

Change in Discourse Quality Following an Attentional Treatment for Aphasia

LJP Altmann^{1,2}, B Crosson^{1,2}, E Mikell¹, CM DeToro^{1,2}, S Leon^{1,2}, LX Blonder^{2,3}, & LJ Gonzalez Rothi^{1,2}

¹University of Florida

²Brain Rehabilitation Research Center at Malcom Randal VA Medical Center

³University of Kentucky



The current study...

- Presents an innovative treatment for anomia designed to increase right hemisphere (RH) attentional contributions to lexical access.
- Demonstrates that this type of treatment can induce changes in discourse production, as well as changes in the trained task, picture naming.

Right Hemisphere Semantics

- Neuroimaging has provided robust evidence that both cerebral hemispheres are active during semantic tasks such as picture naming.
- Several individuals with left hemisphere (LH) damage have been reported with apparently relateralized language functions, suggesting that right hemisphere (RH) language representations may aid recovery from aphasia.

LH damage impairs language and attention

- At least some individuals with aphasia have abnormal attention affecting information presented in R hemispace.
- The more severe the language deficit, the more severe the R visual attention deficit.
 - Petry, Crosson et al (1994). *Neuropsychologia*.

Improved Performance with Left Hemispace Presentation

- Presenting pictures and other language stimuli in the left hemispace has improved language task performance for several individuals with LH lesions.
 - Anderson et al. (1996). *Jrnl of Neurology, Neurosurgery, and Psychiatry*
 - Coslett et al (1993). *Brain*.
 - Coslett (1999). *Neuropsychologia*.
- Hypothesis: Left hemispace presentation of stimuli engages RH attention mechanisms, which, in turn, access RH semantics.

Our Research Questions:

1. Could a treatment designed to engage RH attentional mechanisms improve lexical access in picture naming?
2. Would any of these changes generalize to discourse?

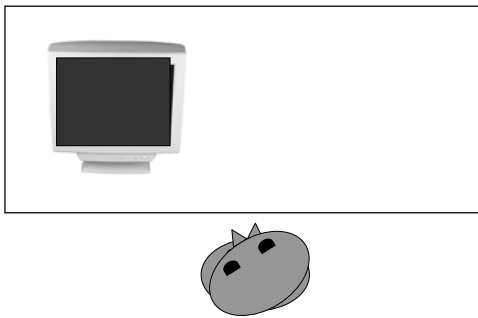
Participants

- 17 individuals with aphasia
 - 11 male; 6 female
 - All right handed
 - LH CVA, diagnosed nonfluent post-stroke
 - Time post-stroke: 40.8 mos. (range 5-127)
 - Age: 61.2 years (range 39-85)
 - Education: 12.9 years (range 8-17)

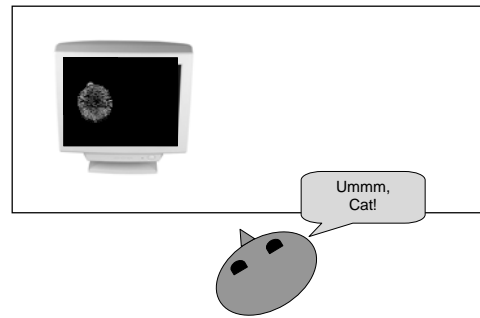
Attentional Treatment

- 3 Phases
- 50 different images in each phase
- Probed with trained and untrained items throughout each Phase
- Standard outcome measures:
 - WAB-Aphasia Quotient (WAB-AQ)
 - Boston Naming Test (BNT)
- Discourse outcomes

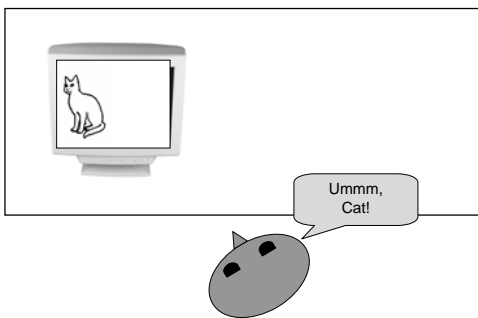
All Phases



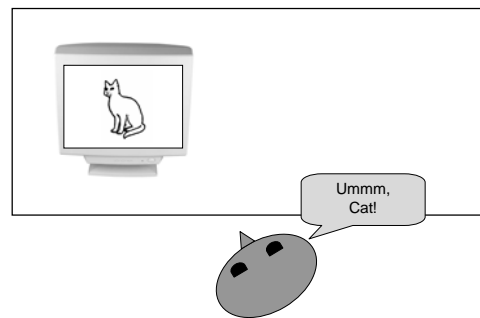
Phase 1



Phase 2

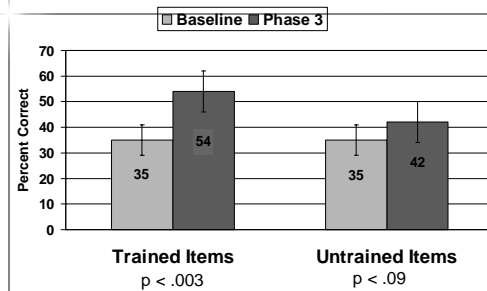


Phase 3



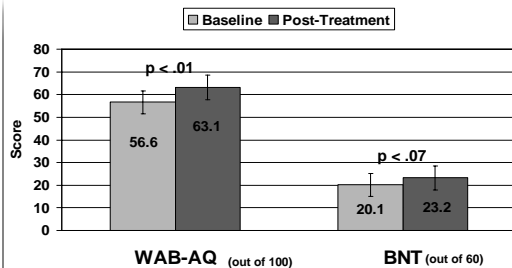
Treatment Results

Effects on Picture Naming



improving: 15/17, $p < .001$ 11/17 (1 tie), $p < .03$

Effects on Independent Measures



improving: 11/15, $p < .02$ (no data on 2 subjects) 8/15 (1 tie), $p = .08$

Answer to 1st Question?

- Yes, redirecting attention to the left hemisphere to engage RH attentional mechanisms can improve picture naming ability in individuals with aphasia.

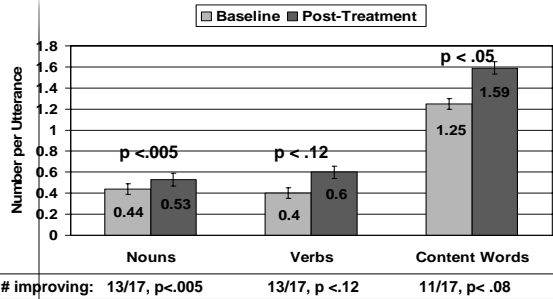
Discourse as an Outcome Measure

- Same set of prompts used at baseline and post-treatment
- Scripted conversations
 - Simulated dinner table conversation
 - Daily events, food preferences
 - Personal pictures brought by patient and caregiver
 - Current event pictures
 - Elvis Presley, Man landing on Moon, Bill Clinton

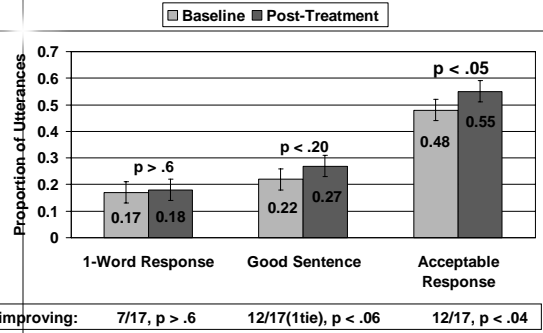
Discourse Measures

- Words (number per utterance)
 - Nouns
 - Verbs
 - Total content words (Nouns, Verbs, Adjectives)
- Sentence type (proportion)
 - 1-Word (relevant) responses
 - Good (grammatical, relevant) Sentences
 - Acceptable Responses
- Information
 - Mean length of utterance in words (MLU)
 - Utterances with new information (UNI) (proportion)

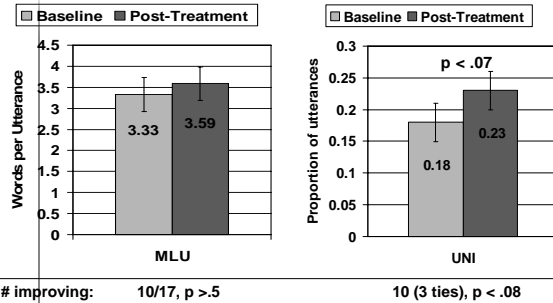
Word Production



Sentence Production



Information Production



Discussion & Conclusions

Engaging RH Attention as a Treatment Strategy

- ★ Anomia treatments that particularly target the activation of RH semantic representations can lead to pervasive changes in communication ability.
 - Changes in WAB-AQ
 - Changes in Discourse Quality
 - More nouns & overall content words produced
 - More conversationally appropriate responses
 - Marginally more utterances with new information

Possible Mechanism

- In this population, RH attention mechanisms and semantic representations are more intact than those in the LH.
- Treatment may increase habitual reliance on RH structures for lexical access and language processing in general.
 - Increased access to all content words.
 - Improved quality of discourse
 - Increases appropriate responses & information

Outcome Measures for Aphasia Treatment

- The goal of anomia treatment is **not** improving picture naming performance.
 - It **IS** improving communication ability!
- Clinician needs to look beyond changes in the trained behavior, to look at changes in discourse and conversational ability.
- Discourse analysis can be extremely difficult and time-consuming.
 - Number of content words
 - Proportion of conversationally appropriate responses
 - Proportion of utterances with new information

Thank you!

This project was supported by
NIDCD (#P50 DC03888, R01 DC007387)
and the VA (#F2182C a Center of Excellence
Grant, and #B3470S Research Career Scientist
Award)

