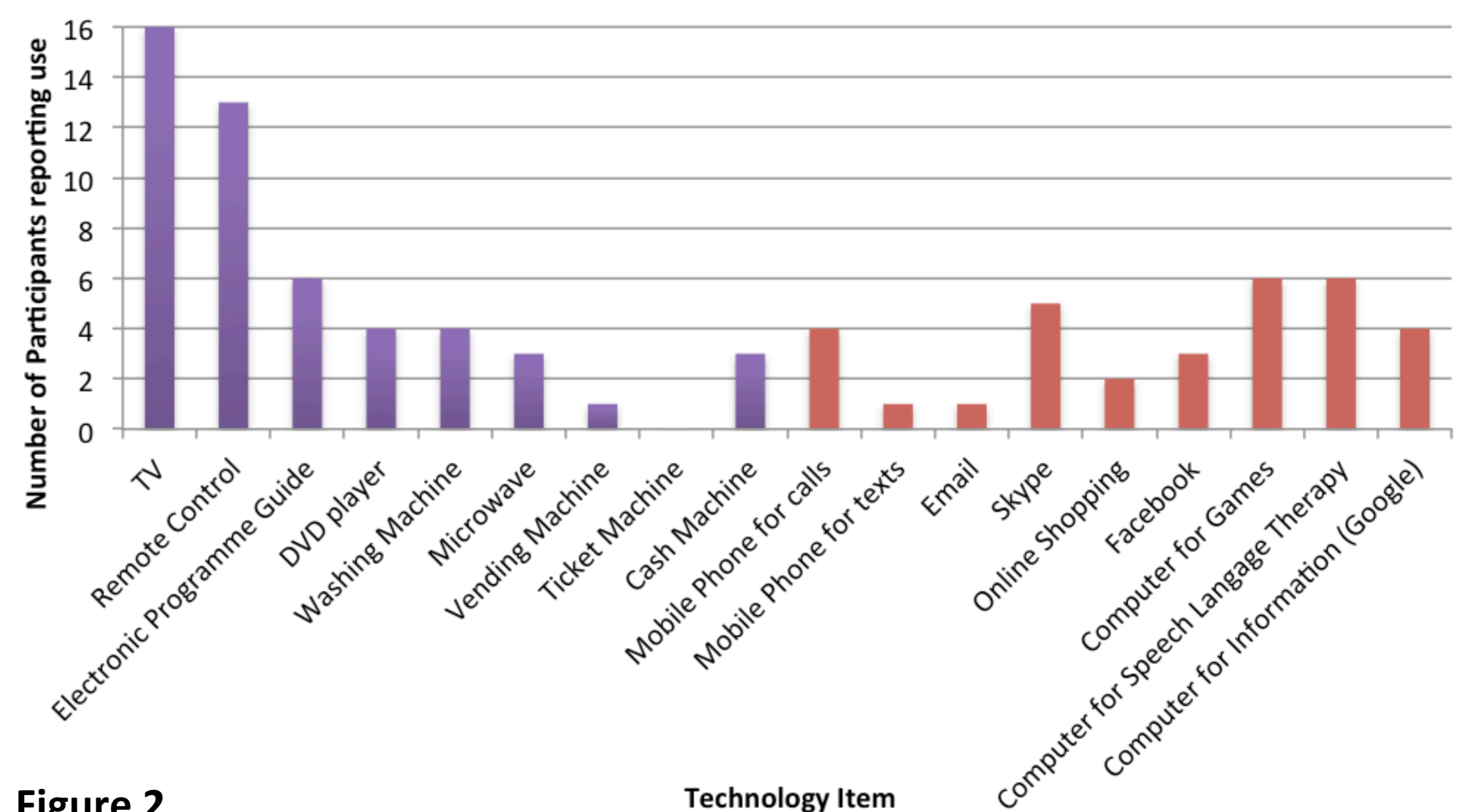


Figure 2

## Results

### Reported levels of Technology Use

Average score (of 18) = 5.33 (range 1 – 14).

A t test confirms that across all participants computer-based technologies are used less than non-computer technologies ( $p < 0.05$ ). No correlation was found between the reported amounts of technology used and formal measurements of limb praxis, visuospatial cognition / executive function, levels of written word comprehension or age.

### Change in Technology Use over Time

A subgroup of 12 participants repeated the technology use questionnaire after 5 weeks – 8 had undergone computer-delivered therapy in this time and 4 received no intervention. There was a significant improvement in technology-use scores over time for all 12 participants ( $F = 6.15 (1, 10), p < .05$ ) and all participants scored more highly in their use of non-computer technology (the first 9 items listed as purple bars in figure 2), than their use of computer technology. There was no difference between the therapy group and the non-therapy group.

## Change in Technology Use Scores over Time

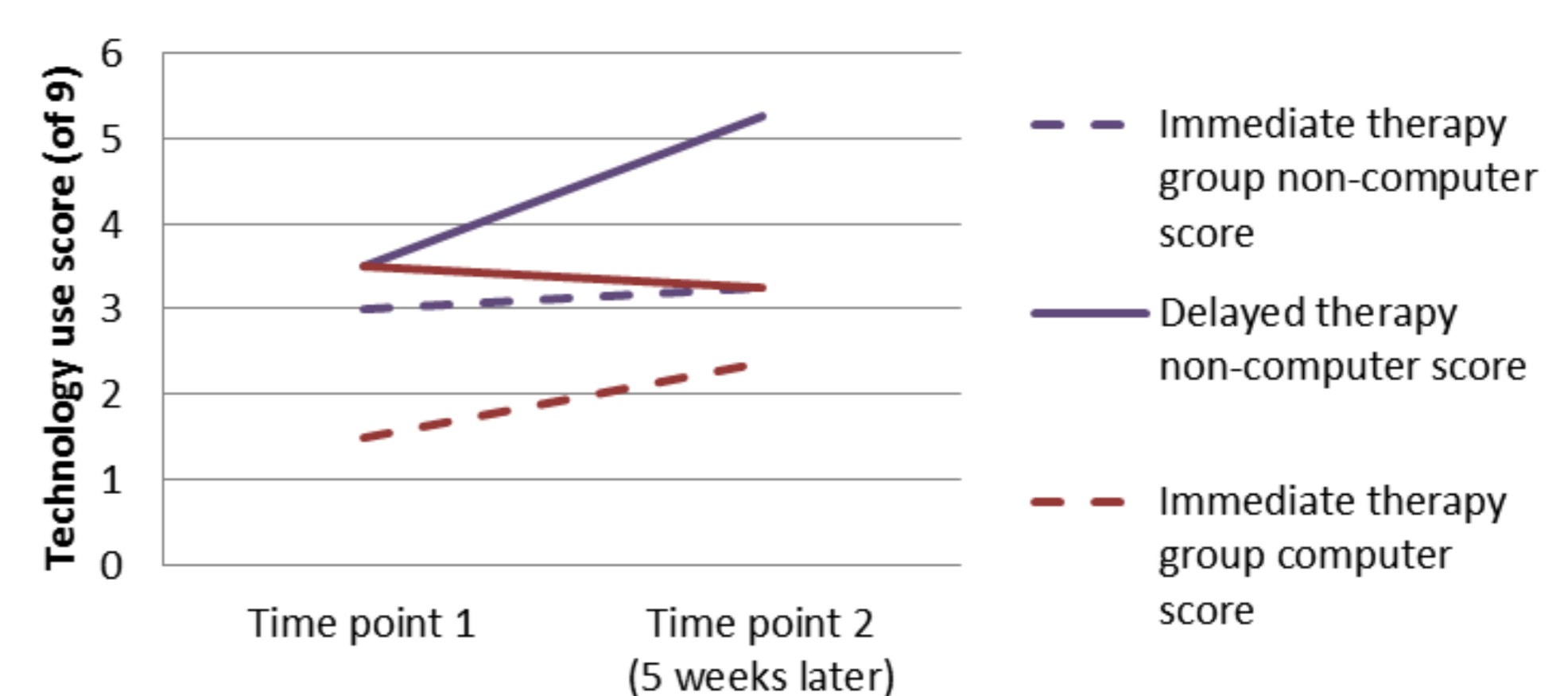


Figure 3

## Discussion

Outcomes suggest relatively low levels of technology use overall for individuals with severe aphasia (5.33 of 18) with non-computer technology being more widely used than computer-technology. No link was found between levels of technology use and measures of non-linguistic cognition. No effect of computer therapy on general technology use was demonstrated. Future comparisons between outcomes for individuals with aphasia vs. individuals with stroke and no aphasia will shed light on related factors of age and disability.

## References

- [1] Czaja, S. J., Charness, N., Fisk, A. D., Hertzog, C., Nair, S. N., Rogers, W. A., & Sharit, J. 2006. Factors predicting the use of technology: findings from the Center for Research and Education on Aging and Technology Enhancement (CREATE). *Psychology and aging*, 21(2), 333.
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- [3] Marshall, J., Roper, A., Galliers, J., Wilson, S., Cocks, N., Muscroft, S., & Pring, T. 2013. Computer delivery of gesture therapy for people with severe aphasia. *Aphasiology* 27, (9): 1128-1146.

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