

Title: Comparing the Treatment Effectiveness of Conversational and Traditional Aphasia Treatments Based on Conversational Outcome Measures

Abstract

Background: Few studies have investigated conversation therapy between a person with aphasia and a clinician. Furthermore, little information exists on traditional stimulation treatment's effect on conversational outcomes.

Methods: Prospective single-subject (ABABA) study repeated across 4 participants, with quasi-randomized treatment order, investigated the treatment effects of conversation and traditional stimulation treatments on conversational outcomes. Primary outcomes included 6-minute conversations coded for pragmatic behaviors, percent CIUs; and auditory comprehension, lexical retrieval, and syntax probe performance.

Results: Conversational abilities were highest during conversation therapy regardless which treatment was administered first. These results provide a template for conducting and measuring conversational therapy.

Paper

Background:

The goal of aphasia rehabilitation is to produce changes that allow people to participate in their everyday life roles (Rodriguez & Gonzalez-Rothi, 2008). Effective conversation is fundamental to everyday communicative functioning and thus the ultimate outcome for speech pathology interventions with individuals with aphasia (Armstrong & Mortensen, 2006). In accord, the American Speech Language and Hearing Association's (ASHA) scope of practice states "the overall objective of speech language pathology services is to optimize an individual's ability to communicate and swallow, thereby improving quality of life" (ASHA, 2007, p. 5).

Systematic reviews and meta-analyses indicate that in general, aphasia therapy is efficacious (Holland, Fromm, DeRuyter, & Stein, 1996; Robey, 1994; Robey, 1998). In this study we replace the term multi-modal stimulation with traditional stimulation (TS) to differentiate it from a non-traditional form of treatment--conversational treatment. To date, no traditional stimulation treatment studies have directly assessed the generalization of treatment effect using conversational outcomes.

In the past decade interest in a *social model*, which emphasizes participation and quality of life in people with aphasia (PWA) has increased. Studies have examined conversational discourse between PWA and their conversation partners (CP). Other research has studied the use of trained CP to improve communication with PWA (Fox, Armstrong, & Boles, 2009; Kagan, Black, Duchan, Simmons-Mackie, & Square, 2001; Lyon, et al., 1997). These studies addressed changes in communication style for the CP partner but not for the PWA. Even fewer studies have used conversation therapy as the primary focus of individual treatment (i.e., between the PWA and clinician) to train strategies that enhance conversational success.

Because no one has investigated whether there is a difference in conversational gains based on which treatment is received, or the order in which the two treatments are received, this study's aim was to examine the effects of TS therapy-first followed by

conversation therapy (CT) compared to CT-first followed by TS therapy on conversational outcomes by asking:

1. Is there a treatment effect for TS aphasia therapy?
2. Is there a treatment effect for traditional probes during CT?
3. Does TS therapy first followed by CT or CT first followed by TS therapy produce better results in conversational outcomes?
4. Does the participant demonstrate improvement on secondary outcome measures for language impairment, impact of the impairment on the person's ability to participate in life roles, and quality of life?

Participants:

Four adults (53-78 years old) at least 6-months post-first left cerebrovascular accident participated. Inclusion criteria included: mild-moderate score on the *Western Aphasia Battery* (WAB; Kertesz, 2007); native English speaker; right hand dominant; no other history of neurological disorders, language disorders, substance abuse, or psychiatric illness; at least a high school education; adequate hearing and vision based on screening; mild to no apraxia of speech; community-dwelling; receiving no speech/language services.

Methods:

This phase I (Robey & Shultz, 1998) prospective study utilized an ABABA single-subject design replicated across participants. The treatment design included: baseline probes (A₁ phase) and pre-testing; TS therapy (B₁ phase); post-testing and withdrawal period (A₂ phase); CT (B₂ phase); and post-post-testing (A₃ phase). Two participants received the treatment in the order described above and two received CT-first in the B₁ phase followed by TS in the B₂ phase. Participants received 10 60-minute individual therapy sessions (2 per week) per treatment type. The number of treatment sessions was designed to reflect current clinical practices (Sarno, 2004). A second-year SLP-M.A. student blind to the study's purpose administered the treatments. The university institutional review board approved this study.

Primary outcome measures included three traditional treatment probes (auditory comprehension, lexical retrieval, and syntax) measured as percent correct, and one conversational probe (6-minute conversation on a topic the participant chose). Probes were taken at the start of each week. Probes were recorded and transcribed using Systematic Analysis of Language Transcription (SALT; Miller, 2004) and coded using a modified version of the Conversational Interaction Coding Form (Algeo & Pimentel, 2006). Utterances were coded for turn-taking interchanges (Initiation, Response, Continuation, Feedback, & Repair/Revision), and correct information units (CIU).

Secondary outcome measures including *WAB*, *ASHA Functional Assessment of Communication Skills* (Frattali et al., 1995), *Stroke and Aphasia Quality of Life Scale* (Hilari, Byng, Lamping, & Smith, 2003), and *Conversational Profile for People with Aphasia* (Whitworth, et al., 1997) were administered in each A Phase. They were selected to measure outcomes in each World Health Organization International Classification of Functioning, Disability and Health (WHO, 2001) domains; impairment, activity and participation. Although quality of life is not technically part of the WHO model, the social model has driven recognition that measuring a treatment's outcome on quality of life is vital in aphasia treatment (Kagan, Simmons-Mackie, Rowland, Huijbregts, Shumway, McEwen, Threats & Sharp, 2008).

Two raters scored all primary outcome measures. One third of the conversation samples were randomly selected and from that sample 10% were randomly selected and scored point-to-point for inter-rater reliability.

Data Analysis:

To date, primary outcome results have been analyzed for two participants using visual inspection and effect sizes (Cohen's *d*). Data are currently being analyzed for the final two participants. Time series analysis will be completed for all four participants when the data are finalized. The turn-taking interchange categories thought to represent positive conversational interactions were combined (IRC; Initiation, Response, & Continuation) into one variable; and those thought to negatively impact communicative interaction (RF; Repair/Revisions & Feedback). Secondary outcome measures were analyzed descriptively.

Results (please note data are for two subjects, remaining data are undergoing analysis):

Inter-rater reliability for the turn-taking interchanges was 91.1% and 85% for CIUs 85%.

Research question #1, there was only an effect demonstrated for syntax when traditional therapy was administered first (see Table 1). Research question # 2, during conversation therapy there was a medium effect found for P03 for auditory comprehension, large effects on lexical retrieval for P01 and P02, and no effect for syntax (see Table 2).

For conversational probe data, P01 demonstrated a decrease in RF and increase in IRC during traditional and conversation therapy. However, the highest levels achieved on the IRC and the lowest level on the RF was during conversation therapy (see Figure 1 graph and Figure 2 effect sizes). For P02 the same effects were demonstrated (see Figure 3 graph and Figure 4 effect sizes). However, conversation therapy was administered first and this is where the highest levels of conversational success were achieved. Trend lines show a decrease in IRC and increase in RF during traditional therapy.

P01 and P02 both demonstrated increases in percent CIU over time regardless of the treatment type (see Figures 5-7 for graphs and effect sizes).

There was no difference in secondary outcome measures (see Table 3) regardless of treatment or treatment administration.

Conclusions:

This is a preliminary attempt to provide clinicians and researchers with a structured way to conduct and measure conversational therapy, to gain consistency in studying the phenomenon. Results demonstrated both treatments had an effect on conversational abilities; however, the highest were achieved at the end of conversation therapy in both protocols. While the results appear promising, the study is limited by the relatively mild aphasia demonstrated by the few PWA participants. However, these results suggest that conversation therapy alone might be beneficial for people with mild aphasia to improve everyday conversational abilities.

References

- Algeo, D., & Pimentel, J. (2006). Reliability of the Conversational Interaction Coding Form when Applied to Natural Conversation, from http://www.eshow2000.com/asha/2008/handouts/1420_1723Pozzolo_Ashley_125790_Nov17_2008_Time_105109PM.pdf#search=%22Conversational%22
- Armstrong, E., & Mortensen, L. (2006). Everyday talk: Its role in assessment and treatment for individuals with aphasia. *Brain Impairment*, 7(3), 175-189.
- ASHA (2007). Scope of Practice in Speech-Language Pathology. 1-18.
- Fox, S., Armstrong, E., & Boles, L. (2009). Conversational treatment in mild aphasia: A case study. *Aphasiology*, 23(7-8), 951-964.
- Frattali, C., Holland, A., Thompson, C., Wohl, C., & Ferketic, M. (1995). The FACS of Life ASHA FACS *American Speech and Hearing Association*, 37(4), 40-46.
- Hilari, K., Byng, S., Lamping, D., & Smith, S. (2003). Stroke and Aphasia Quality of Life Scale-39 (SAQOL-39). Evaluation of Acceptability, Reliability, and Validity. *Stroke*, 34(8), 1-8.
- Holland, A., Fromm, D., DeRuyter, F., & Stein, M. (1996). Treatment Efficacy Aphasia. *Journal of Speech, Language and Hearing Research*, 39(5), 27-36.
- Kagan, A., Black, S., Duchan, J., Simmons-Mackie, N., & Square, P. (2001). Training volunteers as conversation partners using "supported conversation for adults with aphasia" (SCA): A controlled trial. *Journal of Speech, Language and Hearing Research*, 44(3), 624-638.
- Kagan, A., Simmons-Mackie, N., Rowland, A., Huijbregts, M., Shumway, E., McEwen, S., Threats, T., & Sharp, S. (2008). Counting what counts: A framework for capturing real-life outcomes of aphasia intervention. *Aphasiology*, 22(3), 258-280.
- Kertesz, A. (2007). *Western Aphasia Battery-Revised*. San Antonio, TX: PsychCorp.
- Lyon, J. G., Cariski, D., Keisler, L., Rosenbek, J., Levine, R., Kumpula, J., et al. (1997). Communication partners: Enhancing participation in life and communication for adults with aphasia in natural settings. *Aphasiology*, 11(7), 693-708.
- Miller, J. (2004). Systematic Analysis of Language Transcripts (Research Version 8.0) [Computer Software]. Madison: University of Wisconsin.
- Robey, R. (1994). The Efficacy of Treatment for Aphasic Persons: A Meta-analysis. *Brain and Language*, 47, 582-608.

Robey, R. (1998). A Meta-Analysis of Clinical Outcomes in the Treatment of Aphasia.
Journal of Speech, Language and Hearing Research, 41, 172-187.

WHO (2001). *International Classification of Functioning, Disability, and Health*.
Geneva: World Health Organization.

Tables & Figures

	Auditory Comprehension		Lexical Retrieval		Syntax	
	A ₁ -B	A ₁ -A ₂	A ₁ -B	A ₁ -A ₂	A ₁ -B	A ₁ -A ₂
P01	0	0	-3.6	-4.4	0.8*	1.1*
P02	-0.3	0	-2.4	0	-1.2	-1.2
P03	0	0	-0.5	0	-0.7	2.3*
P04	-1.6	-1.2	-0.4	-0.7	-6.8	-8.6

Table 1. Effect sizes for traditional probes during traditional therapy. (P01 & P03 received traditional therapy first)

	Auditory Comprehension		Lexical Retrieval		Syntax	
	A ₁ -B	A ₁ -A ₂	A ₁ -B	A ₁ -A ₂	A ₁ -B	A ₁ -A ₂
P01	0	0	-1.0	1.2*	-0.5	-0.3
P02	-0.3	0	0.3*	0.7*	-2.0	-1.2
P03	-0.7	0.6*	0	-0.7	0	0
P04	-0.7	0	0	0	-0.7	0

Table 2. Effect sizes for traditional probes during conversation therapy.

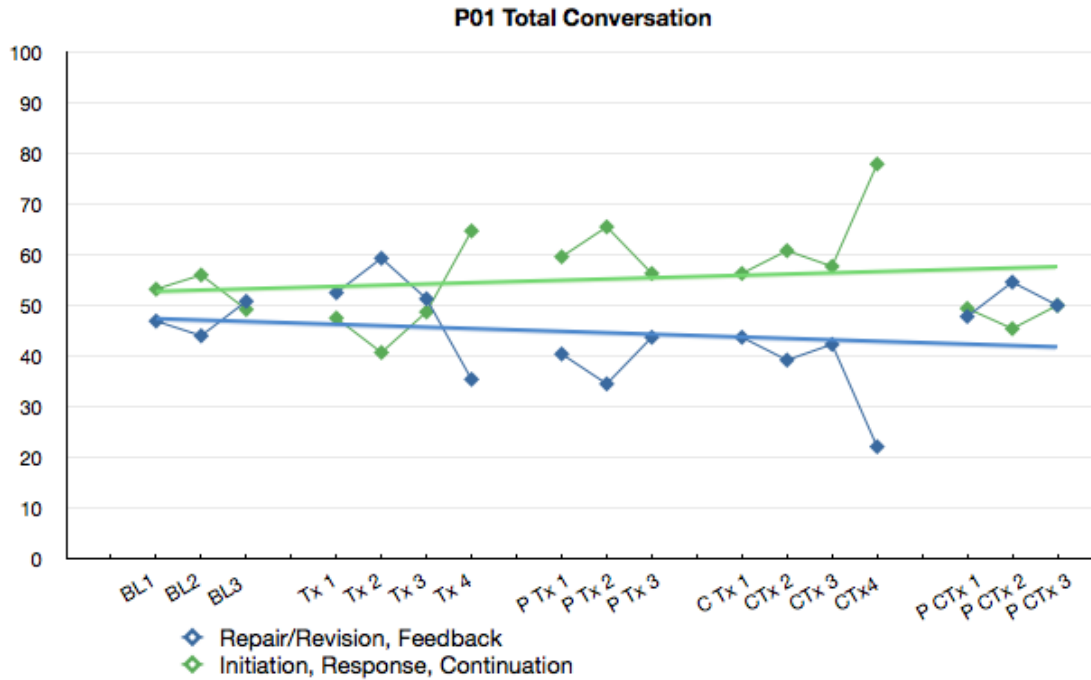


Figure 1. Conversation Data for P01.

Traditional: Repair/Revision & Feedback			Traditional: Initiation, Response & Continuation		
A ₁ -B	A ₁ -A ₂	Visual	A ₁ -B	A ₁ -A ₂	Visual
0.7	-2.3*	Decrease	-0.7	2.3*	Increase

Conversation: Repair/Revision & Feedback			Conversation: Initiation, Response & Continuation		
A ₁ -B	A ₁ -A ₂	Visual	A ₁ -B	A ₁ -A ₂	Visual
-0.6*	2.4	Decrease	0.6*	-2.6	Increase

Figure 2. Effect sizes and visual analysis during Traditional and Conversation Therapy.

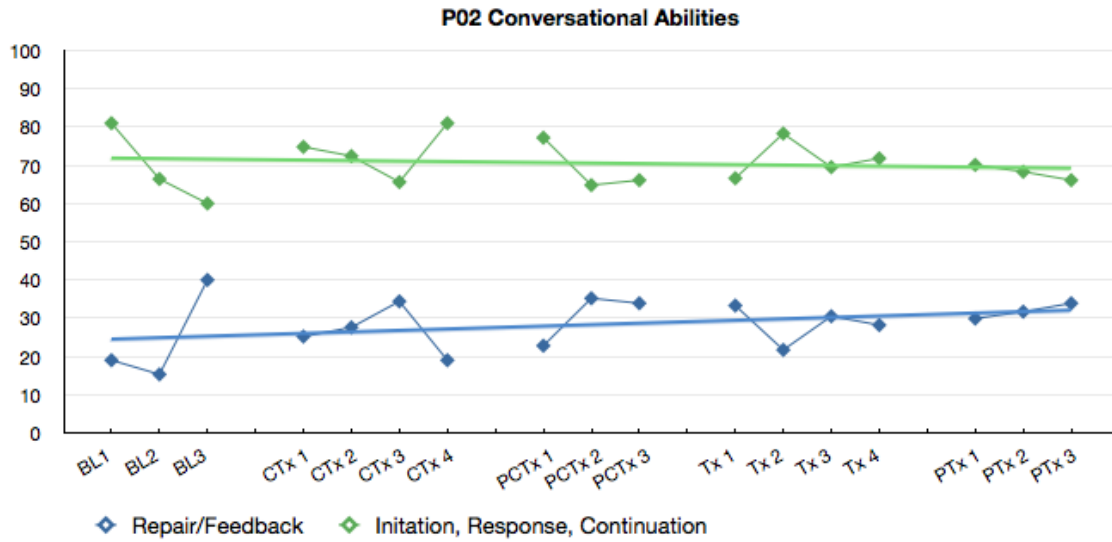


Figure 3. Conversation data for P02

Conversation: Repair/Revision & Feedback			Conversation: Initiation, Response & Continuation		
A ₁ -B	A ₁ -A ₂	Visual	A ₁ -B	A ₁ -A ₂	Visual
-0.6*	2.4	Decrease	0.4*	0.02	Increase

Traditional: Repair/Revision & Feedback			Traditional: Initiation, Response & Continuation		
A ₁ -B	A ₁ -A ₂	Visual	A ₁ -B	A ₁ -A ₂	Visual
-0.3*	0.2	Decrease	0.3*	-0.3	Increase

Figure 4. Effect sizes and visual analysis during Traditional and Conversation Therapy.

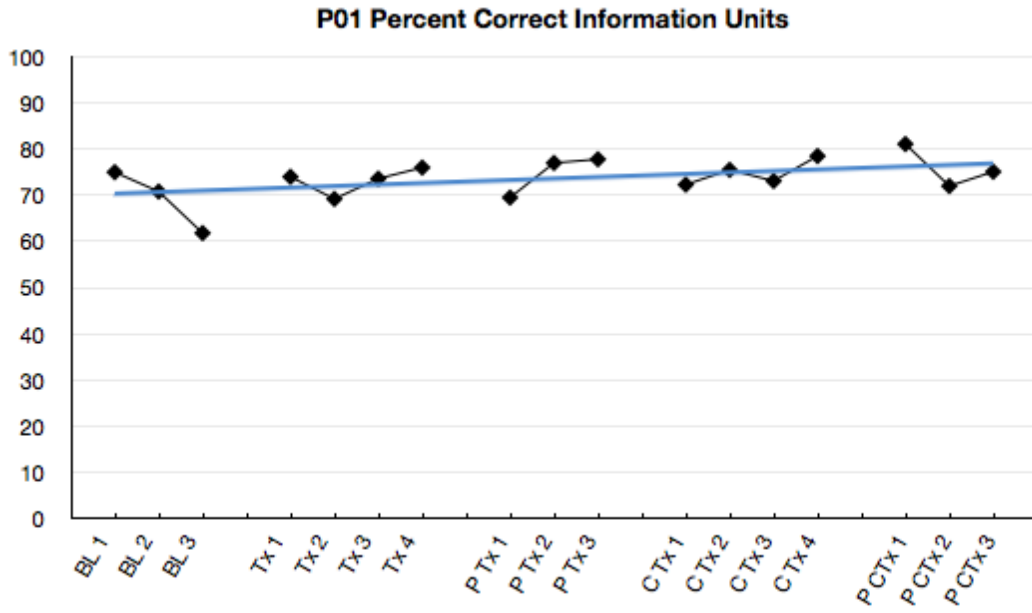


Figure 5. P01 Percent CIUs

Traditional: CIU			Conversation: CIU		
A ₁ -B	A ₁ -A ₂	Visual	A ₁ -B	A ₁ -A ₂	Visual
0.6*	0.8*	Increase	0.02	0.3*	Slight Increase

Figure 6. P01 Effect sizes and visual analysis for CIUs

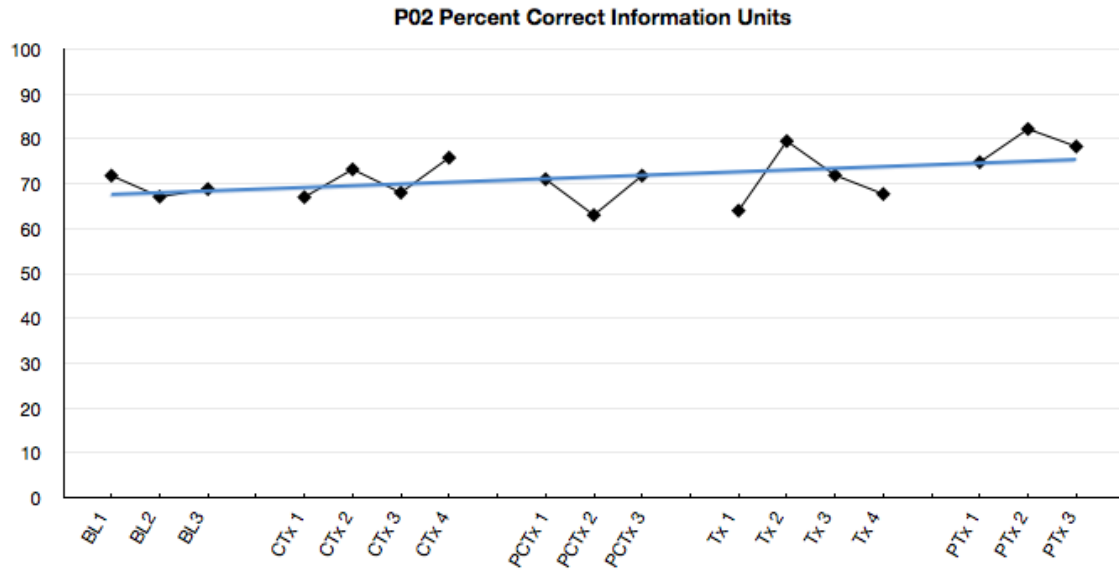


Figure 7. P02 Percent CIUs

Conversation: CIU			Traditional: CIU		
A ₁ -B	A ₁ -A ₂	Visual	A ₁ -B	A ₁ -A ₂	Visual
0.8*	-0.3	Increase	0.4*	2*	Increase

Figure 8. P02 Effect sizes and visual analysis for CIUs

	Pre-Therapy	Post-Traditional	Post-Conversation
WAB P01	91.5	92	94.2
P02	91.5	89.5	91.1
P03	85.6	84.2	85.8
P04	72.9	74.9	76.9
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ASHA-FACS P01	5.7	5.66	5.79
P02	6.19	6.86	6.55
P03	5.55	6.1	4.94
P04	5.28	6.71	6.58
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SAQOL P01	2.54	3.38	3.18
P02	3.85	4.74	3.94
P03	3.38	3.21	3.41
P04	3.56	3.28	2.89

*Data for the CAPP will be added

Table 3. Secondary Outcome Measures: