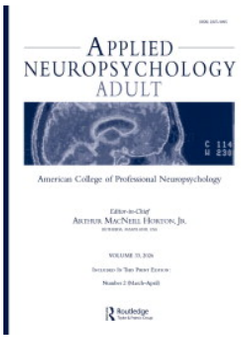

Applied Neuropsychology: Adult

ISSN: 2327-9095 (Print) 2327-9109 (Online) Journal homepage: www.tandfonline.com/journals/hapn21

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To cite this article: Berzan Cetinkaya, Katherine E. Twomey, Mark Jayes & Paul Conroy (15 Jun 2026): Further development and evaluation of the TALES (technology and literacy engagement after stroke) programme with stroke survivors with chronic aphasia: A mixed-methods case series study, Applied Neuropsychology: Adult, DOI: 10.1080/23279095.2026.2688403

To link to this article: https://doi.org/10.1080/23279095.2026.2688403

APPLIED NEUROPSYCHOLOGY: ADULT
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Further development and evaluation of the TALES (technology and literacy engagement after stroke) programme with stroke survivors with chronic aphasia: A mixed-methods case series study

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ABSTRACT

Aims: Having previously reported a case-series study indicating early-stage efficacy, this follow-up evaluation aimed to include treatment modifications, a wider range of people with aphasia in terms of baseline severity and incorporate qualitative feedback as to participants' perceptions of the treatment.

Methods: A mixed-methods case series study was conducted with six participants with varying severities of aphasia who were recruited to take part in an 8-week TALES programme. The intervention involved weekly online group sessions, a weekly one-to-one supported online training session, and independent practice using the Cuespeak therapy software. Outcome measures, including the Western Aphasia Battery-Revised (WAB-R), subtests from the Psycholinguistic Assessments of Language Processing in Aphasia (PALPA), and the Communication Outcomes After Stroke (COAST) scale, were administered pretreatment, post-treatment, and at a 12-week follow-up. Semi-structured interviews were conducted with participants to explore their experiences and perceptions of the programme and these data analyzed utilizing content analysis.

Results: Overall, significant improvements were observed in language function, reading and spelling skills, and communication confidence across the cohort, though some challenges to engagement were noted which may have related to greater aphasia severity. Qualitative analysis identified themes of perceived programme value and benefits, including skills application.

Conclusions: This study provided a clear Phase 1 signal of efficacy in improving language function and communication confidence for this variant of the TALES programme. Pooled results from two studies illustrate individual variation in outcomes across the mild-to-moderate severity range represented in this sample. Participant perceptions supported this use of telehealth with aphasia therapy.

KEYWORDS

Aphasia; confidence; reading; stroke; technology; telerehabilitation; writing

Introduction

People with aphasia (PWA) frequently experience difficulties with literacy (reading and writing), known as alexia and agraphia (Cetinkaya, 2024; Johansson-Malmeling et al., 2021; Kjellén et al., 2017). For PWA with substantially recovered reading skills, there typically remain challenges in reading speed with a much slower rate and with reduced comprehension (Webster et al., 2021). Writing is often impaired by reduced ability to spell correctly and construct grammatically coherent written sentences (Johansson-Malmeling et al., 2021). These literacy difficulties stem from damage to brain regions specialized for processing different elements of written language, as well as the disruption of connections between language regions (Thiel et al., 2013). These symptoms can make it challenging for individuals with aphasia to engage in functional literacy tasks like sending emails, texting, and participating in vocational and or social literacy domains. While intensive therapy focusing on reading and writing skills may improve literacy ability, many individuals with aphasia may continue to experience persistent reading and writing deficits (Kendall et al., 2015). Overall, given the essential role of literacy in modern life, deficits in reading and writing skills can negatively impact the quality of life, social participation, and self-esteem of PWA (Kjellén et al., 2017).

Arguably, societal dependence on literacy has been increasing with the use of internet and mobile devices for communication (Cacciante et al., 2021; Cetinkaya et al., 2024). In particular, reading and writing enable comprehension of written information, expression of thoughts and feelings, and engagement in activities (Caute et al., 2015; Lee & Cherney, 2022; Thiel & Conroy, 2022; Wallace et al., 2023). Reading provides access to vital information, bolsters

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/23279095.2026.2688403

independence, and allows recreational enjoyment (Knollman-Porter et al., 2015), while writing facilitates the communication of needs, ideas, and emotions (Thiel & Conroy, 2022). Thus, supporting and improving literacy skills for PWA is crucial for their overall well-being and quality of life. Various techniques, such as supported reading comprehension and individualized interventions, can help strengthen reading abilities and make written content more accessible (Wallace et al., 2023; Webster et al., 2021).

Group therapy has proven to be a potentially beneficial intervention for enhancing language skills, communication abilities, engagement in daily activities and overall psychological well-being among PWA (Pitt et al., 2019). Systematic reviews of both quantitative and qualitative research on group therapy for aphasia consistently indicate that, despite variations in group protocols and objectives, this form of therapy generally yields improved outcomes and facilitates better quality of life in the longer term than one-to-one therapy for PWA (Lanyon et al., 2013; Wilson et al., 2023). Nevertheless, obstacles often hinder access to group services for PWA, such as post-stroke mobility and transport challenges, limited availability of groups in rural areas, and limitations in resources, funding, and staff within health services for providing adequate group therapy (Blonski et al., 2014). Consequently, it is important to further explore different approaches to delivering group therapy services that can effectively overcome these barriers.

Group-based online interventions for PWA have shown promise not only in promoting recovery of language skills but also in fostering confidence in using these skills (Azios et al., 2024; Lanyon et al., 2013; Wilson et al., 2023). This dual benefit stems from the opportunity to interact with others who share similar experiences, facilitating a supportive environment for communication practice and social connection (Pitt et al., 2019). The initial Technology and Literacy Engagement after Stroke (TALES) study (Cetinkaya et al., 2024) demonstrated encouraging results in this regard, with participants showing statistically significant improvements in self-perceived communication ability as measured by the Communication Outcome after Stroke (COAST) questionnaire (Long et al., 2008). The COAST does not assess literacy directly; it measures communication confidence and participation in daily life. Gains in reading and writing were expected to be translated into broader improvements in communicative function. The rationale grounded in the International Classification of Functioning, Disability and Health (ICF) participation domain and the Life Participation Approach to Aphasia (LPAA) (Chapey et al., 2000; World Health Organization, 2001).

TALES is built on the ICF, which distinguishes body function impairments from activity limitations and participation restrictions. Both The Aphasia Framework for Outcome Measurement (Kagan et al., 2008) and the LPAA (Chapey et al., 2000) shaped the programme's priorities, with participation and functional communication taking precedence over impairment reduction. The choice of outcome measures reflects this: the WAB-R (Kertesz, 2007) addresses language impairment, PALPA (Kay et al., 1996) targets activity-level literacy, and COAST captures communication confidence and participation.

Previously, a Phase 1 study of TALES was piloted and reported with five people with aphasia (Cetinkaya et al., 2024), which demonstrated some promising results for the hybrid approach utilizing online group interaction, guided and independent telehealth practice and functional, personally tailored literacy goals. The treatment methods were shown to be feasible and well-tolerated by participants with moderate to mild aphasia. Statistically significant benefits were found for most participants, although there was some possibility of a ceiling effect for those with milder impairment. These benefits were evident across measures of impairment and confidence, indicating improvements in both language skills and self-perceived communication ability. Overall, the initial report indicated that this online, technology-assisted therapy approach holds potential as an intervention for individuals with chronic aphasia. However, several limitations were identified, such as homogeneity of participant characteristics (for example gender, age), a lack of maintenance phase, a lack of fidelity tracking time on specific software (Cuespeak) tasks and a narrow range of aphasia severity. The current study builds on these findings by addressing these limitations, incorporating a more diverse participant sample, and refining the intervention methods to enhance feasibility and efficacy.

Qualitative methods offer vital insights into how an intervention is perceived and experienced by participants (Simmons-Mackie et al., 2014). In particular, semi-structured interviews elicit detailed perspectives and narratives that quantitative measures cannot capture (Wilson & Kim, 2021). For example, a qualitative study by Kjellen et al. (2017) explored the perspectives of 12 Swedish-speaking participants with mild to severe aphasia regarding their everyday literacy skills. The overarching theme that emerged was that literacy was an ongoing recovery process for the participants. This theme consisted of two subthemes. First, the participants described changes in their conditions for literacy, including improved reading ability over time and slowly improving writing skills. Second, they discussed facing expectations about literacy, including their motivations, strategies, and the positive effects of practice.

Understanding the first-hand experiences of those undertaking the TALES programme will offer crucial data to complement existing results and guide future research and clinical applications of this approach. One of the distinct aims of this study therefore was to explore the experiences and opinions of PWA who participated in a further iteration of the TALES programme using qualitative data generation and analysis methods. The findings may help determine how acceptable and feasible participants found this technology-based group treatment model, illuminate perceived benefits and challenges, and identify potential areas for optimization in future work.

This study therefore represents a further development of TALES, with four primary additions relative to the original report: the inclusion of a qualitative component using semi-structured interviews, a broader participant severity range, a 12-week maintenance assessment, and a pooled analysis across both studies to examine preliminary observations on programme suitability. Of these, the qualitative

component represents the most substantive methodological advance, providing first-person perspectives that the original quantitative-only design could not capture. Based on the background presented, the following research questions will be examined:

1. Does this extended study provide a Phase 1 signal of efficacy and investigate preliminary indications of benefit of TALES across a wider range of aphasia severity?
2. Utilizing a pooled analysis of collective data from the current and a previously reported TALES study, can we identify preliminary observations on the suitability of TALES across a range of aphasia profiles?
3. What are the perceptions of the participants as to the strengths and weaknesses of this approach and how did they find the experience of participating?

Method

Study design

This study utilized a mixed-methods case series approach, adhering to the Consolidated Criteria for Reporting Qualitative Research (COREQ) criteria for qualitative reporting (Tong et al., 2007) (see Appendix A). This research project was built upon the findings and methods of TALES phase 1, which involved an entirely different set of five participants with mostly mild levels of aphasia (mean AQ = 84.24; range 66 – 93.8). The current study with novel participants, new to the intervention, also followed a pretreatment, post-treatment and maintenance assessment template, documenting quantitative outcomes obtained before and after the implementation of the TALES programme (immediately after and later following a post-therapy phase of no involvement). In addition, semi-structured interviews were conducted with each participant within two weeks of completing the maintenance assessment, by which time participants had had some time to reflect on their experience of participating in the programme. The programme continued to focus on online literacy intervention for individuals with aphasia, with 1:1 online support within a group treatment context.

Ethics

The study protocol for TALES was approved by the research ethics committee of the Division of Psychology, Communication and Human Neuroscience at the University of Manchester (Ref: 2022-14463-24948). All participants provided informed consent to take part.

Participants

Six participants were recruited, with different levels of aphasia severity and related conditions. All participants met the criteria of being 18 years or older, having developed chronic aphasia after a stroke, residing in Greater Manchester or North-West England, and expressing an interest in improving their functional literacy skills. Participants were fluent in English and had no significant history of vision problems, hearing loss or psychiatric illness. Time since stroke onset varied among participants, reflecting the diversity of the sample. All participants completed pretreatment assessments. Five of the six recruited participants completed the study in full. One participant (P6) did the initial evaluation and joined two sessions of the treatment but then decided not to participate in the subsequent treatment phase or post-treatment assessment phase. Table 1 outlines key demographic details about the study participants, as well as data related to their attendance records. There were two female and four male participants, with an age range of 42–77 years old (mean = 60.8 years, SD = 12.3 years). All were beyond the inclusion criterion of 6 months post-onset (range = 10 to 252 months). Given the skewed distribution, five participants fell between 10 and 66 months, with one participant at 252 months. The median (34.5 months, IQR = 39.0 months) is reported as the primary measure of central tendency; the mean was 69.7 months (SD = 91.5 months). Five participants were right-handed before their stroke, while one was left-handed. The group had diverse occupational backgrounds, including nurse, computer engineer, teacher, and engineer. Attendance was high, with three participants attending all 8 sessions and two attending 7 out of the 8 sessions. One participant (P6) with the most severe aphasia (WAB-R-AQ score was 14.1) attended two sessions before withdrawing from the study.

Procedure

The programme implemented in this study extended the intervention protocol used in the first report of TALES (Cetinkaya et al., 2024), with some continuity and some targeted refinements. As previously, after baseline testing, participants took part in a series of weekly online group sessions, each lasting 90 minutes. Details of the content of these sessions are provided in Table 2. To access the online group intervention sessions via Zoom, participants were provided individual login details and support. These sessions involved 1:1 interaction with speech and language therapy students who had been offered bespoke training to take part in the programme. The sessions also included group

Table 1. Participants' demographic data, baseline aphasia score, severity and attendance information.

ID	Age	Sex	Occupation prior to stroke	Months since stroke	Premorbid handedness	Pretreatment WAB-R AQ	Severity	Attendance
P1	42	F	Nurse	66	L	88.8	Mild	7/8
P2	77	M	Teacher	21	R	65.6	Moderate	8/8
P3	50	M	Computer engineer	24	R	50.2	Severe	8/8
P4	72	F	Engineer	252	R	69.8	Moderate	7/8
P5	63	M	Engineer	10	R	84.2	Mild	7/8
P6	61	M	Engineer	45	R	14.1	Very Severe	2/8 (then withdrew)

Table 2. Details of the TALES programme (online group sessions).

Sessions	Part 1	Part 2
1	• Students and PWA chat and get basic facts about each other. • Complete Case history and Goal Setting form with each participant.	• Working with each participant to introduce aphasiatherapyonline.com as an initial and relatively simple example of an aphasia software.
2	• Use Microsoft Word as a tool for single word spelling.	• Look at written diary or calendar format for writing.
3	• Building on written diary work toward description of events of the week*. • Recap concept of different word types- Objects (people, places, things), Actions (-ing words), and Descriptor words (adjectives, adverbs).	• Introduce the concept of a 'review' of a film, sporting event, TV programme, play etc. • Focus on one event chosen by PWA and with student as scribe, focus on key events/highlights and use of some descriptors.
4	• Structuring a narrative in writing, focusing on different word classes: -Verbs/action words (walking, dancing, seeing…) -Nouns/things/concepts (fisherman, goose, government…) -Descriptors: adjectives, adverbs (sleepy, enormous…) Watch video clips and work 1:1 to write words in categories.	• Social media checklist and task focusing on opening phrases, responses, and signing off phrases.
5	• Filling in missing words task, building on previous work on different word classes	• Experiment with Word software, supporting writing (dictation, read aloud, spell and grammar check).
6	• Personal Narrative Writing, working on an extended piece about a personally salient episode.	• Lighter topic: 'Year I was born', writing key facts about participant's date of the birth using relevant websites.
7	• Language of advice: being an 'agony aunt' and offering written guidance to problem queries.	• Editing longer text from previous session using reading aloud software or having student read aloud to allow participant to edit and improve the text.
8	• Writing for Speaking preparation, debate about the value of Christmas.	• Review of Progress and Goal setting, working through questions to get feedback on the programme and future plans.

*https://www.nhstayside.scot.nhs.uk/OurServicesA-Z/AdultAcquiredSpeechandLanguageTherapy/PROD_314107/index.htm.

conversations for additional language and communication practice. The focus remained on improving reading and writing skills while fostering a supportive group environment for social communication.

Modifications included the addition of an extra week of therapy duration (8 weeks rather than previously 7) and a follow-on maintenance assessment after a period of no therapy (12 weeks later). In addition, a WhatsApp group was set up for the participants to further support functional engagement with everyday literacy tasks and their interaction with it was encouraged. The group communicated by sharing photos, using emojis and writing. Finally, duration of participants' interaction with the Cuespeak software was recorded in order to inform our understanding of any observed effects.

In a typical TALES programme session, the session chair (final author) briefed the whole group about the aims of the current session in the main Zoom group room (5–10 minutes). Then, one PWA worked with one student Speech and Language Therapist (SLT) together in pairs in their separate "Zoom room" for 40–45 minutes. The whole group came back together into the main Zoom room to review progress. After the short break (typically 10 minutes), the student and PWA continued to work together (further 15–20 minutes). The session ended with the whole group returning to the main Zoom room, where the chair summarized the session and provided general and specific feedback and encouragement. After the session, students sent the documents they had worked on with the PWA to the session chair via email. In some instances, PWA continued to work independently on a piece of writing and then emailed this on to the chair also. Please see Table 2 for more details about the online group sessions.

As in the first iteration of TALES (Cetinkaya et al., 2024), participants were introduced to the aphasia therapy software Cuespeak (https://cuespeak.com/) for individualized home practice. Cuespeak was selected for supported home practice given its good accessibility, its multi-modal and structured, hierarchical approach to language therapy, and for its functionality in providing feedback on specific levels of task engagement and success. Finally, weekly 1:1 online support-sessions, lasting 30 minutes each, were provided to address technical challenges and offer individualized guidance.

Pre-, post- and follow-up assessments were conducted by the first author to ensure consistency. Additionally, several measures were in place to support intervention consistency, though a formal fidelity protocol was not implemented. Prior to the programme, student SLTs attended bespoke training covering both online interaction with people with aphasia and the session-by-session structure. During delivery, the final author chaired all group sessions, moved between breakout rooms to provide modeling and guidance, and was available to students via a designated call button. After each session, students emailed the written materials produced during their 1:1 pairing to the chair, offering an indirect record of task coverage across dyads. For the Cuespeak component, time-on-task data were recorded for each participant to index home practice engagement.

Data collection

Quantitative data collection and outcome measures

Participants completed comprehensive language and communication assessments at three time points: before starting the programme (pretreatment), immediately after finishing the 8-week intervention (post-treatment), and 12 weeks after completing the programme (maintenance). The first author individually administered the assessments in each participant's home following standard procedures, allowing researchers to evaluate changes in skills and determine whether gains were maintained three months later. Following the Research Outcome Measurement in Aphasia (ROMA) guidelines for standardization, the Western Aphasia Battery-Revised

(WAB-R) was used to evaluate aphasic symptoms and severity through measures of spontaneous speech, auditory comprehension, repetition, naming, reading, and writing. These scores were used to calculate the Aphasia Quotient (AQ), Language Quotient (LQ), and Cortical Quotient (CQ) for each participant. Literacy and language processing skills were assessed using Psycholinguistic Assessments of Language Processing in Aphasia (PALPA) reading and spelling subtests, specifically subtest 31 (Reading High/Low Imageability and Total), subtest 37 (Sentence Reading), and subtest 40 (Spelling High/Low Imageability and Total). Additionally, the Communication Outcome after Stroke (COAST) questionnaire evaluated participants' broader communication skills and their impact on quality of life. This 20-item tool uses simple language and visual support to cover verbal/non-verbal communication, perceived improvement since stroke, and the effect of functional communication, with 15 items measuring abilities and 5 assessing the impact of difficulties on a 5-point scale.

Qualitative data collection

This qualitative component, utilizing two different data collection methods, aimed to complement the quantitative findings and provide a more comprehensive understanding of the acceptability and impact of the TALES intervention from the participants' perspective. To gain insight into participants' experiences and perceptions of the TALES programme, semi-structured interviews were conducted with each participant within two weeks of completing the maintenance assessment. The interviews were carried out by the first author using two different methods: via email (Egan et al., 2006) and through the Zoom online platform

(Wilson & Kim, 2021). Egan et al. (2006) found that email-facilitated qualitative interviewing (EFQI) offered several benefits for participants with traumatic brain injury, including more time for reflection, greater control over self-disclosure, and the ability to communicate more effectively in writing than verbally. The asynchronous nature of EFQI also allowed participants to respond when they felt refreshed rather than fatigued, and provided a more comfortable interview setting that accommodated cognitive-linguistic impairments. This was also considered appropriate given that participants had been practising extended writing as a task for the duration of the TALES treatment programme. It should be noted that EFQI was used exclusively as a qualitative data collection method to explore participants' experiences of the programme; reading and writing skills were assessed separately using standardized PALPA subtests administered at each quantitative assessment point. For the email interviews, participants were sent a list of open-ended questions (see Appendix B) and asked to provide detailed written responses. Despite encouragement to do so, P3 did not engage in the email interview. Zoom interviews offer greater flexibility versus face-to-face interviews in scheduling and access to geographically dispersed participants, potentially increasing sample diversity and reducing costs associated with travel (Archibald et al., 2019). For the Zoom interviews, an interview guide (see Appendix C) was developed to explore topics such as participants' overall impressions of the programme, perceived benefits and challenges, experiences with the online group sessions, one-to-one sessions and individual practice (Cuespeak), and suggestions for improvement. Interviews with P1, P4, and P5 were conducted one-on-one with the researcher, while P2's spouse was present during both the intervention and the interview to provide communication support as needed. P3 did not engage in the Zoom interview. To facilitate effective communication during the interviews, several strategies were employed to support participants. The researcher used aphasia-friendly techniques, including speaking slightly slowly and clearly, using simple sentence structures, and providing visual support when necessary (Wilson & Kim, 2021). The researcher allowed ample time for participants to formulate their responses, avoiding rushing or interrupting. Open-ended questions and prompts (e.g. Likert-scale chart) were used to encourage detailed responses and allow for the emergence of unanticipated themes. Zoom interviews were video and audio-recorded with participants' consent.

Quantitative data analysis

Descriptive statistics were used to summarize the demographic characteristics of the participants and their performance on the outcome measures (WAB-R, PALPA subtests, and COAST) at each time point (pretreatment, post-treatment, and maintenance). Given the small sample size and non-normal distribution, non-parametric statistical tests were employed to analyze changes in performance over time. The Friedman test, a non-parametric alternative to the repeated-measures ANOVA, was used to compare the scores on each outcome measure across the three-time points. If significant differences were found, post-hoc pairwise comparisons using the Wilcoxon signed-rank test were conducted to determine which time points differed significantly from each other. Following Cohen's (1992) widely accepted guidelines for interpreting effect sizes, values of 0.20, 0.50, and 0.80 were deemed to represent small, medium, and large effects, respectively.

Qualitative data analysis

The first author transcribed the interviews verbatim. Zoom interviews were transcribed using Otter.ai, a speech-to-text transcription service. The transcripts were reviewed and edited for accuracy by the first author. Subsequently, the last author performed a secondary review of all transcripts to verify their precision and completeness. The first author engaged in regular discussions with the second and the last author throughout the research process, including during the data collection, analysis, and interpretation stages. To further enhance the qualitative rigor, the third author, an expert in qualitative research methodology, was consulted during the design and analysis phases of the study. Content analysis, a qualitative approach suitable for sparse qualitative datasets (Graneheim & Lundman, 2004), was used to analyze the data obtained from the email and Zoom interviews. Written (email) and oral (Zoom) responses were initially

analyzed together for each participant to provide a comprehensive view of their experience. This integrated approach was adopted to identify and account for any modality-specific variations in communication (Wilson & Turner, 2024). Where significant discrepancies between written and oral responses were observed, these were explicitly documented in the findings to highlight potential modality-dependent nuances. In the absence of substantial differences, the oral responses were prioritized for presentation. Subsequently, a cross-participant comparative analysis was conducted to identify overarching themes, categories, and subcategories across the entire sample. NVivo software (version 14) (Lumivero, 2024), designed to assist in the management and analysis of qualitative data, was used to facilitate data management, coding, and analysis. The analytic approach combined inductive and directed elements. Coding was primarily data-driven, with themes and categories derived from the transcripts rather than imposed in advance. At the same time, the scope of the analysis was shaped by the study aims, namely to capture participants' experiences of the programme and to identify perceived barriers and facilitators, reflecting what Hsieh and Shannon (2005) term a directed content analysis. This hybrid positioning is acknowledged as a methodological choice rather than an inconsistency, and is consistent with the pragmatic, aim-focused nature of Phase 1 intervention research.

Results

The results are organized according to the three research questions. Research Questions 1 and 3 draw exclusively on data from the current TALES 2 cohort. Research Question 2 presents a pooled analysis combining data from both the current and the previously reported TALES 1 study, as detailed in Table 5.

Quantitative results

> ***Research Question 1:*** *Does this extended study provide a Phase 1 signal of efficacy and investigate preliminary indications of benefit of TALES across a wider range of aphasia severity?*

In response to Research Question 1, investigating the feasibility and benefit of TALES for individuals with a wide range of severity (AQ score from 14.1 to 88.8) in aphasia, alexia, and agraphia, it should firstly be noted that the participant (P6: AQ 14.1) at the lower end of the severity range left the study after two sessions. He appeared to be frustrated and discouraged by the experience, and despite support, was unable to engage in the programme.

Results based on the remaining five participants (with a mean AQ of 71.72 and a range of 50.2–88.8) indicated positive outcomes as follows, suggesting that the intervention may have efficacy across these various levels of impairment.

Wab-r

Figure 1 provides pretreatment, post-treatment, and maintenance median scores at the group level for WAB-R subtests (AQ, CQ, LQ). Friedman tests for non-parametric data showed significant differences across the three-time points (AQ: $\chi^2(2) = 8.40$, $p = .015$; CQ: $\chi^2(2) = 10.00$, $p = .007$; LQ: $\chi^2(2) = 10.00$, $p = .007$). Follow-up Wilcoxon signed-rank tests revealed significant improvements from pretreatment to post-treatment (AQ: $p = .042$; CQ: $p = .043$; LQ: $p = .043$) and from pretreatment to maintenance (AQ: $p = .043$; CQ: $p = .043$; LQ: $p = .043$) for all three measures. Importantly, there was no statistically significant decrease from post-treatment to maintenance for AQ ($p = .138$), indicating that improvements were maintained. However, CQ ($p = .043$) and LQ ($p = .043$) both showed a decrease in this measure (Table 3). These findings indicate that significant

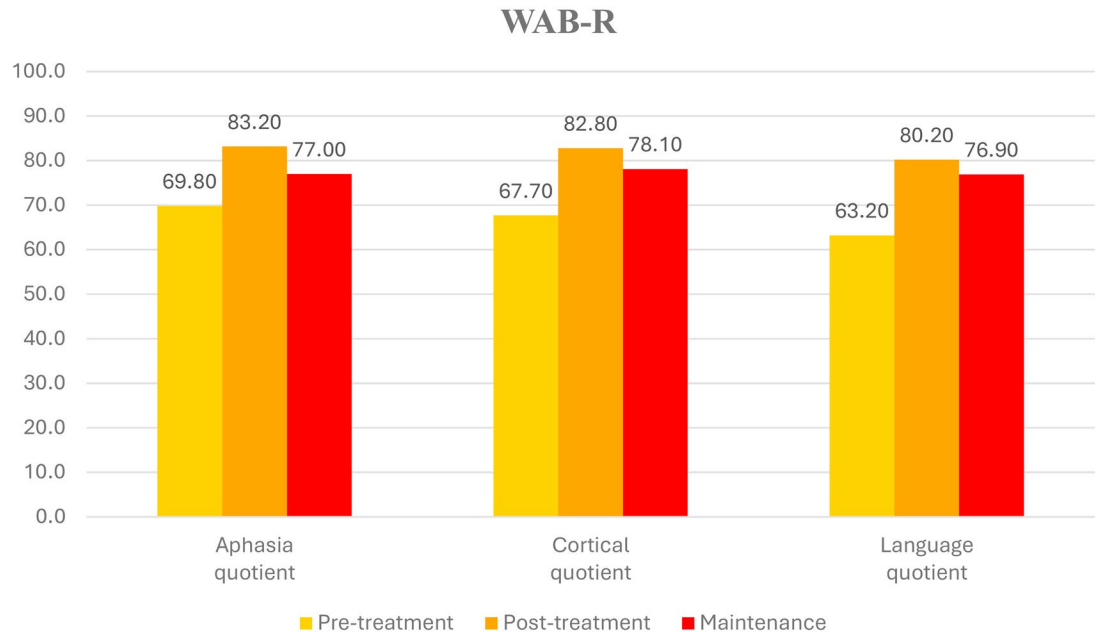

Figure 1. Median scores for WAB-R subtests at pretreatment, post-treatment, and maintenance.

Table 3. Friedman test results.

Measure	Pretreatment (Median)	Post-treatment (Median)	Maintenance (Median)	Friedman Test *p*-value	Pre vs Post *p*-value (effect size)	Pre vs Main *p*-value (effect size)	Post vs Main *p*-value (effect size)
AQ	69.80	83.20	77.00	.015	.042 (0.94)	.043 (0.53)	.138 (−0.37)
CQ	67.70	82.80	78.10	.007	.043 (1.09)	.043 (0.62)	.043 (−0.43)
LQ	63.20	80.20	76.90	.007	.043 (1.03)	.043 (0.62)	.043 (−0.38)
COAST	38	49	48	.050	.043 (0.92)	.144 (0.54)	.102 (−0.32)
RHI	37	39	36	.101	.068 (0.52)	.138 (0.41)	.285 (−0.15)
RLI	29	38	37	.161	.109 (0.24)	.176 (0.18)	.194 (−0.05)
RT	68	77	75	.016	.043 (0.35)	.043 (0.27)	.144 (−0.08)
SR	15	20	25	.022	.043 (0.71)	.043 (0.68)	.786 (−0.02)
SHI	9	14	15	.015	.043 (0.94)	.042 (0.71)	.414 (−0.19)
SLI	4	10	8	.050	.042 (0.96)	.136 (0.60)	.197 (−0.26)
ST	13	24	23	.056	.043 (0.96)	.080 (0.72)	.276 (−0.23)

AQ: Aphasia Quotient, COAST: Communication Outcome after Stroke, CQ: Cortical Quotient, LQ: Language Quotient, RHI: Reading High Imageability, RLI: Reading Low Imageability, RT: Reading Total, SHI: Spelling High Imageability, SLI: Spelling Low Imageability, SR: Sentence Reading, ST: Spelling Total.

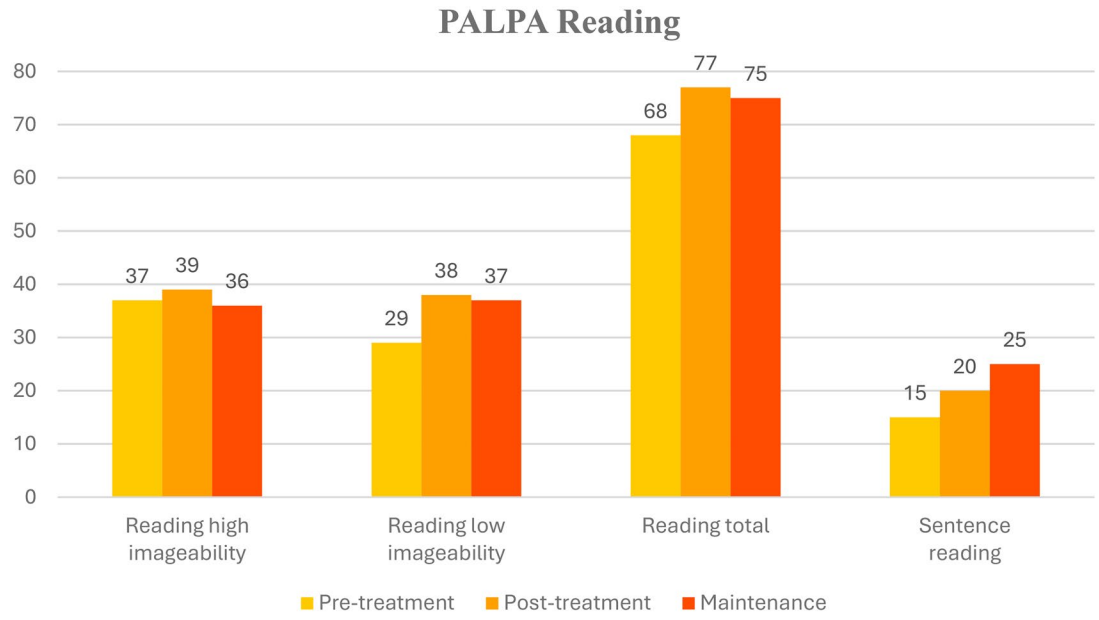

Figure 2. Median scores for PALPA reading subtests at pretreatment, post-treatment, and maintenance.

improvements in language function as measured by the WAB-R were observed following the intervention, and these gains appeared to be sustained at follow-up for AQ.

PALPA reading

Figure 2 displays the median scores for PALPA reading subtests (RHI, RLI, RT, and SR) at three time points. The results showed significant differences between the time points for RT ($\chi^2(2) = 8.28$, $p = .016$) and SR ($\chi^2(2) = 7.60$, $p = .022$), but not for RHI ($\chi^2(2) = 4.57$, $p = .101$) or RLI ($\chi^2(2) = 3.636$, $p = .161$). Follow-up Wilcoxon signed-rank tests revealed significant improvements from pretreatment to post-treatment (RT: $p = .043$; SR: $p = .043$) and from pretreatment to maintenance (RT: $p = .043$; SR: $p = .043$) for RT and SR. There were no significant differences between post-treatment and maintenance for RT ($p = .144$) and SR ($p = .786$) (Table 3). These findings show that significant improvements in some PALPA Reading scores (RT and SR) were observed following the intervention, and these gains appeared to be sustained at follow-up.

PALPA spelling

Figure 3 presents the median values for the PALPA spelling subtests (SHI, SLI and ST) across three-time points. There were significant differences between time points for SHI ($\chi^2(2) = 8.40$, $p = .015$) and SLI ($\chi^2(2) = 6.00$, $p = .050$), but not for ST ($\chi^2(2) = 5.76$, $p = .056$). Follow-up Wilcoxon signed-rank tests revealed significant improvements from pretreatment to post-treatment (SHI: $p = .043$; SLI: $p = .042$; ST: $p = .043$) and from pretreatment to maintenance for SHI ($p = .042$), but not for SLI ($p = .136$) or ST ($p = .080$). There were no significant differences between post-treatment and maintenance for SHI ($p = .414$), SLI ($p = .197$), or ST ($p = .276$) (Table 3). These findings suggest that significant improvements in PALPA Spelling scores from pretreatment to post-treatment were observed, and these gains appeared to be largely sustained at follow-up across all three subtests.

COAST

Figure 4 provides pretreatment, post-treatment, and maintenance median scores for COAST. The results revealed an

approaching significance difference between time points ($\chi^2(2) = 6.00$, $p = .050$). Follow-up Wilcoxon signed-rank tests indicated a significant increase in COAST scores from pretreatment to post-treatment ($p = .043$), indicating an improvement after the intervention. There were no significant differences between pretreatment and maintenance ($p = .144$) or between post-treatment and maintenance ($p = .102$) time points (Table 3). While maintenance scores remained numerically higher than baseline and a medium effect size was observed from pretreatment to maintenance (d = 0.54), statistical support for long-term maintenance of COAST gains was not established in this sample.

Effect size

Table 3 includes the effect size (Cohen's d) scores for all outcomes across three time points. It should be noted that effect size estimates based on a sample of five participants are inherently unstable and highly sensitive to individual variability; the values reported below should therefore be treated as preliminary descriptive indicators rather than precise estimates of effect magnitude. With this caveat in mind, large effect sizes were observed from pretreatment to post-treatment on several measures, including AQ, CQ, and LQ (d = 0.94, 1.09, and 1.03 respectively), as well as SHI, SLI, and ST (d = 0.94, 0.96, and 0.96 respectively). The COAST measure also showed a large effect size from pretreatment to post-treatment (d = 0.92). At follow-up, medium to large effect sizes were observed from pretreatment to maintenance on AQ, CQ, and LQ (d = 0.53, 0.62, and 0.62 respectively), spelling measures (SHI: d = 0.71, SLI: d = 0.60, ST: d = 0.72), and COAST (d = 0.54). Reading measures showed more modest improvements, with medium effect sizes for RHI ($d = 0.52$) and SR ($d = 0.71$) from pretreatment to post-treatment, which

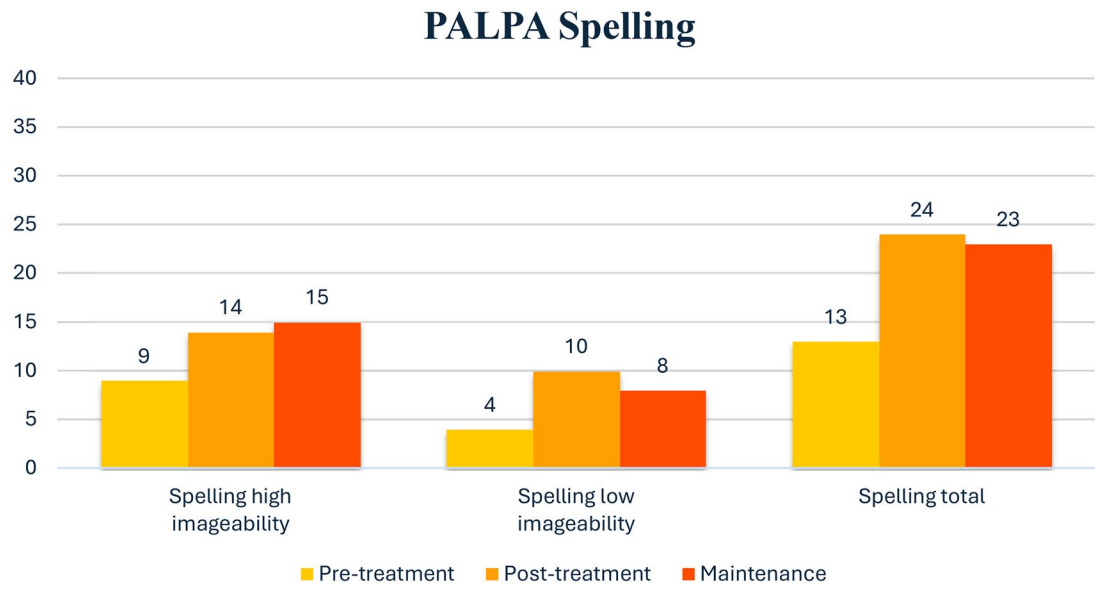

Figure 3. Median scores for PALPA spelling subtests at pretreatment, post-treatment, and maintenance.

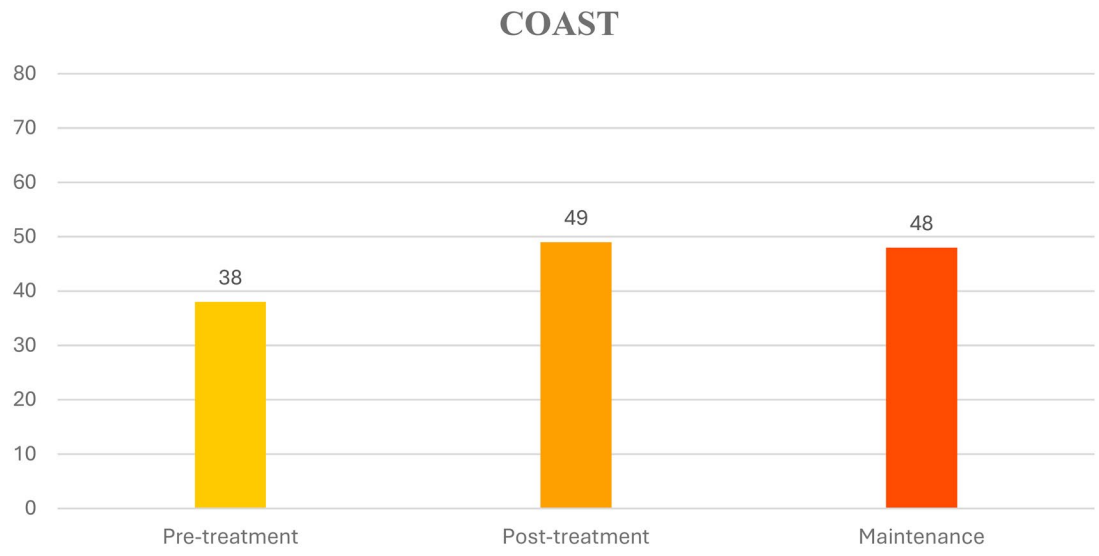

Figure 4. Median scores for COAST at pretreatment, post-treatment, and maintenance.

Table 4. Cuespeak usage time.

Participants	Spelling 1	Spelling 2	Spelling 3	Reading 1	Reading 2	Reading 3	Other sessions total	Total usage time
P1	0	7m	6h 10 m	0	46m	6h 6 m	4h 29 m	17h 38 m
P2	2h 48 m	11h 47 m	10m	58m	6h 12 m	0	11m	22h 6 m
P3	0	3h 3 m	2h 29 m	0	11m	1h 49 m	9h 5 m	16h 37 m
P4	59m	3h 34 m	45m	32m	8m	7h 15 m	19h 41 m	32h 54 m
P5	0	5h 42 m	22h 47 m	0	39m	10h 27 m	2m	39h 37 m

H = hour, m = minute. Note: total usage time mean: 25h 51 m. Difficulty levels 1–3 reflect Cuespeak's hierarchical task structure, with level 1 representing the least demanding and level 3 the most demanding tasks within each activity. "Other sessions" encompass additional Cuespeak modules including speech production, auditory comprehension, sentence-level tasks, sound awareness, and verb processing.

were largely maintained at follow-up ($d = 0.41$ and 0.68 respectively). Comparisons between post-treatment and maintenance revealed small negative effect sizes for most measures, indicating slight decreases in performance. The largest decreases were observed in WAB-R measures (AQ: $d = -0.37$, CQ: $d = -0.43$, LQ: $d = -0.38$), and COAST ($d = -0.32$), while reading measures showed negligible to small decreases (d ranging from −0.02 to −0.15), and spelling measures demonstrated small decreases (d ranging from −0.19 to −0.26).

Cuespeak usage time

As a further analysis of treatment feasibility, we examined the extent to which participants were willing and able to engage in independent computer-based therapy. Table 4 shows the Cuespeak usage time across different activities: spelling, reading, and other sessions (speech, understanding speech, working on sentences, working with sounds, focus on verbs) and difficulty levels (1, 2, 3). The total usage time ranged from 17 hours 38 minutes (P1) to 39 hours 37 minutes (P5), with an average usage time of 25 hours 51 minutes per participant. P5 spent the most time using Cuespeak at nearly 40 hours, with the majority of this time, 22 hours 47 minutes, being on spelling activity 3. P1 spent the least total time at around 17.5 hours. All participants utilized Cuespeak for spelling activities, with usage times ranging from 10 minutes (P2) up to 22 hours 47 minutes (P5 on spelling 3). Reading activities also accounted for substantial usage, especially for P2 and P5 who spent over 10 hours each on reading activity 3. Overall, there was variation across participants but reasonably high engagement with multiple Cuespeak activities and language modalities.

Interim summary: quantitative results

Overall, the quantitative results indicated that the intervention positively impacted various aspects of language function, including specific language domains (WAB-R), reading, and spelling (PALPA). Importantly, the intervention positively affected measures of confidence in communication (COAST). The significant improvements observed in WAB-R, Reading Total (RT), Sentence Reading (SR), Spelling High Imageability (SHI), Spelling Low Imageability (SLI), Spelling Total (ST) and COAST, from pretreatment to post-treatment indicate that the intervention had some efficacy in enhancing language skills, literacy skills and confidence. The maintenance of gains at follow-up was more consistent for the WAB-R, RT, SR and SHI, suggesting that these improvements were more stable over time. The decline in some measures from post-treatment to maintenance indicated that some gains may be less durable and require ongoing support or practice to maintain. The lack of significant improvements in RHI and RLI suggests that the intervention had a more limited impact on these specific aspects of language function. Broadly, however, our quantitative data highlight the potential benefits of the intervention in promoting language recovery across multiple domains, with some variability in the maintenance of gains over time.

> ***Research Question 2****: Utilizing a pooled analysis of collective data from the current and a previously reported TALES study, can we identify preliminary observations on the suitability of TALES across a range of aphasia profiles?*

The data presented in Table 5 are individual scores from the initial evaluation (Cetinkaya et al., 2024) and the current studies for AQ and COAST assessment. In the initial (TALES 1/T1) study, participants' initial AQ scores ranged from 66.0 to 93.8, indicating mild to moderate aphasia. The current (TALES 2/T2) study included participants with a broader range of severity, with initial AQ scores from 14.1 to 88.8, spanning very severe to mild aphasia. Improvements in AQ scores were observed in both studies, with changes ranging from 3.8 to 13.7 points in the initial evaluation study and 4.8 to 20.0 points in the current study. Notably, the participant with the lowest initial score in the current study (P3-T2) showed the largest improvement of 20 points. COAST scores also improved across both studies, ranging from 3.7 to 16.2 points in the initial evaluation study and 3.7 to 22.5 points in the current study. The participant with the highest initial AQ score in the current study (P5-T2) demonstrated the largest COAST score improvement of 22.5 points.

Table 5 presents individual AQ and COAST trajectories for participants across both studies, grouped descriptively by severity quadrant for reference purposes only. This grouping should be interpreted with considerable caution: the very severe quadrant (AQ 1–25) is unrepresented due to attrition, and the severe quadrant (AQ 26–50) comprises a single participant (P3 T2), precluding any meaningful comparison across severity levels. Rather than reflecting severity-related patterns, the observed gains are more appropriately understood as individual trajectories. Descriptively, the participant in the severe range showed the largest AQ gain (20 points), while the largest COAST improvement was observed at the mild end of the spectrum (22.5 points, P5 T2). These observations are noted as illustrative of individual variability rather than indicative of a systematic relationship between

baseline severity and treatment response. Future studies with larger, adequately powered samples would be needed to examine severity as a predictor of outcome.

Qualitative results

Research Question 3: *What are the perceptions of the participants as to the strengths and weaknesses of this approach and how did they find the experience of participating?*

Content analysis of the interview transcripts and written responses (email) from four participants (P1, P2, P4, P5) generated two underlying themes from the participants' experiences: 1) Appreciating the comprehensive, engaging, and surprising nature of the programme, and 2) Noticing benefits and feeling motivated to practise skills independently. Table 6 provides excerpts of raw data that illustrate key findings from the study. Three main categories were identified from the study: 1) experiences with the TALES programme, 2) applying skills and changes noticed, and 3) feedback on programme delivery and technology. Within these categories, 10 subcategories were identified (Table 6).

Table 5. Individual WAB-R and COAST results (%).

	AQ			COAST		
Participant	Pre	Post	Change	Pre	Post	Change
P6 (T2)	14.1	–	-	23.6	–	-
P3 (T2)	50.2	70.2	**20**	43.8	53.8	**10**
P2 (T2)	65.6	79	**13.4**	48.8	52.5	**3.7**
P4 (T1)	66	77.8	**11.8**	45	56.3	**11.3**
P4 (T2)	69.8	83.2	**13.4**	47.5	63.8	**16.3**
P2 (T1)	77.6	91.3	**13.7**	58.8	75	**16.2**
P5 (T2)	84.2	94.4	**10.2**	73.8	96.3	**22.5**
P6 (T1)	87.8	–	-	62.5	–	-
P1 (T2)	88.8	93.6	**4.8**	41.3	61.3	**20**
P1 (T1)	91.6	97.6	**6**	57.5	70	**12.5**
P5 (T1)	92.2	96.6	**4.4**	81.3	85	**3.7**
P3 (T1)	93.8	97.6	**3.8**	66.3	77.5	**11.2**

T1: Tales 1 (previous study); T2: Tales 2 (current study) COLOR CODING: Yellow: Very severe (0–25), Blue: Severe (26–50), Green: (51–75), Pink: Mild (≥76).
Participants in TALES 1 and TALES 2 underwent slightly different interventions, which may have influenced the outcomes.

Experiences with the TALES programme

All four participants who took part in the email and Zoom interviews (P1, P2, P4, and P5) found many aspects of the TALES programme helpful. P5 expressed surprise and enjoyment in relation to completing certain activities, such as videos (e.g. watching and retelling brief narratives from YouTube), games (e.g. filling in missing words task), and writing exercises (e.g. structuring a narrative in writing, focusing on different word classes), stating,

> Ermm, It was, I think the phone and games were they was quite good. You know, like saying, all this, the (unclear) can do this. And, you know, different things about I didn't know we're going to do things like that, though.

P5 also mentioned wanting more time and practice with students, saying,

> Yeah. Yeah. I like that it was good but I thought it was could have the thing was it was only it was only one for about an hour or so an hour and a bit. And it went up what I could have stayed on longer.

Three participants (P2, P4, and P5) reported that the programme met or exceeded their initial expectations.

Applying skills and changes noticed

All participants reported benefiting in reading, writing, and/or confidence. They also mentioned practising regularly outside of sessions. P1, P2, and P5 specifically mentioned using email, reading, and the Cuespeak app to practise. Three participants (P1, P4, and P5) reported feeling more confident when communicating with others. For example, P1 stated, *"Erm ……. theatre, I go theatre. Ermm…. one week ago, but*

Table 6. Summary of qualitative content analysis; categories and subcategories.

Category	Subcategory	Example quotes
Experiences with the TALES programme	- Finding all aspects of programme helpful - Being surprised by certain activities like videos, games, writing - Meeting or exceeding initial expectations	"All of them" (P1) "Ermm, it was, I think the phone and games were they was quite good. You know, like saying, all this, the (unclear) can do this. And, you know, different things about I didn't know we're going to do things like that, though" (P5) "It was met it… was I thought it was gonna be (pointed to the likert scale) eh yellow what it was far a bit far above that on the green" (P5)
Applying skills and changes noticed	- Benefiting in reading, writing and/or confidence - Practicing regularly outside sessions - Using email, reading, Cuespeak to practice - Feeling more confident communicating with others	"Both of … most of …. Reading hard …. hard, writing maybe. Difficult, difficult reading fine honestly. Confidence? Yes!" (P4) "Most definitely regularly. I mean, we couldn't claim every day, but it was most days" (P2's partner) "Ermm … email wonderful, and texts, ermm …. reading…… out loud…. Okay" (P1) "Shops, fine. Doctors fine. I don't know. Speak, speakeasy (refers to local charity)" (P4)
Feedback on programme delivery and technology	- Finding 1:1 sessions supportive and sufficient for their needs - Suggesting longer 1:1 sessions - Experiencing some technical difficulties using Zoom/ technology	"Yeah. I did like it. I did. I didn't know what to do it's to do when he first started. But, and then after that, I saw it was really, really good for me" (P5) "Ermm Time two hours" (P1) "So, there are aspects of the technology that (participant's name) just still struggles with" (P2's partner)

…. I …. theatre workers, ermm drinks, sweets ermm…. I do it." and P5 stated,

> Definitely, quite a bit. For me, help helped me to learn how to speak to people. It's the best thing for me is learning how to speak to people. As because I couldn't speak to properly to you and people like that.

when asked if they felt more confident talking to strangers.

Feedback on programme delivery and technology

Three participants (P1, P4, and P5) found the one-to-one sessions supportive and sufficient for their needs. P1 suggested having longer individual sessions, saying, "*Ermm time two hours.*" P2 reported experiencing some technical difficulties using Zoom and other technology. For instance, P2's spouse stated,

> So, there are aspects of the technology that P2 just still struggles with. He keeps handing me it and saying it's gone. And then I have to mess around by whatever it was supposed to be.

In summary, the content analysis revealed that all participants found the TALES programme helpful and engaging, with the programme meeting or exceeding their expectations. Participants reported improvements in reading, writing, and confidence, which motivated them to practise regularly outside of sessions using various methods. The one-to-one support was found to be adequate, with one participant suggesting longer sessions. The technical difficulties noted by one participant highlight the importance of increased attention to technical aspects of delivery for future iterations of TALES. Overall, however, the programme was appreciated for its comprehensive and engaging approach, and the benefits participants noticed in their skills and confidence. These findings are consistent with the earlier preliminary observation from Cetinkaya et al. (2024) that, alongside quantifiable differences in language outcomes and well-being, participants experienced TALES as a positive and engaging programme. The qualitative data complement rather than confirm the quantitative results, offering an additional perspective on how participants made sense of their experience.

Discussion

The present study aimed to investigate specific aspects of feasibility and identify a Phase 1 signal of early efficacy for TALES programme, an online group-based intervention targeting functional literacy and social engagement in individuals with chronic aphasia. The study also sought to explore participants' experiences and perceptions of the TALES programme through qualitative interviews. The study's mixed-methods approach provided a comprehensive evaluation of the intervention's efficacy and participants' experiences, and demonstrated promising results in improving language function, literacy skills, and communication confidence for individuals with chronic aphasia.

Quantitative results showed significant improvements in several key areas, including overall language function (as measured by WAB-R), reading and spelling skills (PALPA subtests), and communication-related quality of life (COAST). These findings align with previous research on the efficacy of group therapy interventions for aphasia (Lanyon et al., 2013; Wilson et al., 2023) and support the potential of telerehabilitation approaches in aphasia treatment (Dunne et al., 2023; Pitt et al., 2019). The significant gains observed in the WAB-R scores suggest that the TALES programme positively impacted overall language processing, which is crucial for functional communication (Olsson et al., 2019). The improvements in reading and spelling skills, particularly in sentence reading and spelling high imageability words, are noteworthy. These gains indicate that the programme effectively targeted literacy skills, which are often challenging for individuals with aphasia (Johansson-Malmeling et al., 2021; Webster et al., 2021). The maintenance of these improvements at follow-up suggests that the intervention may have long-lasting effects on literacy skills, although some decline was observed in certain measures.

The increase in COAST scores from pretreatment to post-treatment indicates that participants experienced enhanced confidence in their communication abilities. This result, reflecting improved communication confidence, mirrors the result from Lee and Cherney (2022) study on text messaging intervention, highlighting the potential of functional, technology-based approaches to enhance communicative confidence. This finding is particularly important as improved confidence can lead to increased social participation and quality of life for individuals with aphasia (Jacobs & Ellis, 2023; Plourde et al., 2019). The maintenance of these gains at follow-up, albeit with some decline, suggests that the intervention's effects on communication confidence may be relatively durable.

The high level of engagement with the Cuespeak software, as evidenced by the usage time data, shows participants found this component of the intervention accessible and beneficial. The variation in usage patterns across participants highlights the importance of tailoring interventions to individual needs and preferences. Future research could explore the relationship between Cuespeak usage patterns and improvements in specific language and literacy skills. Caregiver involvement was not a formally embedded component of TALES, and most participants engaged with the programme independently. One exception was P2, whose spouse provided communication support across sessions and during the qualitative interview. The largely independent engagement of other participants suggests the programme may be accessible without mandatory caregiver involvement, which has practical advantages for real-world delivery. At the same time, the communication challenges observed, particularly around technology use, indicate that some participants may benefit from informal caregiver support, and future iterations might consider whether optional caregiver involvement could improve accessibility for those with greater support needs.

Across both studies, individual participants showed varied trajectories in AQ and COAST outcomes. Descriptively, the participant with the lowest pretreatment AQ in the current study (P3-T2, AQ = 50.2) showed the largest gain in

language function, while the largest COAST improvement was observed in a participant at the mild end of the severity range (P5-T2). These observations are noted as individual-level descriptions rather than evidence of a systematic severity-related pattern. The pooled sample is too small and heterogeneous to support inferences about severity as a predictor of outcome. It should also be noted that the most severely impaired participant (P6-T2, AQ = 14.1) withdrew from the programme, and the current evidence base therefore does not extend to the very severe range. Whether baseline severity moderates response to TALES remains an open question requiring adequately powered future studies. Future research should focus on developing sensitive outcome measures, optimizing treatment protocols for different severity levels, and investigating long-term maintenance and generalization of gains to everyday communication situations (Teti et al., 2023; Vuong et al., 2025).

The qualitative component represents the most substantive methodological addition to this iteration of TALES relative to the original report, which relied solely on quantitative outcome data. Its findings offer a dimension of understanding that the outcome measures alone cannot provide, capturing how participants experienced and attributed meaning to their progress. The qualitative analysis provided valuable insights into participants' experiences with the TALES programme. The emergence of themes related to programme appreciation and perceived functional benefits aligns with the quantitative results, offering a more nuanced understanding of the intervention's impact. The findings also align with and build on previous research on the experiences of individuals with aphasia participating in technology-based group interventions. The themes of programme appreciation and perceived benefits echo those found in other studies of telerehabilitation for aphasia (Gauch et al., 2023; Pitt et al., 2019; Woolf et al., 2016). For instance, the increased confidence in communication reported by participants mirrors findings from Pitt et al. (2019b), who found that telerehabilitation group therapy led to improved communicative confidence and social participation. The appreciation of the functional, real-world focus of TALES, particularly in relation to email and text messaging, aligns with research by Thiel et al. (2017) and Lee and Cherney (2022), who highlighted the importance of addressing everyday communication needs in aphasia therapy. The positive experiences with the group format support the findings of Lanyon et al. (2013) and Wilson et al. (2023), who emphasized the benefits of peer support and social interaction in group-based aphasia interventions. Importantly, the qualitative data in this study provide insights into the lived experiences of participants, offering a deeper understanding of how they engaged with and benefited from the TALES programme, and importantly, revealing that engagement with TALES was associated with positive effects in other aspects of their lives. Overall, the qualitative findings complement the quantitative results, offering additional insight into how participants engaged with and made sense of the TALES programme, and supporting its potential as a comprehensive approach to aphasia rehabilitation.

However, the study also highlighted several challenges that need to be addressed in future iterations of the programme. Technical difficulties, particularly with Zoom and other digital platforms, were noted by some participants, consistent with findings reported by Menger et al. (2020). These issues can hinder the smooth delivery of the programme and reduce its efficacy. Ensuring that participants have access to reliable technology and providing additional technical support are essential steps to mitigate these challenges. Furthermore, suggestions for longer one-to-one sessions indicate that some participants may benefit from more extended and intensive individual support. A further interpretive issue concerns the heterogeneity of post-onset duration. Five participants fell within 10 to 66 months post-stroke, while one was 252 months post-onset, which may have independently shaped treatment response in ways the current sample size cannot account for. Future iterations of the programme would benefit from narrowing this range or reporting outcomes separately across participants at markedly different stages of aphasia chronicity. Regarding the qualitative component, all interviews were conducted by the first author, who had been directly involved in delivering the programme. Prior familiarity between interviewer and participants may have introduced social desirability bias. Future studies would benefit from using an interviewer independent of the intervention team. A related concern is that the interview guide itself was structured primarily around positive experience and perceived benefit, with limited direct probing of dissatisfaction or barriers. This framing may have further constrained the range of responses obtained, and future iterations should incorporate more explicitly balanced questioning to elicit both positive and negative perspectives. The brief duration of the Zoom interviews (10–15 minutes) is a further constraint on the qualitative findings. Although this was intentional, as longer verbal interviews can place excessive demands on participants with aphasia, the Zoom data were supplemented by written responses obtained through EFQI. Even so, the combined dataset remains modest in scope. Iterative interview designs, in which participants revisit questions across multiple shorter contacts, may offer a more accessible route to richer qualitative data in future work.

The present study has several strengths, including the use of multiple language modalities to assess the impact of the intervention on various aspects of language function and the inclusion of a follow-up assessment to evaluate the maintenance of gains over time. However, while the results are generally positive, some limitations should be noted. The small sample size limits the generalizability of the findings, and the lack of a control group makes it difficult to definitively attribute improvements to the intervention alone. Outcome assessments were conducted by the first author, who was also involved in delivering the programme, meaning that assessors were not blinded to treatment status. Although standardized tools were used throughout, the potential for assessor familiarity to influence scoring cannot be fully excluded, and independent blinded assessment would strengthen the internal validity of future studies. Furthermore, future studies should investigate the optimal duration and intensity of the intervention to maximize language gains and promote long-term maintenance of improvements, while also eliciting perspectives from speech and

language therapists to inform best practices. As highlighted by Teti et al. (2023) and Vuong et al. (2025), there is a need for more research on a wider range of telehealth assessment and intervention protocols for aphasia, as well as careful consideration of how to translate in-person programs to telehealth delivery.

Conclusion

The TALES programme demonstrates promising results in improving language function, literacy skills, and communication confidence for individuals with chronic aphasia presenting with mild-to-moderate impairment. The withdrawal of the most severely impaired participant indicates that the current programme format may not yet be sufficiently accessible for individuals at the very severe end of the severity spectrum, and further adaptation would be needed before efficacy claims can extend to that population. The mixed-methods approach provided a comprehensive evaluation of the intervention's efficacy and participants' experiences. Quantitative results showed significant improvements in multiple language measures, while qualitative findings revealed themes of programme appreciation and perceived benefits. These outcomes provide a Phase 1 signal of early efficacy, suggesting that TALES represents a promising preliminary approach to addressing functional literacy and social engagement in chronic aphasia presenting with mild-to-moderate impairment. Future research should focus on larger-scale effectiveness studies, examining treatment response across a broader and more representative severity range, and investigating long-term maintenance of gains. The present findings provide early-stage support for the continued development of technology-based group interventions like TALES, with clinical integration remaining a longer-term goal contingent on replication in larger, controlled studies.

Acknowledgements

We are grateful to the six participants with aphasia who took part in this study. Berzan Cetinkaya would like to acknowledge the Republic of Turkey Ministry of National Education for providing financial support. We would also like to thank Jon Hunt and Robin Keech from Cuespeak for their support with this software programme.

Author contributions

CRediT: **Berzan Cetinkaya**: Formal analysis, Methodology, Writing – original draft, Writing – review & editing; **Katherine E. Twomey**: Supervision; **Mark Jayes**: Supervision; **Paul Conroy**: Supervision.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The author(s) reported there is no funding associated with the work featured in this article.

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References

Archibald, M. M., Ambagtsheer, R. C., Casey, M. G., & Lawless, M. (2019). Using zoom videoconferencing for qualitative data collection: Perceptions and experiences of researchers and participants. *International Journal of Qualitative Methods*, *18*, 1609406919874596. https://doi.org/10.1177/1609406919874596

Azios, J. H., Lee, J. B., Sigur, A., Archer, B., & Elman, R. J. (2024). Online Aphasia Groups: Navigating issues of voice and identity. *American Journal of Speech-Language Pathology*, *33*(1), 333–348. https://doi.org/10.1044/2023_AJSLP-23-00186

Blonski, D. C., Covert, M., Gauthier, R., Monas, A., Murray, D., O'Brien, K. K., Mendelson, A. D., & Huijbregts, M. (2014). Barriers to and facilitators of access and participation in community-based exercise programmes from the perspective of adults with post-stroke aphasia. *Physiotherapy Canada. Physiotherapie Canada*, *66*(4), 367–375. https://doi.org/10.3138/ptc.2013-70

Cacciante, L., Kiper, P., Garzon, M., Baldan, F., Federico, S., Turolla, A., & Agostini, M. (2021). Telerehabilitation for people with aphasia: A systematic review and meta-analysis. *Journal of Communication Disorders*, *92*, 106111. https://doi.org/10.1016/j.jcomdis.2021.106111

Caute, A., Cruice, M., Friede, A., Galliers, J., Dickinson, T., Green, R., & Woolf, C. (2015). Rekindling the love of books–a pilot project exploring whether e-readers help people to read again after a stroke. *Aphasiology*, *30*(2–3), 1–30. https://doi.org/10.1080/02687038.2015.1052729

Cetinkaya, B. (2024). *Evaluating the effects of telerehabilitation on literacy skills, aphasia severity and quality of life of people with post-stroke aphasia* [PhD Thesis]. The University of Manchester (United Kingdom

Cetinkaya, B., Twomey, K., Bullard, B., EL Kouaissi, S., & Conroy, P. (2024). Telerehabilitation of aphasia: A systematic review of the literature. *Aphasiology*, *38*(7), 1271–1302. https://doi.org/10.1080/02687038.2023.2274621

Cetinkaya, B., Twomey, K. E., & Conroy, P. (2024). Initial evaluation of the TALES (technology and literacy engagement after stroke) programme targeting functional literacy and social engagement in people with aphasia after stroke. *Aphasiology*, 38(10),1589-1607. https://doi.org/10.1080/02687038.2024.2322769

Chapey, R., Duchan, J. F., Elman, R. J., Garcia, L. J., Kagan, A., Lyon, J. G., & Simmons Mackie, N. (2000). Life participation approach to aphasia: A statement of values for the future. *The ASHA Leader*, *5*(3), 4–6. https://doi.org/10.1044/leader.FTR.05032000.4

Dunne, M., Hoover, E., & DeDe, G. (2023). Efficacy of aphasia group conversation treatment via telepractice on language and patient-reported outcome measures. *American Journal of Speech-Language Pathology*, *32*(5S), 2565–2579. https://doi.org/10.1044/2023_AJSLP-22-00306

Egan, J., Chenoweth, L., & McAuliffe, D. (2006). Email-facilitated qualitative interviews with traumatic brain injury survivors: A new and accessible method. *Brain Injury*, *20*(12), 1283–1294. https://doi.org/10.1080/02699050601049692

Gauch, M., Leinweber, J., Plath, A., Spelter, B., & Corsten, S. (2023). Quality of life outcomes from aphasia telepractice: A scoping review. *Aphasiology*, *37*(7), 1112–1136. https://doi.org/10.1080/02687038.2022.2079604

Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, *24*(2), 105–112. https://doi.org/10.1016/j.nedt.2003.10.001

Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277–1288. https://doi.org/10.1177/1049732305276687

Jacobs, M., & Ellis, C. (2023). Relationship between Aphasia impairment and communication confidence in mild Aphasia. *Aphasiology*, *37*(8), 1137–1148. https://doi.org/10.1080/02687038.2022.2081313

Johansson-Malmeling, C., Hartelius, L., Wengelin, Å., & Henriksson, I. (2021). Written text production and its relationship to writing processes and spelling ability in persons with post-stroke aphasia. *Aphasiology*, *35*(5), 615–632. https://doi.org/10.1080/02687038.2020.1712585

Kagan, A., Simmons-Mackie, N., Rowland, A., Huijbregts, M., Shumway, E., McEwen, S., Threats, T., & Sharp, S. (2008). Counting what counts: A framework for capturing real-life outcomes of aphasia intervention. *Aphasiology*, *22*(3), 258–280. https://doi.org/10.1080/02687030701282595

Kay, J., Lesser, R., & Coltheart, M. (1996). Psycholinguistic assessments of language processing in aphasia (PALPA): An introduction. *Aphasiology*, *10*(2), 159–180. https://doi.org/10.1080/02687039608248403

Kendall, D. L., Oelke, M., Brookshire, C. E., & Nadeau, S. E. (2015). The influence of phonomotor treatment on word retrieval abilities in 26 individuals with chronic aphasia: An open trial. *Journal of Speech, Language, and Hearing Research: JSLHR*, *58*(3), 798–812. https://doi.org/10.1044/2015_JSLHR-L-14-0131

Kertesz, A. (2007). *Western Aphasia Battery–Revised*. The Psychological Corporation. https://doi.org/10.1037/t15168-000

Kjellén, E., Laakso, K., & Henriksson, I. (2017). Aphasia and literacy—The insider's perspective. *International Journal of Language & Communication Disorders*, *52*(5), 573–584. https://doi.org/10.1111/1460-6984.12302

Knollman-Porter, K., Wallace, S. E., Hux, K., Brown, J., & Long, C. (2015). Reading experiences and use of supports by people with chronic aphasia. *Aphasiology*, *29*(12), 1448–1472. https://doi.org/10.1080/02687038.2015.1041093

Lanyon, L. E., Rose, M. L., & Worrall, L. (2013). The efficacy of outpatient and community-based aphasia group interventions: A systematic review. *International Journal of Speech-Language Pathology*, *15*(4), 359–374. https://doi.org/10.3109/17549507.2012.752865

Lee, J. B., & Cherney, L. R. (2022). Transactional success in the texting of individuals with aphasia. *American Journal of Speech-Language Pathology*, *31*(5S), 2348–2365. https://doi.org/10.1044/2022_AJSLP-21-00291

Long, A., Hesketh, A., Paszek, G., Booth, M., & Bowen, A. (2008). Development of a reliable self-report outcome measure for pragmatic trials of communication therapy following stroke: The Communication Outcome after Stroke (COAST) scale. *Clinical Rehabilitation*, *22*(12), 1083–1094. https://doi.org/10.1177/0269215508090091

Lumivero. (2024). *NVivo*

Menger, F., Morris, J., & Salis, C. (2020). The impact of aphasia on Internet and technology use. *Disability and Rehabilitation*, *42*(21), 2986–2996. https://doi.org/10.1080/09638288.2019.1580320

Olsson, C., Arvidsson, P., & Blom Johansson, M. (2019). Relations between executive function, language, and functional communication in severe aphasia. *Aphasiology*, *33*(7), 821–845. https://doi.org/10.1080/02687038.2019.1602813

Pitt, R., Theodoros, D., Hill, A. J., & Russell, T. (2019). The impact of the telerehabilitation group aphasia intervention and networking programme on communication, participation, and quality of life in people with aphasia. *International Journal of Speech-Language Pathology*, *21*(5), 513–523. https://doi.org/10.1080/17549507.2018.1488990

Plourde, J. M., Purdy, S. C., Moore, C., Friary, P., Brown, R., & McCann, C. M. (2019). Gavel Club for people with aphasia: Communication confidence and quality of communication life. *Aphasiology*, *33*(1), 73–93. https://doi.org/10.1080/02687038.2018.1453043

Simmons-Mackie, N., Savage, M. C., & Worrall, L. (2014). Conversation therapy for aphasia: A qualitative review of the literature. *International Journal of Language & Communication Disorders*, *49*(5), 511–526. https://doi.org/10.1111/1460-6984.12097

Teti, S., Murray, L. L., Orange, J., Page, A. D., & Kankam, K. S. (2023). Telehealth assessments and interventions for individuals with post-stroke aphasia: A scoping review. *American Journal of Speech-Language Pathology*, *32*(3), 1360–1375. https://doi.org/10.1044/2023_AJSLP-22-00324

Thiel, A., Hartmann, A., Rubi-Fessen, I., Anglade, C., Kracht, L., Weiduschat, N., Kessler, J., Rommel, T., & Heiss, W.-D. (2013). Effects of noninvasive brain stimulation on language networks and recovery in early poststroke aphasia. *Stroke*, *44*(8), 2240–2246. https://doi.org/10.1161/STROKEAHA.111.000574

Thiel, L., & Conroy, P. (2022). 'I think writing is everything': An exploration of the writing experiences of people with aphasia. *International Journal of Language & Communication Disorders*, *57*(6), 1381–1398. https://doi.org/10.1111/1460-6984.12762

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care: Journal of the International Society for Quality in Health Care*, *19*(6), 349–357. https://doi.org/10.1093/intqhc/mzm042

Vuong, G., Burns, C. L., Dignam, J., Copland, D. A., Wedley, H., & Hill, A. J. (2025). Configuration of a telerehabilitation system to deliver a comprehensive aphasia therapy program via telerehabilitation (TeleCHAT): A human-centred design approach. *Aphasiology*, *39*(1), 93–124. https://doi.org/10.1080/02687038.2024.2314328

Wallace, S. E., Hux, K., Knollman-Porter, K., Patterson, B., & Brown, J. A. (2023). A mixed-methods exploration of the experience of people with Aphasia using text-to-speech technology to support virtual book club participation. *American Journal of Speech-Language Pathology*, *32*(6), 2768–2791. https://doi.org/10.1044/2023_AJSLP-23-00094

Webster, J., Morris, J., Malone, J., & Howard, D. (2021). Reading comprehension difficulties in people with aphasia: Investigating personal perception of reading ability, practice, and difficulties. *Aphasiology*, *35*(6), 805–823. https://doi.org/10.1080/02687038.2020.1737316

Wilson, C., Jones, A., Schick-Makaroff, K., & Kim, E. S. (2023). Understanding the impact of group therapy on health-related quality of life of people with Aphasia: A scoping review. *Speech, Language and Hearing*, *26*(2), 88–101. https://doi.org/10.1080/2050571X.2021.1917216

Wilson, C., & Kim, E. S. (2021). Qualitative data collection: Considerations for people with Aphasia. *Aphasiology*, *35*(3), 314–333. https://doi.org/10.1080/02687038.2019.1693027

Wilson, E., & Turner, N. (2024). Expanding qualitative interviewing for studies involving adults with different communication needs: Reflections on research with people living with motor neurone disease. *International Journal of Qualitative Methods*, *23*, 16094069241251537. https://doi.org/10.1177/16094069241251537

Woolf, C., Caute, A., Haigh, Z., Galliers, J., Wilson, S., Kessie, A., Hirani, S., Hegarty, B., & Marshall, J. (2016). A comparison of remote therapy, face to face therapy and an attention control intervention for people with aphasia: A quasi-randomised controlled feasibility study. *Clinical Rehabilitation*, *30*(4), 359–373. https://doi.org/10.1177/0269215515582074

World Health Organization. (2001). *International Classification of Functioning, Disability and Health: ICF*. World Health Organization.