University of Michigan
Aphasia Program

Mapping New Directions

RESEARCH ON INTENSIVE THERAPY OUTCOMES: AN ANNOTATED BIBLIOGRAPHY FOR THE LAST TEN YEARS

- Hinckley, J. J., & Carr, T. H. (2005). Comparing the outcomes of intensive and non-intensive context-based aphasia treatment. *Aphasiology*, *19*, 965–974.

This study aimed to directly investigate the effects of context-based aphasia treatment and intensive therapy on participants with aphasia. Thirteen adults participated in the study, 12 with Broca's aphasia and 1 with transcortical motor aphasia. Context-based treatment, which focuses on whole-task training and ecological validity, was provided to participants in the non-intensive group for 4 hours weekly and participants in the intensive group received 20 hours of individual treatment and 5 hours of group therapy each week. Four common measures were implemented pre- and post-treatment to evaluate clients. Two of these measures were taken from a catalogue-ordering task which was evaluated in a quiet environment and then with a concurrent tone detection task. The two standardized assessments that were used were the Communicative Abilities in Daily Living task (CADL-2) and the Psycholinguistic Assessment of Language Processing in Aphasia (PALPA). At pre-testing, no statistically significant differences were found. After calculating a difference score (post-score minus pre-score), similar improvements were found in the intensive and non-intensive groups on the catalogue-ordering tasks and picture naming tasks (PALPA). The non-intensive group showed greater improvement on the CADL-2. Results suggest that intensive therapy may not be more effective when implementing context-based treatment and that 4 hours per week may be suitable for this specific type of therapy. Intensive and non-intensive schedules were equally effective when a single context was the focus of training, but only the intensive schedule resulted in transfer of training to other language modalities.

- Meinzer, M., Djundja, D., Barthel, G., Elbert, T., & Rockstroh, B. (2005). Long-term stability of improved language functions in chronic aphasia after constraint-induced aphasia therapy. *Stroke*, *36*, 1462–1466.

This study investigated the immediate and long-term (6 months post therapy) effects of short-term intensive language therapy in 27 participants with chronic aphasia. Participants received 30 hours of training within a 2-week period. Language evaluations were done using the Aachen Aphasia Test (AAT), and the Communicative Effectiveness Index (CETI), and the Communicative Activity Log (CAL) was completed by relatives. Patients were tested before treatment, immediately after, and then 6 months post treatment. Results of the AAT immediately after short-term intensive treatment showed improvements in language function for all participants, and these improvements were maintained through testing 6 months post treatment. According to the CETI, relatives considered communicative effectiveness to have improved after training and remain above baseline at the 6-month follow up, and the CAL reported an immediate increase in amount of everyday communication. These results suggest that short-term intensive therapy is not only immediately effective but that the results can be maintained even 6 months post-treatment.

- Pulvermüller, F., Hauk, O., Zohsel, K., Neininger, B., & Mohr, B. (2005). Therapy-related reorganization of language in both hemispheres of patients with chronic aphasia. *NeuroImage*, *28*, 481–489.

This study investigated the effects of intensive therapy on cortical reorganization due to language improvement in patients with aphasia. Ten native German speakers with aphasia due to a left CVA participated in 30 hours of therapy over a 10-day period. The Token Test in the Aachen Aphasia Test was used to assess language functioning before and after therapy and brain activity was tested using a lexical decision experiment. This task required participants to view a series of words and pseudo words and respond by pushing a button to indicate their judgment of the word as a real or pseudo word. Participants' EEG was recorded while they completed this task. After 10 days of intensive therapy, participants showed improvements in language as evidenced in improvements on the Token Test. This was correlated with participants' improvement in neurological activity during the lexical decision task involving words but not pseudo words. Evoked response potentials post-treatment for the word stimuli became stronger over the course of therapy whereas the pseudo words showed no change. The word stimuli showed increased cortical activation bilaterally, providing evidence of cortical reorganization after intensive therapy.

- Meinzer, M., Elbert, T., Wienbruch, C., Djundja, D., Barthel, G., & Rockstroh, B. (2004). Intensive language training enhances brain plasticity in chronic aphasia. *BMC Biology*, *2*, 20.

Twenty-eight participants with chronic aphasia (post-onset > 12 months) received 30 hours of therapy within a 2-week period. Participants were administered the Aachen Aphasia Test Battery before and after therapy. ASWAM (Abnormal Slow Wave Activity Mapping), which detects slow wave activity common near lesion areas in the brain, was also done before and after therapy. Sixteen of the 28 patients showed a decrease in slow-wave activity, and all 28 patients displayed an increase in language function according to the Aachen Aphasia Test Battery. These results provide evidence that intensive therapy results in language gains as measured by changes in slow-wave brain activity; the reduction of slow wave activity in the left hemisphere of the brain occurs most significantly with intensive therapy and subsequent improvements in language function.

- Bhogal, S. K., Teasell, R., Speechley, M., & Albert, M. L. (2003). Intensity of aphasia therapy, impact on recovery. *Stroke*, *34*, 987–993.

A meta-analysis was conducted using speech and language therapy outcomes literature on patients with aphasia after a stroke. Ten articles were selected, representing 864 individual patients. Of the ten studies, the most common outcome measures were the Token Test, Porch Index of Communicative Abilities (PICA), and Functional Communication Profile (FCP). These were used for analysis in this study. Two of the 10 studies lacked relevant data, and of the 8 remaining studies 4 showed positive results and 4 showed negative results. The 4 positive studies reported approximately 100 hours of therapy whereas the negative studies reported approximately 44 hours in total. It is noteworthy that the rates differed as well. The 4 positive studies reported approximately 8.8 hours of therapy per week for 11.2 weeks and the negative studies reported 2 hours per week for 22.9 weeks. Results showed that the positive studies, which showed more significant improvement in the target measures, also reported implementation of more intensive therapy over a shorter period of time, while the negative studies showed less improvement with less intensive therapy.

- Basso, A., & Caporali, A. (2001). Aphasia therapy or the importance of being earnest. *Aphasiology*, *15*, 307–332.

This study investigated the effects of language therapy on 6 patients with aphasia. The 6 patients were separated into pairs and served as individual comparison studies. Comparisons were not made regarding specific tasks but more generally in improvements in daily communication. The first pair of patients with aphasia participated in similar therapy programs and differed in intensity: the control patient received 5 hours of therapy a week while the experimental patient received 2-3 hours of therapy 7 days per week. While direct comparisons of their production post-therapy could not be done, it was evident that the patient receiving intensive therapy showed greater improvements in production and was more communicative. The second comparison between 2 patients with global aphasia showed the experimental patient still improving in language function after 40 months of therapy 7 days a week. The control patient reached a plateau after 16 months of therapy and received 5 hours of therapy a week for 20 weeks. The final comparison showed the experimental patient still improving while participating in 14 months of therapy for 7 days a week while the control patient received 5 hours of therapy per week for 15 weeks and reached a plateau after 11 months. With a majority of characteristics of the patients compared being similar, these data suggest that a more intensive regimen of therapy can result in more gains for patients with aphasia.

- Pulvermüller, F., Neininger, B., Elbert, T., Mohr, B., Rockstroh, B., Koebbel, P., et al. (2001). Constraint-induced therapy of chronic aphasia after stroke. *Stroke*, *32*, 1624–1626.

Constraint-induced therapy implements an intensive therapy schedule over a minimal number of consecutive days. This study implemented constraint-induced therapy, (3 hours per weekday for 2 weeks) in the treatment of 10 patients while 7 patients received a more conventional treatment which consisted of the same number of hours extended over 4 weeks. All participants had suffered a single stroke and were native speakers of German. Pre- and post-testing was administered using the Aachen Aphasia Battery and the Communicative Activity Log (CAL) was used to assess language use in everyday life. After treatment, results showed significant improvement for patients receiving intensive constraint-induced therapy compared to patients receiving conventional treatment. These results also carried over to the CAL which indicated that patients receiving intensive constraint-induced therapy showed 30% improvement in communication in everyday life while control patients did not show improvement.

- Hinckley, J. J., & Craig, H. K. (1998). Influence of rate of treatment on the naming abilities of adults with chronic aphasia. *Aphasiology*, *12*, 989–1006.

Hinckley and Craig conducted a retrospective study on the outcomes of adult patients with chronic aphasia who received various degrees of therapy. All three studies included participants from the Residential Aphasia Program at the University of Michigan with chronic aphasia and used the Boston Naming Test (BNT) and content units (CU) from the Analysis of Utterance procedure as common measures. The first study examined participants who received 6 weeks of intensive therapy (23 hours per week) and results showed significant changes in BNT scores and CU production from pre- to post-testing. Study 2 compared treatment results of participants who received intensive therapy with those who received less than 3 hours of therapy per week. Results again showed that participants receiving intensive therapy improved (93% of patients improved on BNT and 80% on CU production), while 40% of participants receiving less than 3 hours of therapy per week improved on the BNT and 33% on CU production. Finally, Study 3 investigated the common clinical recommendation of 3-5 hours of therapy per week over a 6-week period and compared this to intensive therapy of 23 hours per week. Results here showed 90% of participants improving with intensive treatment and 50% of participants improving with non-intensive treatment based on BNT scores.

- Robey, R. R. (1998). A meta-analysis of clinical outcomes in the treatment of aphasia. *Journal of Speech, Language, and Hearing Research, 41*, 172–187.

Although meta-analyses of the clinical outcomes of aphasia treatments have been done previously, this 1998 meta-analysis attempts to address more specific questions regarding aphasia therapy including the effects of different amounts and magnitudes of treatment. Fifty-five articles of the outcomes of patients with aphasia were reviewed and coded for target variables such as amount of treatment, type of treatment, initial severity, and type of aphasia. The 55 outcomes articles provided evidence that high-intensity treatment, here defined as a minimum of 2 hours of therapy per week, during the acute period resulted in greater language changes and furthermore that increases in duration of treatment result in increases of the magnitude of change.

- Odell, K. H., Bair, S., Flynn, M., Workinger, M., Osborne, D., & Chial, M. (1997). Retrospective study of treatment outcome for individuals with aphasia. *Aphasiology*, *11*, 415–432.

This retrospective study compiled data from medical charts of 20 patients with either moderate or severe aphasia. All 20 patients were diagnosed with a left CVA and received various numbers of half-hour therapy sessions. A median score from the Functional Communication Profile (FCM) was recorded and used as a common pre- and post-testing measure. All patients achieved a change of the median score of 1, showing 1 level of FCM improvement. However, it was also evident that patients showed the most improvement if they participated in a greater number of therapy sessions. Both moderate and severe participants who received 1-22 sessions of therapy gained 0.5-1.5 levels, participants receiving 23-40 sessions gained 1-3 levels, and a single participant receiving 110 sessions improved 4 levels.

- Denes, G., Perazzolo, C., Piani, A., & Piccione, F. (1996). Intensive versus regular speech therapy in global aphasia: A controlled study. *Aphasiology*, *10*, 385–394.

Denes et al. investigated the outcomes of patients with global aphasia who received either regular (3 times a week) or intensive (daily) speech therapy. Eighteen native Italian speakers participated and were split into 2 groups. One group received regular therapy, defined as 60 sessions over a 6-month period and the intensive treatment group received 130 therapy sessions. Pre- and post-testing were conducted using the Aachen Aphasia Test (AAT). Because group size was so small, it was not possible to compare the groups other than to observe that while all participants showed improvement on the AAT, those receiving intensive therapy showed greater gains. Furthermore, of the 8 participants receiving intensive therapy, only 4 were still classified as patients with global aphasia after therapy. The others were diagnosed with Broca's, non-classifiable aphasia, or amnestic. Of the 9 participants in the regular therapy group, 6 continued a diagnosis of global aphasia and others were given less severe diagnoses.

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