



## Computer-based script training for aphasia: Emerging themes from post-treatment interviews

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### ABSTRACT

This study presents results of post-treatment interviews following computer-based script training for persons with chronic aphasia. Each of the 23 participants received 9 weeks of AphasiaScripts training. Post-treatment interviews were conducted with the person with aphasia and/or a significant other person. The 23 interviews yielded 584 coded comments that were categorized into ten themes. Five of the themes related to the communication behaviors of the participant, whereas the other five related to the computer program and study procedures. Examples of each theme are presented. The themes provide qualitative evidence of change and generalization, supporting the use of this computer-based script training program.

**Learning outcomes:** The reader will be able to describe (1) a computer program developed for training scripts for individuals with aphasia, and (2) Summarize themes derived from post-treatment interviews regarding changes in communication after computer-based script training.

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Although individuals with aphasia benefit from treatments that improve linguistic skills, residual communication problems generally continue to have a substantial impact on their daily lives. Therefore, treatments that are more socially oriented and focus on improving ability to participate in personally relevant daily activities have received increased attention (LPAA Project Group, 2000; Simmons-Mackie, 2008). Script training is an approach to aphasia therapy that focuses on conversation practice pertinent to the person with aphasia. Studies have supported the use of script training for individuals with aphasia and apraxia of speech. For example, Youmans, Holland, Munoz, and Bourgeois (2005) examined the efficacy of script training with two persons with non-fluent aphasia using a single subject, multiple baseline design across three different scripts. Script performance improved to 97% and 100% accuracy for both participants as training on each script was implemented, while baseline measures for untrained scripts remained low and stable. There was limited generalization to novel conversation partners. The authors did not report performance on traditional standardized language tests such as the Western Aphasia Battery (Kertesz, 1982) because they did not anticipate changes in underlying linguistic competence.

More recently, Youmans, Youmans, and Hancock (2011) evaluated script training with three individuals with apraxia of speech. All participants successfully mastered their scripts and demonstrated script retention for six months following treatment. Participants reported increased confidence, speaking ease, and speech naturalness.

AphasiaScripts is a computer program that has been developed to facilitate script training. It provides a realistic conversational context for repetitive practice (Cherney, Halper, Holland, & Cole, 2008). This is important in view of the

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underlying theory on which script training is based, the instance theory of automatization (Logan, 1988). Instance theory suggests that automaticity of skills is achieved by retrieving memories of complete context-bound skilled performances. These memories are formed with repeated exposures to and practice on the same task. Many highly routine tasks are more appropriately practiced as a whole task within a context (sentences and conversation), rather than being broken down into component sub-skills (phonemes and words).

We have previously evaluated the impact of AphasiaScripts using patient-reported outcomes (Manheim, Halper, & Cherney, 2009) as measured by the Communication Difficulty (CD) subscale from the Burden of Stroke Scale (BOSS) (Doyle, 2002; Doyle, McNeil, & Hula, 2003; Doyle et al., 2004). A delayed treatment design was used for 20 subjects with chronic aphasia, and BOSS measures were taken at baseline, pre-intervention, post-intervention and follow-up. AphasiaScripts resulted in a statistically and clinically significant decrease of 6.79 points ( $p = .038$ ) in the CD subscale of the BOSS which was maintained during the follow-up period.

The term “patient-reported outcomes” (PROs) has evolved to include any endpoint derived from patient reports, whether collected in the clinic, in a diary, or by other means, including symptom reports, formal instruments to measure health-related quality of life, health status, and satisfaction with treatment (Wilke, Burke, & Erickson, 2004). The added value for assessing patient reported outcomes in a variety of chronic conditions is now well documented for evaluation of treatment effectiveness (Bottomley, Jones, & Claassens, 2009; Tubach et al., 2005; Wiklund & Junghard, 2003; Wilke et al., 2004). In this paper, we present another method of measuring patient-reported outcomes following script training – post-treatment interviews. Having a second PRO measure would serve to corroborate the prior results.

In a pilot study of AphasiaScripts with three participants with chronic aphasia (Broca's, Wernicke's and anomic), post-treatment interviews were conducted following practice of three individualized scripts over a nine week period of time. Five positive themes were consistently identified from the post-treatment interviews as follows: increased verbal communication; improvements in other modalities and situations; communication changes noticed by others; increased confidence; and satisfaction with the software. In this article, we report on the results of the post-treatment interviews of an additional 23 participants following AphasiaScripts training.

## 1. Methods

### 1.1. Study design

A delayed treatment design was used in which participants received a computer-based intervention for nine weeks. Standardized language assessments including the Western Aphasia Battery and the Burden of Stroke Scale were administered at four separate time periods: (1) at entry into the study (baseline); (2) approximately six weeks later at the start of the intervention (pre-treatment); (3) at the end of the intervention (post-treatment); and (4) at a retest planned to occur at approximately six weeks after the end of the intervention (follow-up). Interviews were conducted with the participant and/or a significant other by the treating clinician and investigator only at the post-treatment assessment session.

### 1.2. Intervention

In AphasiaScripts, an avatar that serves as a virtual therapist is programmed to produce natural speech with correct movements of the speech articulators (Cherney et al., 2008). Prior to treatment, the individual with aphasia and the speech-language pathologist worked together to develop individualized scripts on a topic that was meaningful, relevant, and matched to the participant's communication level. Examples of the scripts have been described elsewhere (Holland, Halper, & Cherney, 2010). After a script was developed, it was typed into the program and recorded by the speech-language pathologist.

Using AphasiaScripts, the individual with aphasia practiced the recorded conversations repeatedly. Script practice has three phases. First, the participant listens to the entire script while it appears on the screen. Second, each sentence or conversation turn is practiced repeatedly. Third, the conversation is practiced with the virtual therapist while cues are provided depending on the participant's needs (see Fig. 1). These include seeing the written word, hearing the therapist's voice during choral speaking, and watching oral-motor movements of the virtual therapist. These cues are faded over time so that eventually the participant practices the conversation with the virtual therapist, without cues, as in a real conversation (Cherney et al., 2008). The participants with aphasia can control their own practice sessions. They select how much time they want to spend in each phase of the program and can choose to practice individual words, sentences, or the entire script.

Participants practiced three individualized scripts for three weeks each, for a total of nine weeks of treatment. They were asked to practice at least 30 min a day, six days a week for a minimum practice time of three hours a week.

### 1.3. Post-treatment interviews

Post-treatment interviews were conducted by the treating speech-language pathologist and investigator (LRC) in a quiet room. Interviews were semi-structured and followed a general protocol that is presented in Appendix A. The questions were open-ended, allowing the interviewers to pursue inquiry following the lead of the interviewee(s), in order to touch on as many areas of potential change as possible and to get the richest responses. Supported communication techniques were used

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