

Change in Discourse Quality Following an Attentional Treatment for Anomia

Elizabeth A. Mikell¹, Bruce Crosson^{1,2}, Lee. X. Blonder^{2,3}, Leslie Gonzalez Rothi^{1,2}, & Lori J. P. Altmann^{1,2}

¹University of Florida

²Brain Rehabilitation Research Center, NFSG VA Medical Center; ³University of Kentucky



ABSTRACT

This study examined generalization effects on discourse production from an innovative treatment for anomia. The treatment goal was to facilitate activation of right hemisphere semantic representations by activating right hemisphere attention circuits. Seventeen participants with aphasia provided discourse samples before and after treatment. These samples were analyzed for quantitative changes in word classes (Nouns, Verbs), response types (1-word, elliptical, grammatical sentences), and information. Post-treatment subjects produced significantly more nouns and grammatical sentences. The production of verbs and information showed marginally significant improvement. These results demonstrate that facilitating lexical access can improve discourse at many levels, and that discourse analysis can play an important role in evaluating treatment outcomes.

METHODS

Participants:

17 individuals with anomia due to a single left hemisphere lesion.
 • Mean Age: 61.1 (12.5), Range 39-85 Mean Education: 12.9 (2.5), Range 8-17
 • WAB pre: 54.7 (21.1), Range 15.7-89.4 WAB post: 60.3 (20.3), Range: 15.1-89.7 (p < .02)
 • BNT pre: 18.5 (17.11), Range 0-47 BNT post: 20.8 (18.4), Range 0-51 (p < .08)

Attentional treatment:

- Treatment consisted of 3 phases all intended to engage the attention mechanisms in the nondominant (right) hemisphere in order to improve lexical access.
- Stimuli for each phase included 50 line drawings of objects, with no overlap between items used in each phase. Stimuli in each list were matched for frequency and word length, and were chosen from a variety of semantic categories.
- All phases required the participant to name pictures. When a picture was named incorrectly, the examiner identified it and the participant repeated the correct name.
 - **PHASE 1:** The computer monitor to display stimuli was situated 45 degrees to the left of subjects' central fixation point. (See Fig. 1)
 - A firework-like image then flashed on the left side of the monitor.
 - A line drawing appeared on the left side of the screen for naming
 - **PHASE 2:** The computer monitor to display stimuli was situated 45 degrees to the left of subjects' central fixation point. (See Fig. 1)
 - The line drawing to be named appeared on the left side of the screen
 - **PHASE 3:** The computer monitor was positioned 45 degrees to the left of the central fixation point of the participant. (See Fig. 2)
 - The line drawing was centered on the computer monitor.

Figure 1. Position of patient and stimuli in Phases 1 & 2

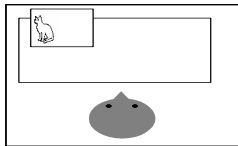
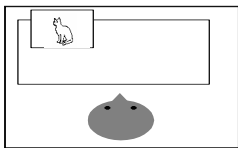


Figure 2. Position of patient & stimuli in Phase 3



Discourse Data Collection

Language samples were elicited in 3 ways from aphasic subjects before and after they received the attentional naming 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.
- Total content words (N + V + Mod) were also analyzed.

•Sentence level

- 1- word responses: conversationally appropriate, linguistically and socially acceptable single word answers to questions
 - "What kind of pudding do you want?" "Vanilla."
 - Did not include 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

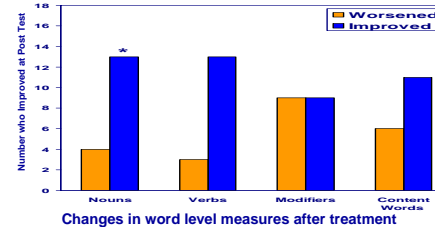
- Utterance with New Information (UNI): response provided new information to the ongoing conversation.
- Number of Different Words (NDW)
- Type-Token Ratio (TTR): NDW/total words; a measure of lexical diversity.
- Percent Maze Words (MAZE): Mazes included any words or utterances that were apparently not related to the participant's intended utterance

Analyses

- The Wilcoxon Signed Rank Test was used to compare performance before and after the attentional treatment.
- This measure takes into account whether changes are positive or negative as well as the magnitude of these changes.
 - Therefore, in 2 different analyses in which the same number of people change, 1 may be significant and the other may not.
 - For an example, see the graphs of Noun and Verb production in 1st graph. In this instance, 1 participant produced many fewer verbs at post test than pre, rendering the analysis nonsignificant.

RESULTS

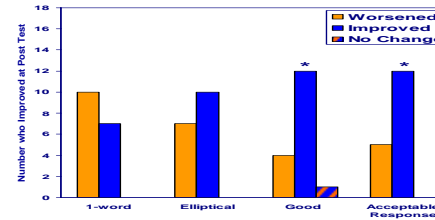
WORD PRODUCTION MEASURES



Changes in word level measures after treatment

- Production of nouns: Z(16) = -2.817, p < .01
- Production of verbs: Z(16) = -1.586, p < .12
- Production of modifiers: Z(16) = -1.254, p > .20.
- Production of content words: Z(16) = -1.775, p < .08

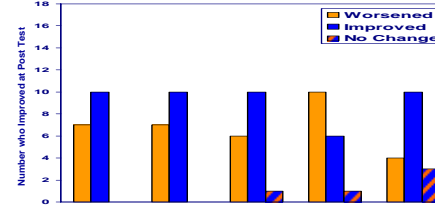
SENTENCE MEASURES



Changes in sentence level measures after treatment

- Production of 1-Word Responses: Z(16) = -.450, p > .50
- Production of Elliptical Responses: Z(16) = -.071, p > .50
- Production of Good Sentences: Z(16) = -2.107, p < .05
- Production of Acceptable Responses: Z(16) = -2.107, p < .05
- Includes Good + Conversationally appropriate Elliptical + 1-Word Responses

INFORMATION MEASURES



Changes in information after treatment

- Mean length of utterance: Z(16) = -.639, p > .50
- Type-token ratio: Z(16) = -.664, p > .50
- Number of different words: Z(16) = -1.474, p = .14
- Percent of mazed words: Z(16) = -.311, p > .50
- Units of new information: Z(16) = 1.789, p < .08.

DISCUSSION

• Increase in quality of discourse

- Not only was there a significant increase in the number of nouns, the increase in the number of verbs, content words and information produced per utterance (UNI) also approached significance.
 - Thus, the attentional naming treatment facilitated lexical access and, perhaps, informativeness in discourse in a majority of subjects.
 - We believe that these increases reflect an increased reliance on RH language resources during the production of discourse.

• No change in the percent of maze words

- Maze production is not usually reported in the literature, but can significantly impact the effectiveness of verbal communication.
- Other studies using more traditional treatments have actually increased the production of maze words (See Del Toro et al., this conference)
- Alternative treatments such as this may avoid this problem.
 - Further investigation of the effects of treatments on maze production are warranted.

• Measuring information in conversation speech

- There are currently no measures suited to examining information content in unconstrained spontaneous speech or narratives.
- Using the UNI (Utterances with New Information) offers many advantages to the clinician.
 - No extensive training is needed for its use.
 - It can be used to measure change in nonpropositional speech
 - It can be used to compare across aphasia types.
- However, the UNI misses the true quantity of information, because it only allows a count of 1 per utterance.
 - The UNI may be most effective when paired with other measures (e.g., number of content words produced).
 - Further development of information measures is needed.

• Current discourse scoring methods:

- Are confusing and lack uniformity
- Lead to difficulty comparing across studies
- Lead to difficulty replicating scoring methods
- Lead to difficulty replicating elicitation methods
 - Standard protocols for eliciting and analyzing discourse are needed.

• Current procedures for the analysis of discourse are far too complex to apply in clinical settings.

- Clinicians have neither the time nor skill to analyze discourse transcripts to the extent that has been done here.
- Changes in the amount of information communicated in every day speech can be an important gauge of the effectiveness of treatment.
- Methods for discourse coding and analysis are needed that can be easily implemented by clinicians.
 - Counting UNI's (Utterances with New Information) requires minimal training and may provide clinicians with a straightforward means of tracking change in communication ability.

Acknowledgements: We would like to thank the members of the UF Language over the LifeSpan Lab for continuing support in this and other studies. In particular, we thank, Susan Leon, Sarah Key-DeLyria, Michelle Babb, Pamela Carvajal, Charlene Cohen-DeRoy, Lynn Dirk, Becca Huy, Courtney Edwards, Andrea Smith, & Caitlin Varga for assisting with discourse coding on this and other related projects.

