Severe Chronic Aphasia: An Intensive Treatment Protocol for Auditory Comprehension

Introduction

Severe auditory comprehension deficits associated with aphasia can impact all aspects of a person's life. For example, prognosis for rehabilitation independence during ADLs, mobility, and urinary continence is poorer for people with severe auditory comprehension deficits. Furthermore, the treatment dropout rate is higher for people who have auditory comprehension deficits (Paolucci et al., 2005). People with aphasia can also become frustrated because their auditory comprehension impairments adversely impact their social relationships and vocational opportunities which causes social isolation (Davidson, Howe, Worrall, Hickson, & Togher, 2008; Garcia, Laroche, & Barrette, 2002).

A review of the literature reveals a plethora of interventions designed to improve the verbal expression skills of people with aphasia (Schuell, Jenkins, & Landis, 1964, Robey, 1998, Mortley, Wade, & Enderby, 2004; Choe, Azuma, Mathy, Liss, & Edgar, 2007). Furthermore, research suggests that intensive treatment improves the verbal expression skills of people with chronic aphasia (Cherney, Patterson, Raymer, Frymark, & Schooling, 2008; Kleim, & Jones, 2008). Specifically, a meta-analysis revealed that treatment sessions that last between 2-4 hours daily, facilitated improved communicative ability (Basso, 2005). While there is research to support how an intense treatment protocol can positively impact verbal expression for people with aphasia, there is limited data regarding how these interventions impact auditory comprehension, including detection of a communication breakdown. Therefore, the purpose of this study was to investigate whether an intensive auditory comprehension treatment protocol improved participants': 1) detection of auditory comprehension breakdowns at the word level and 2) word-level auditory comprehension.

Methods

Participants

Participants included 3 adults with chronic aphasia and severe auditory comprehension deficits. All participants had aphasia due to left hemisphere stroke, were at least 1 year post onset, had at least a high school education, were right-handed, native speakers of American English and demonstrated hearing and vision adequate to perform the experimental tasks. Table 1 lists the participant's age, gender, months post-onset, as well as type and severity of aphasia.

Treatment Protocol

The researchers employed a single-subject ABA design. Participants were seen for two hours per day, 5 days per week for 4 weeks. The treatment included a word-level auditory comprehension task. Specifically, participants were required to correctly match the spoken word of the examiner to a picture of high frequency. Stimuli included 40- 4x6 color pictures of objects based on Francis & Kucera's frequency analysis *of* English usage lexicon and grammar (1982). The participant's viewed each picture three times, on nonconsecutive occasions. More specifically, the stimuli were presented once with a semantically related foil, once with a phonologically related foil, and once with the target word. The participant was required to identify the correct target and reject the semantic and phonemic foil in order to obtain full credit

for a response. (Example: Target – Hat, Semantic Foil – Scarf, Phonemic Foil – Bat). Researchers documented participant initiated requests for clarification or repetition of verbally presented stimuli was measured during the experimental tasks. Additionally, participants were instructed on how to use a frustration rating scale to convey their frustration at any point during treatment. If participants did not use the rating scale, a cue was given by the investigator to rate frustration upon completion of the experimental activity.

Reliability. The researchers will complete an inter-judge reliability measure on 20 percent of the sessions to the level of treatment fidelity (in-progress).

Dependent Variables:

The researchers measured the following during each session:

1. Number of correct yes/no responses to the target, semantic, and phonemic foils.
2. Number of participant-initiated requests for clarification when detection of breakdowns in auditory comprehension occurred (e.g., request for repetition or gestured/voiced misunderstanding).
3. Participant fatigue/frustration rating at the beginning, after completion of experimental phases and at the end of each session using a 0 to 5 rating scale.

Results

Single Word Comprehension

Participant 1. A stable baseline and an immediate response to intervention with generalization to untrained stimuli was demonstrated. Follow-up maintenance probes revealed higher average percent correct response than observed during baseline for both the treated and untreated stimuli. Calculations of Cohen's d yield an effect size of 11.3 (Cohen, 1988) (see Figure 1).

Participant 2. Following a stable baseline, Participant demonstrated an immediate response to intervention with generalization to untrained stimuli. Follow-up maintenance probes revealed higher average percent correct response than determined at baseline for both treated and untreated stimuli. Calculations of Cohen's d yield an effect size of 21.3 (Cohen, 1988) (see Figure 2).

Participant 3: Treatment protocol modifications were made for Participant 3 during the first week of the experimental phase because it was determined that the original treatment protocol was too complex for her. The following modifications were made: (1) number of stimuli were decreased from 40 to 13; (2) foils changed to include a target word, a non-word, and a phonemically-related non-word, and (3) the investigator provided 2-3 repetitions of each verbally presented stimuli. However, this participant did not demonstrate a response to intervention even with the aforementioned modification made. The effect size for Participant 3 was not calculated due to a lack of variance during the pre-treatment phase (see Figure 3).

Self Awareness/Requests for Repetition

Participant 1. An increase in independent requests for repetition was demonstrated when compared to baseline with generalization to non-treated stimuli. Rate of requests decreased during the maintenance phase and returned to initial baseline levels (see Figure 4).

Participant 2. In comparison to the baseline phase, there was an increase in independent requests for repetition with generalization to non-treated stimuli. Follow-up maintenance probes revealed a higher number of requests for repetition than observed during baseline (see Figure 4).

Participant 3. Awareness of comprehension breakdown was not observed and no independent requests for repetition or clarification were made throughout the treatment protocol. Even with cues from the examiner, an increase in use of repetition was not utilized by the participant.

Clinical Implications

This study confirmed that an intensive auditory comprehension protocol can successfully be employed and that improvements in comprehension with generalization to non-treated stimuli can occur in people who have severe chronic aphasia. A contributing factor to this improvement was an increase in number of self-initiated requests for repetition. An increase in self-awareness of comprehension breakdowns may have been the reason for this increase in request for clarification. On the other hand, Participant 3's lack of improvement in awareness of communication breakdowns may have contributed to the lack of improvement in response accuracy. Further testing regarding speech perception deficits and self awareness may help refine this treatment protocol. The current study may be strengthened in future replications by incorporating personally-relevant materials and by including measures that capture the changes in verbal expression anecdotally observed.

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Table 1

Demographic and aphasia related data for the 3 participants in this study

Variable	P1	P2	P3
Months Post Onset	65	15	56
Age	72	67	73
Gender	Female	Female	Female
Years Of Education	12	12	12
Type of Aphasia	Wernicke's	Global	Global
WAB Aphasia Quotient	53.2	4.3	47
WAB Auditory Comprehension Subtest Score	4.3	3.9	1.6
PPVT-V Standard Score	47	55	20

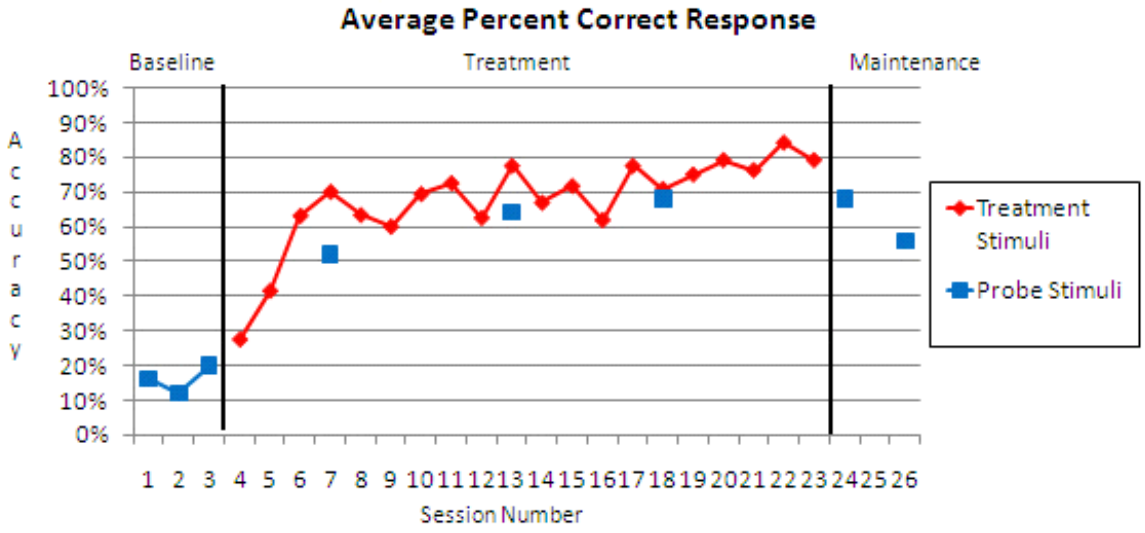

Figure 1. Comprehension of single high frequency words by Participant 1.

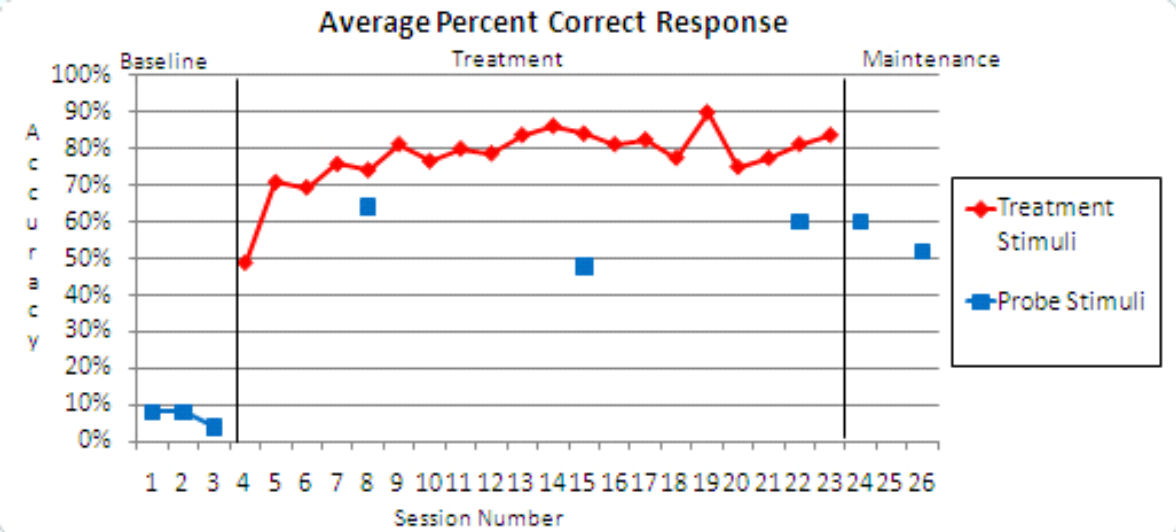

Figure 2. Comprehension of single high frequency words by Participant 2.

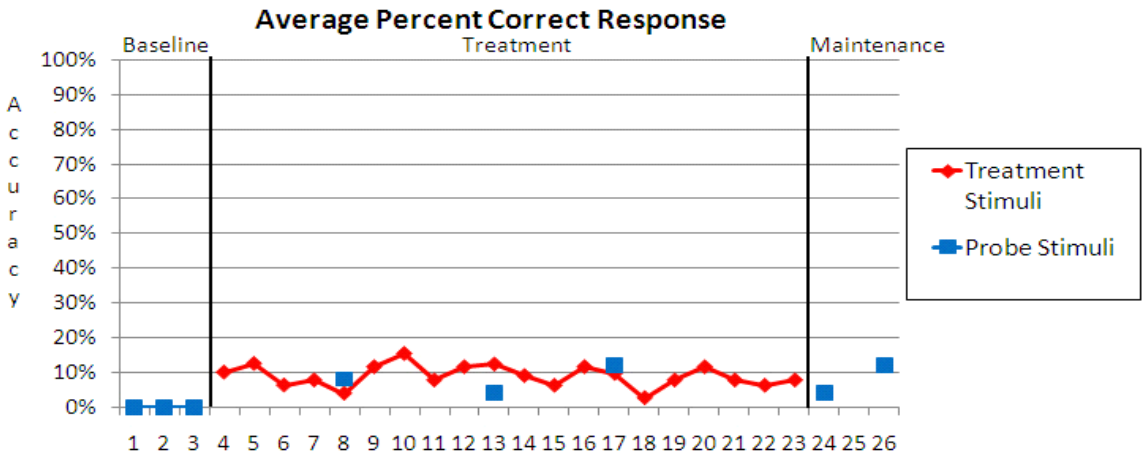

Figure 3. Comprehension of single high frequency words by Participant 3.

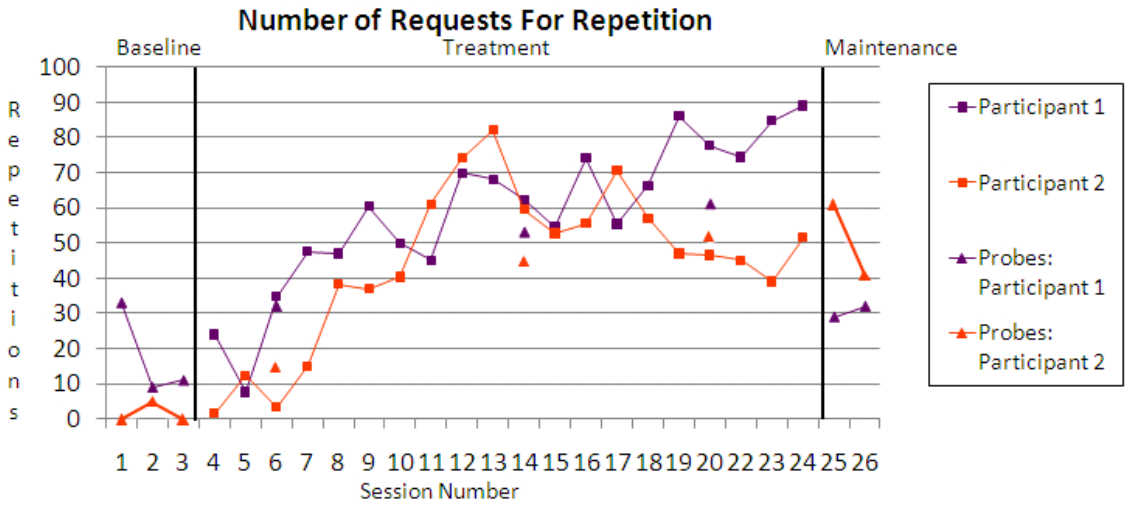

Figure 4. Independent request for repetition during comprehension breakdowns.