

## Purpose

To compare the effects of two treatments on the production of discourse using grammatical analysis that quantifies changes in the production of various grammatical units and forms before and after treatment.

## Methods

### Participants

- 17 adults with aphasia (12 nonfluent, 5 fluent)
- 38-81 y/o; avg 61 y/o
- Unilateral L CVA resulting in aphasia 4+ months prior to study
- Western Aphasia Battery: 21.3-78.2; avg 53.2
- Word retrieval impairment for both Nouns & Verbs
- Motor speech impairment no greater than moderate severity
- Gestural+Verbal Group: all found to have mild to moderate limb apraxia except one with severe apraxia

### Treatment Design

- Multiple baseline design across participants and stimulus sets for 2 word retrieval treatments
- Stimuli in both treatments were imageable items matched for frequency and syllable length
- Participants were treated with either nouns or verbs (see below)
- Training: 10 sessions, 2-4/week
- (1) Gestural+Verbal Treatment (GV)
  - Examiner presents picture and word with gesture 3x → participant repeats word and gesture 3x
  - Examiner performs gesture only → participant repeats gesture 3x
  - Examiner displays word → participant repeats 3x
  - Examiner repeats word (by syllable if needed) pauses for 5 sec → participant says name and performs gesture; Reinforced or given correct response
  - GV verb treatment – 7 participants; GV noun treatment – 5 participants
- (2) Semantic Phonologic Treatment (SP)
  - Examiner presents picture & name → participant repeats name 3x
  - Examiner asks questions with pictures: 2 phonological, 2 semantic
  - SP verb treatment – 2 participants; SP noun treatment – 3 participants

### Discourse Data Collection

- Language samples were elicited in 3 ways from aphasic subjects before and after they received treatment.
  - A “dinner table conversation” in which the caregiver asked scripted questions about their favorite foods and activities.
  - Scripted questions about personal pictures chosen by either the individual with aphasia or his or her family members.
  - Scripted questions about current events pictures of Elvis Presley, Bill Clinton, and the moon landing.
- Language samples were video and audio taped, and later transcribed verbatim using the Systematic Analysis of Language Transcripts (SALT) transcription format (Miller & Chapman, 2000).

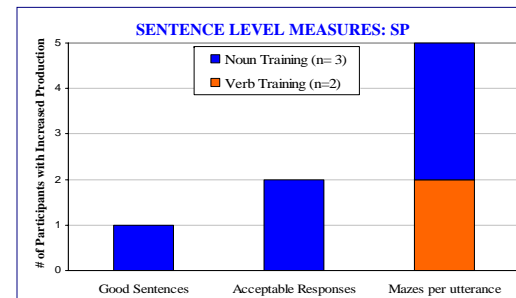
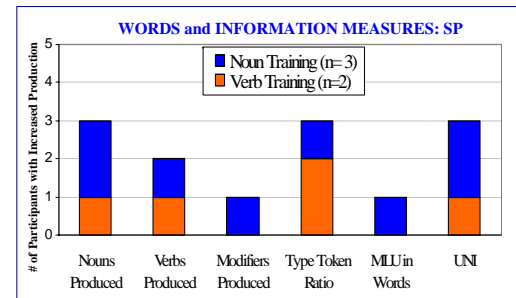
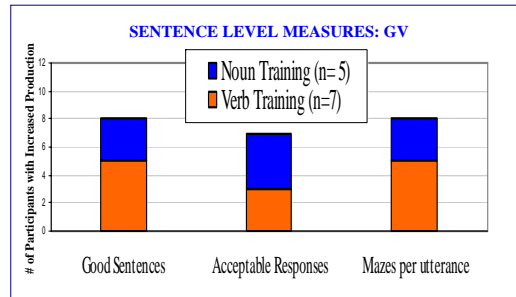
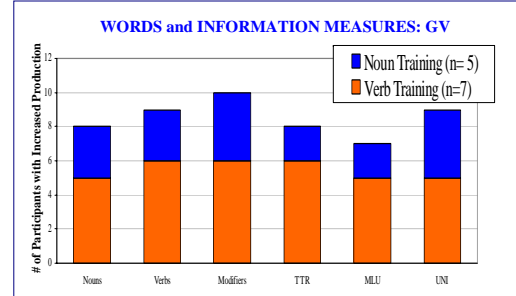
### Discourse Scoring

- **Word level**
  - Nouns, verbs, and modifiers were coded.
  - Modifiers included adjectives, adverbs, and verbs or nouns that acted as an adjective or an adverb in context.
- **Sentence level**
  - 1- word responses: conversationally appropriate, linguistically and socially acceptable single word answers to questions
    - “What kind of pudding do you want?” “Vanilla.”
    - yes/no responses
  - Elliptical response: conversationally appropriate, linguistically and socially acceptable answers to questions
    - “Watch TV.” as a response to “What do you want to do tonight?”
  - Good sentences: completely grammatical sentences that were relevant to the ongoing discourse
  - Acceptable responses: The total of appropriate 1-Word, Elliptical and Good responses.
- **Information level**
  - Utterance with New Information (UNI): response provided new information to the ongoing conversation.
  - Mean length of utterance in words (MLU)
  - Type-Token Ratio (TTR): number of different words/total words; a measure of lexical diversity.
  - Percent Maze Words (MAZE): Mazes included any words or utterances that were apparently not related to the participant’s intended utterance including repetitions, rephrasing, or semantically unrelated interjections such as ‘um’ and ‘uh’.

### Analyses

- The Wilcoxon Signed Rank Test was used to compare performance before and after treatment.
- This measure takes into account whether changes are positive or negative as well as the magnitude of these changes.
- There were no significant effects due to the extremely small N, therefore we just report descriptive findings.

## Results



## Discussion

### Effects of Gestural+Verbal Treatment on Discourse

- **GV treatment facilitated lexical retrieval in the GV trained groups.** This is consistent with previous findings in treatment and assessment studies of speakers with aphasia and unimpaired speakers.
  - Pashek (1997) found that verbal plus gestural treatment significantly increased naming compared to the effects of verbal-only treatment.
  - Hadar, Wenkert-Olenik, Krauss, and Soroker (1998) found that speakers with aphasia produced more gestures when word finding decreased. They concluded that making gestures increased lexical retrieval.
  - Rauscher, Krauss, and Chen (1996) found that when speakers without neurological impairment were not allowed to use gestures, word retrieval decreased.
- **GV treatment lead to increased production in a number of measures.** A majority of participants showed increased production of UNIs and lexical diversity (TTR) as well as noun, verb, and modifier production.
- **GV treatment resulted in increased production of grammatically correct and conversationally acceptable responses.** After treatment, participants produced a greater number of grammatical, coherent sentences and acceptable responses, although these changes were not significant.
- **GV training also improved informativeness in a majority of participants.** As might be expected, increases in content word production were accompanied by increases in utterances with new information. Moreover, this measure likely underestimates the actual change in informativeness: UNIs were coded one per utterance. Thus, an utterance with one piece of new information and a second utterance with three pieces of new information were each given one UNI code. New measures of information are needed.
- **Production of mazes increased in 8 of 12 participants,** indicating selection and production of the correct word may have been exacerbated by the treatment.

### GV verb training led to larger gains than GV Noun training.

- GV verb training led to changes in both MLU in words and TTR not found in GV Noun training. Verbs are typically more difficult to retrieve, **perhaps because of their associated argument structures.** However, increasing the availability of verb argument structures may signal the need for more words to complete an utterance, affecting the lexical diversity of the participant.

### Effects of Semantic Phonologic Treatment on Discourse

- **Participants receiving the SP treatment had no significant gains in discourse measures.** The SP treatment group had an extremely small ‘N’. Thus, even when all participants improved or worsened on a measure, (e.g., mazes) results were not significant.

### Mazes

- **SP treatment increased production of mazes in all participants.** GV treatment increased maze word production in 75% of the group.
  - **Stimulating the lexical access system using SP treatment may have overburdened the sentence production mechanism.**
  - Stimulation of the semantic phonological system due to treatment may have increased inter-word interference in the lexical access system, leading to increases in mazed words.
  - The GV treatment may have had similar effects, activating a selection of words competing for production.
  - Note that mazes increased even in participants with increased information in their discourse.

**Mazes are not typically coded and analyzed but may be important in the investigation of lexical access and sentence formulation.**

- Increased mazes may be a positive indicator of increased lexical availability. However, numerous maze words in conversation may contribute to frustration in the speaker and listener, discouraging conversation. Thus, the common practice of ignoring and even deleting maze words from discourse samples may prevent us from noticing and investigating an important practical and theoretical effect of treatment.

### Limitations

**Small N in each group** hampered our ability to identify significant results..

**Analysis included different aphasia types**

**Analysis was completed on groups and not individuals**

**Analysis included different types of discourse**

Differences previously found between discourse with and without picture stimuli include: less verbal complexity with pictures, higher efficiency scores without pictures, and higher cohesive harmony without pictures (Glosser, Weiner, & Kaplan, 1998; Armstrong, 1988). Considering this, future analyses should limit themselves to a single discourse type.

### Discourse as an outcome measure for treatment

Grammatical analysis is a viable method for measuring discourse changes after treatment. Present methods of discourse analysis are cumbersome and impractical for clinical settings. Measuring changes in the amount of information communicated is particularly important.

The UNI is easy to use with minimal training, and may be particularly suited to aphasic discourse. Mazes are usually ignored, but may provide important information about the practical and theoretical effects of a particular treatment.

**Discourse analysis is an important outcome measure for treatment, especially since improving conversational ability is the ultimate goal of any aphasia treatment.**