
This is the accepted version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: http://openaccess.city.ac.uk/19806/

Link to published version: http://dx.doi.org/10.1159/000471872

Copyright and reuse: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.
Aphasia (or dysphasia) is used to describe the acquired language condition that is caused by left hemisphere brain injury. Aphasia may persist as a chronic disability, and presents in around one third of stroke cases. Writing skills may be selectively or co-morbidly impaired in aphasia.

Traditional approaches to writing impairments (or dysgraphia) for people with aphasia seen in the literature largely focus on single word spelling practice as therapy and single word spelling tests as the primary assessment (e.g. Rayner et al., 2010; Beeson, Higgenon & Riga, 2013; Tsapkini & Hills, 2013). Recently, rehabilitation has begun to integrate technology into these interventions (such as software that guides an individual through spelling exercises e.g. Step-by-Step (Mortley, Wride & Edensor, 2006)).

Despite their rigour and effectiveness, single-word approaches to writing therapy and assessment (with or without technology) may be challenged in terms of their contribution to an individual’s activity and participation, two health-related domains defined in the World Health Organization’s (WHO) International Classification of Functioning, Disability and Health Framework (ICF) (WHO, 2007). These domains are major aspects of health-related quality of life (HRQoL) which is repeatedly reported to reduce for people with aphasia (e.g. Håler & Byng, 2009). People with aphasia may experience barriers to many aspects of activity and participation when their writing skills are impaired. The writing skills required for good functioning in these domains are referred to as functional writing.

As yet, there does not appear to be an established tool to measure functional writing of people with aphasia, though those for functional verbal communication are increasingly used in practice. While some case studies on participants using technology for functional writing have been published, there is little large scale research. This paper presents findings addressing these two key issues.

**What this study contributes:**
1. Evaluate efficacy of functional writing therapy using technology for a group of people with aphasia.

---

**Methodology**

**Design**

Within subjects, repeated measures design involving participants with aphasia after stroke (findings presented n=10).

**Therapy**

Therapy involved use of 2 main-stream writing technologies on iPads and laptops:

- **Dragon Naturally Speaking**
- **Write Online Simple**

Participants received 12 hours of therapy over 6 weeks with a Speech and Language Therapist in addition to technology training sessions. Participants were loaned devices in order for them to practice writing at home.

**Results**

**Handwritten**

There was no significant difference in scores of social validity across the different time points (Friedman χ² (2) = 0.8; p=0.67(ns)). There was a general trend that scores increase post-therapy, with these scores being the highest [median(IQR)= 6.75(2.81)], surprisingly followed by pre-therapy scores [5.84(1.45), with follow up scores being the lowest [5.64(4.06)].

**Technology Assisted Writing**

1. Statistically significant differences between pre and post-therapy social validity measures of writing when using technology suggests this therapy approach may act as a beneficial compensatory approach for writing impairments in aphasia.
2. However, this change was not maintained at 6 weeks follow up indicating further research could be done into strategies to promote preservation of skills.
3. There was not a significant improvement in handwritten scores, suggesting that it may not act as a remedial therapy approach, i.e. no generalisation to handwriting skills. There was however a trend that handwriting improved after therapy, though this was not significant.
4. Therapy of this nature may improve the ability of people with aphasia to complete functional writing tasks such as writing emails.
5. This in turn may reduce the barriers to activity and participation in daily life for people with writing impairments in aphasia.

**References**


Copyright ©Katie Chadd (2017), City, University of London katie.chadd@city.ac.uk

---

**Keywords:**

Aphasia

Writing

Technology

Assessment

Therapy

Speech and Language

**Figure 2:**

There was no significant difference in scores of social validity across the different time points (Friedman χ² (2) = 0.8; p=0.67(ns)). There was a general trend that scores increase post-therapy, with these scores being the highest [median(IQR)= 6.75(2.81)], surprisingly followed by pre-therapy scores [5.84(1.45), with follow up scores being the lowest [5.64(4.06)].