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Short-term Memory Training in Aphasia: Patterns of Treatment-Induced Learning and its Implications for Sentence Comprehension

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Background

Auditory-verbal short-term memory (STM) deficits and their effects on aphasic sentence comprehension have been contested for decades. Several studies revealed close links between STM and sentence comprehension in aphasia. For example, STM contributes to the processing of sentences with many content words (Martin & Feher, 1990). A recent study found that STM correlated with spoken sentence comprehension (Leff, Schofield, Crinion, Seghier, Grogan, Green & Price, 2009). However, only a handful of studies have investigated training of STM in aphasia. Using a novel treatment of STM in a person with aphasia, we sought to determine if the treatment would result in: **A.** improvements in STM (measured by span tasks); **B.** generalization to sentence comprehension (measured by the Token Test (TT, McNeil & Prescott, 1978) and the Test for the Reception of Grammar (TROG, Bishop, 1989)).

Method

MH was a 71-year-old woman, five years post-stroke, presenting with transcortical motor aphasia (aphasia quotient 40) and no motor speech deficits. Using listening span tasks, training was implemented in a multiple-baseline design. Training involved spans of 5 and 6 monosyllabic words and spans of 3 and 4 polysyllabic words (3 syllables). No other language tasks were trained. During training, MH listened to two lists of semantically unrelated nouns and judged whether the lists were the same or different. Throughout treatment, the order of words (within and across lists) was different from probe to probe. Concreteness, frequency, and phonological similarity were controlled.

Results & Discussion

Figure 1 shows MH's performance in each treatment probe. Listening span improved from 4 (pre-treatment) to 6 monosyllabic words. A span of 3 polysyllabic words was robust. However, polysyllabic words (at span 4) were more challenging, and treatment did not result in significant improvement. A goodness-of-fit based on the number of responses that fell above a 70% correct criterion of success was significant ($X^2(1)=5.538$ $p< .05$). Forward digit span improved from 4 to 6 digits. Digit listening span improved from 4 to 7 digits. The following abilities did not show improvements: Backward digit span, phonological processing, spoken noun comprehension. MH did not show significant changes on the TT (pre-training: 45%, post-training: 55%). However, she showed improvements

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on the TROG (pre-training: 49%, post-training: 64%). This difference was significant (McNemar $X^2(1)=7.042$ $p< .01$). The results show that following training, STM in aphasia can improve and this improvement can generalise to sentence comprehension.

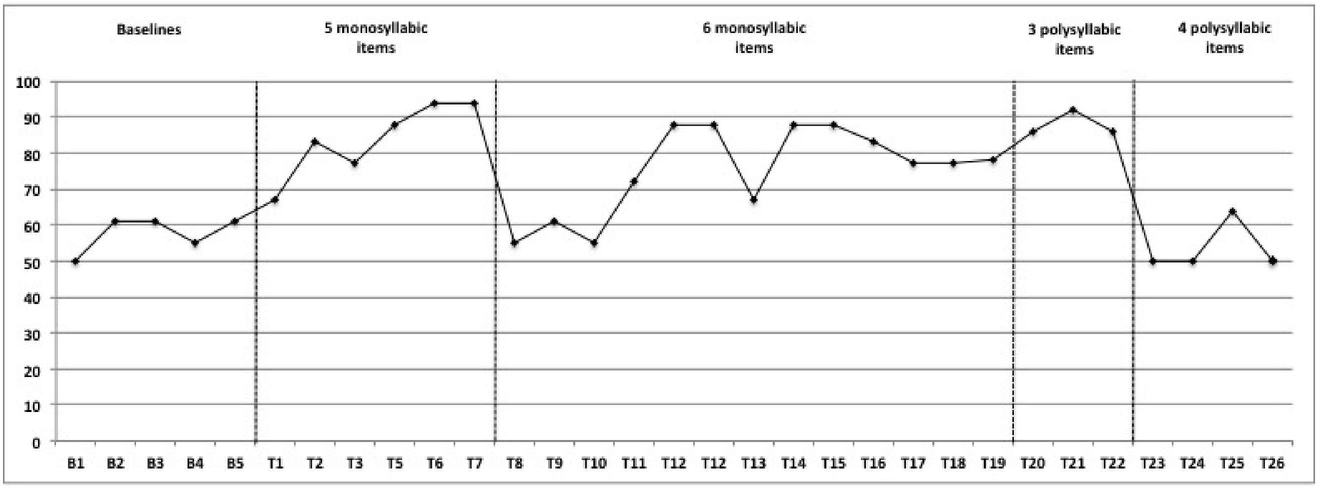

Figure 1. Performance during training

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