

Constraint Treatment for Chronic Aphasia: Do Treatment Gains Generalize to Story Retelling?

Constraint treatments for motor deficits after stroke involve immobilizing the unaffected arm and providing extensive practice with the affected arm to improve movement (e.g., Wolf et al., 1989; 2006). Similarly, constraint treatments for aphasia, or Constraint-Induced Language Therapy (CILT), require particular types of verbal output (the constraint) and extensive practice making verbal responses to improve speaking (Maher et al., 2006; Pulvermüller et al., 2001). In both the motor and language realms, performance benchmarks must be attained before a patient is able to move to the next level of training (the shaping component of the constraint treatment approach).

A vital ingredient in the constraint treatment approach is massed practice. In a recent review of aphasia rehabilitation studies, Cherney et al., (2008), found that intensity of treatment was the most important variable in improved language. Likewise, intensity of treatment has been shown to be a critical factor for motor recovery (Wolf et al., 2007), as well as language therapies (Bhogal, Teasell, & Speechley, 2003). Most therapy settings, however, do not provide the intensity necessary in the standard clinical environment (see Lang et al., 2009).

Despite promising early results for CILT, several unresolved questions remain. First, most studies of constraint for aphasia have been conducted with people less than 1 year post-stroke, though the Maher et al. (2006) study reported positive results for people with chronic aphasia. Moreover, evidence from single case studies suggests that people with chronic aphasia should benefit from CILT (Moss & Nicholas, 2006). The current investigation focused on those with chronic aphasia to replicate and extend the Maher et al. findings. Second, it is unclear what the best outcome measures are for CILT. Pulvermüller and colleagues (2001) have reported changes over treatment in impairment measures of aphasia and increases in self-reported quantity of language produces in daily life. We have focused on determining whether quantity of language (number of words produced), quality of language (content information units), or both increased with CILT. Third, it is unclear whether CILT gains extend to novel verbal production tasks. One of our goals was to determine if CILT treatment gains generalize to an untreated verbal production task, Narrative Story Card (Helm-Estabrooks & Nicholas, 2003) retelling.

Method

Participants. Eight individuals (six women, two men) with aphasia due to left hemisphere stroke participated in this study. The severity of aphasia ranged from mild to moderate on the Boston Diagnostic Aphasia Examination-III (Goodglass, Kaplan & Barresi, 2001). All patients had chronic aphasia—three years post-stroke or greater. All had a desire to improve verbal production skills.

Procedure. Four groups were enrolled in the study. Each study group consisted of two participants. Each group was seen 10 times (5 days/week for two consecutive weeks). Daily

treatment sessions lasted 3 hours. Treatment time was spent playing an adapted version of Go Fish, among other treatment tasks.

Participants took turns verbally asking for a card from their partner. A barrier was placed between the two participants to ensure that they could not use hand movements or facial expressions to facilitate their requests.

Participants were asked to use a particular grammatical format when making each request. Over the course of treatment, we gradually increased the grammatical complexity of their requests as they mastered easier formats (e.g. “rose”, “Can I have a rose?”, “May I please have a red rose?”). Treatment for all groups was administered by a licensed Speech Language Pathologist. Treatment programs were customized for each group, and individual goals were established for each participant based on his or her skill level at the start of the study.

Generalization probes were used to determine the extent to which gains in treatment corresponded to functional communication changes. Narrative Story Cards (Helm-Estabrooks & Nicholas, 2003), sets of pictured sequences depicting an accompanying orally presented story, were used as a generalization probe. The experimenter read a story, while the subject looked at the accompanying pictured sequence. Subjects were asked to retell the story to the best of their ability. Their responses were then used to determine if increased meaningful verbal production in treatment carried over to performance on this untreated task in the form of increased quantity and accuracy and informational content in speech.

Subjects’ responses were audio taped and transcribed. Experimenters used a checklist accompanying each narrative story to count the number of content information units (CIUs) produced by the subject.

For example:

[Original Story]: Abe is a lobsterman. One day, he finds a really big lobster in his lobster trap.

[Subject]: Abe is a lobsterman. One day out, ou out out in his bo boat h he he, umm, catches a huge lobster.

This example subject produced 6 of 9 possible CIUs. In scoring, some allowances were made if the subject changed tense (“he found” instead of “he finds”), or if meaning was identical to that of the CIU (“a huge” instead of “a really big”).

Group Results

Note, participants all made gains in treatment over the two week interval; some gains were large, some small. Data reported here are for the generalization task, Narrative Story Card (Helm-Estabrooks & Nicholas, 2003) retelling. First, we examined results for all 8 participants

included in a group. As can be seen in Figure 1, total number of words produced on the generalization probe increased only slightly with treatment. Likewise, when examining content information units (CIUs) as a group, little change over the treatment interval was observed in the Narrative Story Card CIUs (see Figure 2).

Individual Results

Although there was not much change in total words or number of CIUs produced in the group data, individual participants varied from the group level data quite a bit in their performance on Narrative Story Cards over the study interval. To illustrate those differences, two individuals were selected. One individual was deemed a “responder” because she showed moderate treatment gains and these gains generalized to Narrative Story Card retelling (Subject #1 in Figures 3 and 4). The other individual was deemed a “non-responder,” because he showed little treatment gain and no generalization of that small gain to Narrative Story Card retelling (Subject #5 in Figures 3 and 4). Figure 3, Panels A & B, show performance for total number of words produced on Narrative Story Card retelling. Figure 4, Panels A & B, show performance for CIUs. Overall, CIUs appear to be a more sensitive measure to changes over time than total number of words.

Conclusions

The CILT program was beneficial to people with chronic aphasia (more than 3 years post-stroke), but gains made in treatment generalized only modestly to Narrative Story Card retelling for most participants in this study. Performance across individuals was quite variable and was not reflected by overall group performance. We continue to examine the pattern of gains across participants to determine who benefits most from the CILT approach and which measures best reflect changes in language performance made in therapy.

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Figure 1. Group average word count for Narrative Story Cards measured every other day before the treatment session.

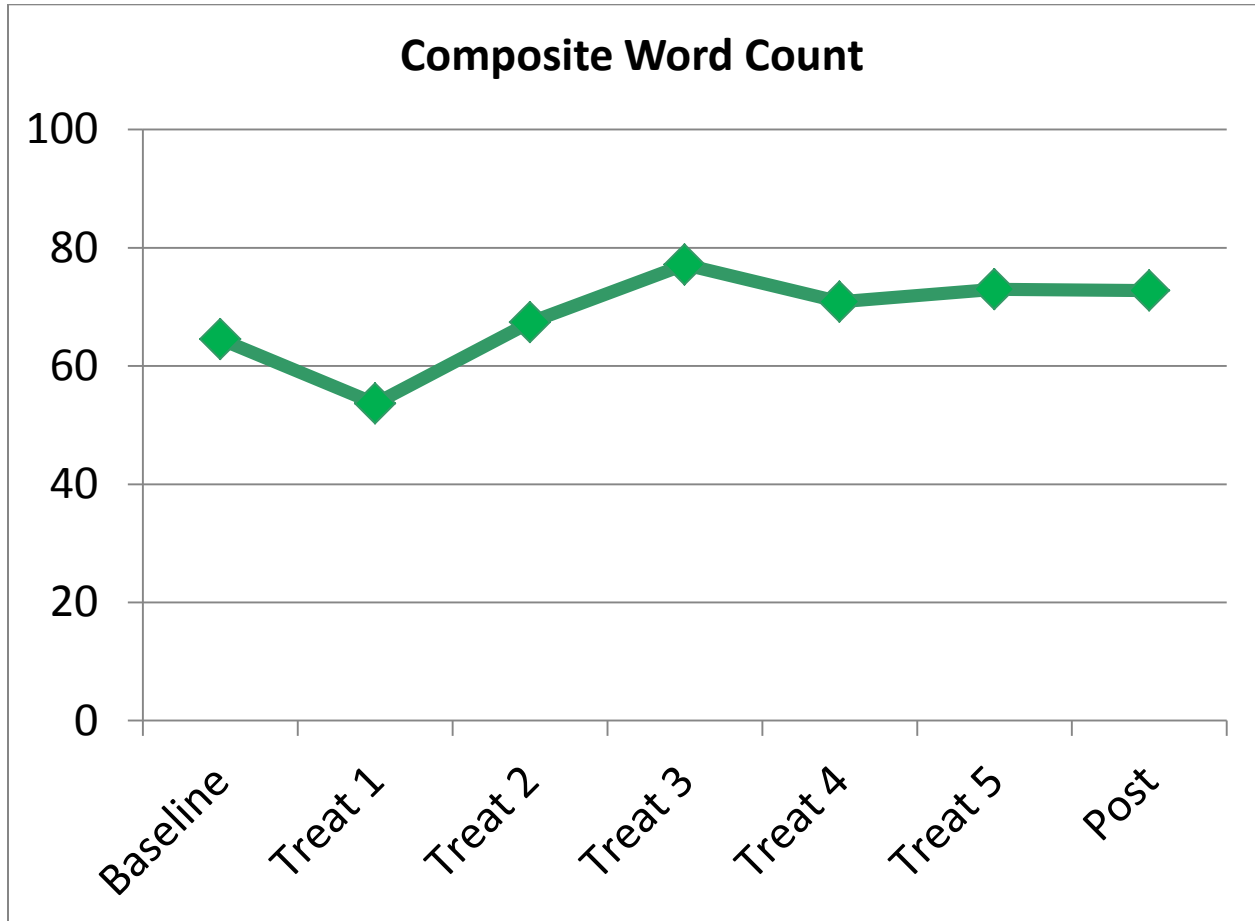


Figure 2. Group average Content Information Units (CIUs) for Narrative Story Cards measured every other day before the treatment session.

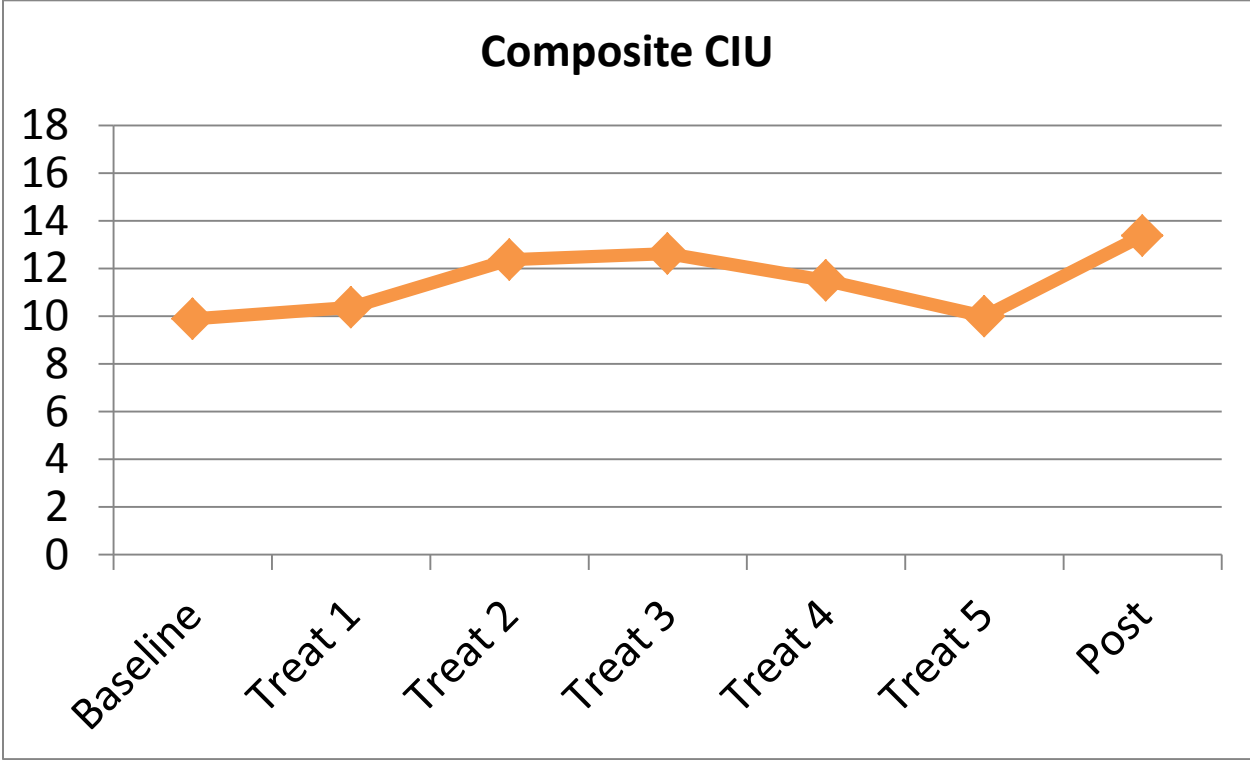


Figure 3. Individual results for words produced for a treatment “responder” (Subject #1) and a treatment “non-responder” (Subject #5).

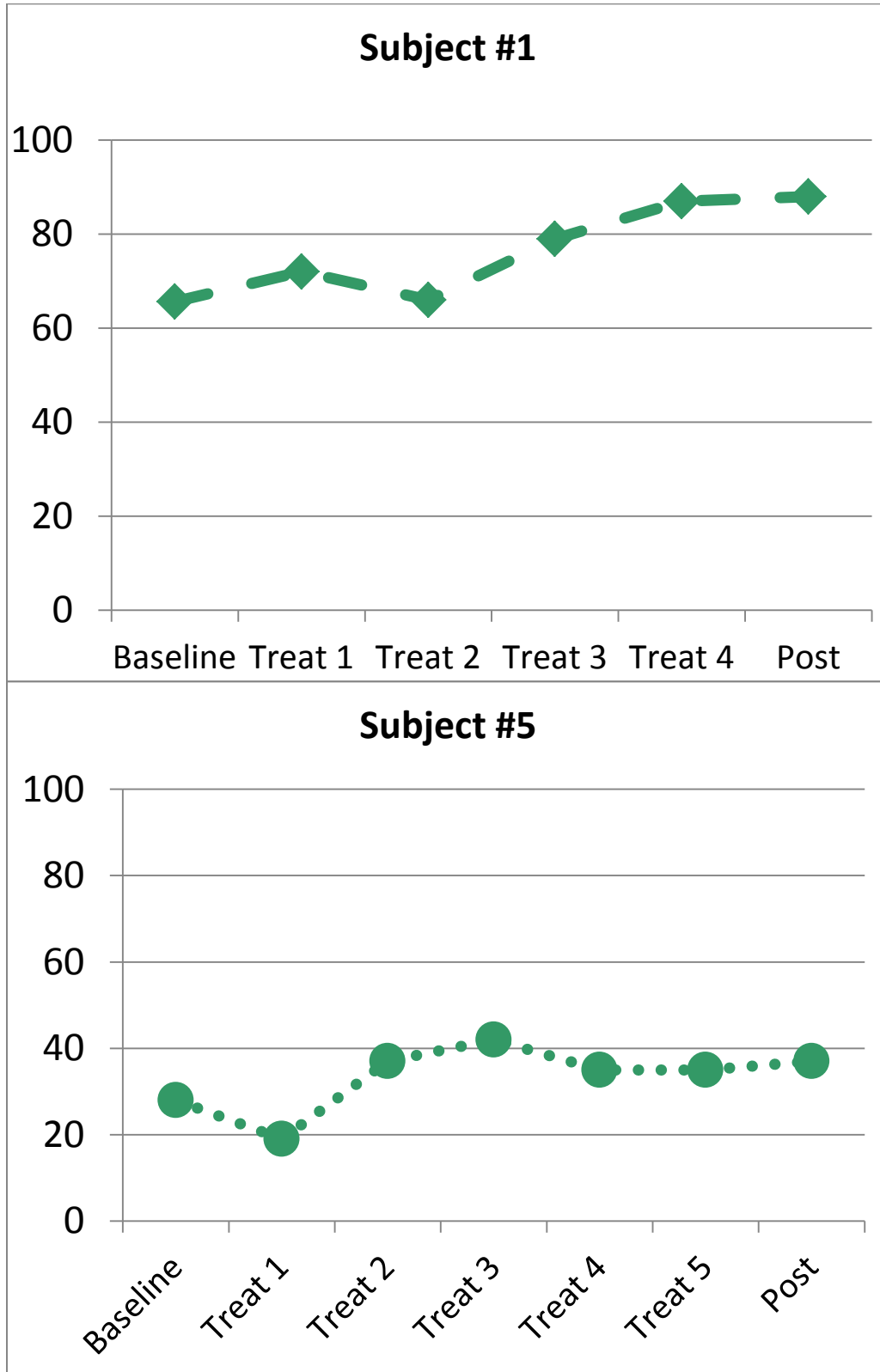


Figure 4. Individual results for Content Information Units (CIUs) produced for a treatment “responder” (Subject #1) and a treatment “non-responder” (Subject #5).

