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Introduction
- Persons with aphasia who are trained to generate abstract words (e.g., justice) in a specific context-category (e.g., courtroom) have been shown to improve not only on the trained items, but also on concrete words (e.g., lawyer) in the same context-category (Kiran, Sandberg, & Abbott, 2009).
- However, the underlying neural mechanism of this generalization effect is unknown.

Methods
- Participants
  - Five right-handed persons with aphasia secondary to left hemisphere stroke (T F, mean age: 53).
  - All participants were scanned using fMRI before and after a therapy-based treatment.
- Treatment
  - Based on the Complexity Account of Treatment Efficacy (Thompson, Shapiro, Kiran, & Sabeckis, 2003)
  - Consisted of training abstract words in a specific context-category for up to 10 weeks.
  - Criterion for stopping treatment before 10 weeks: 80% accuracy for 2 weeks in a row
- fMRI Task
  - Word Judgment
- Data Analysis
  - GLM in SPM8
    - Contras
      - Post-treatment Abstract > Pre-treatment Abstract
      - Post-treatment Concrete > Pre-treatment Concrete
    - Task-related functional connectivity
      - CONN toolbox for SPM8
      - Functional ROIs = 5 mm sphere around peak activation voxels elicited during word processing (i.e., abstract + concrete > control)
  - Used meta-analyses of abstract and concrete word processing (Binder, Desai, Graves, & Conant, 2009; Redifer, Wang, Corder, Bitzer, & Shinar; 2010 [BLUE]) and our own work in healthy older adults [GREEN] as a guide.
- Conducted semipartial ROI-ROI correlations individually for each patient to create 4 networks:
  - Post-treatment Abstract
    - Post-treatment Concrete
  - Pre-treatment Abstract
    - Pre-treatment Concrete
- Pre-treatment matrix subtracted from post-treatment matrix to obtain increases in connectivity (decreases ignored for now).
  - Used confidence intervals to determine significance of each value
  - Focused on increases that resulted in positive correlations post-treatment

Conclusions
- Overall, behavioral gains in treatment are measurable as specific neural changes in fMRI and task-related functional connectivity in persons with aphasia.
- All patients show more changes in intra-L(L-L or R-R) than inter-hemispheric connections for both abstract and concrete networks.
- For the trained items, there is no correlation between increases in connectivity and effect size; however, there is a negative correlation between number of connections that change in the concrete network and the effect size for generalization to concrete words. This may indicate increased effort.
- There appear to be certain nodes in the abstract network whose connections increase as a function of treatment (FWE p < .05).
- All but one patient showed changes in both abstract (trained) and concrete (untrained) word processing.

References