Treatment and generalization effects of training atypical exemplars of semantic categories for patients with chronic aphasia

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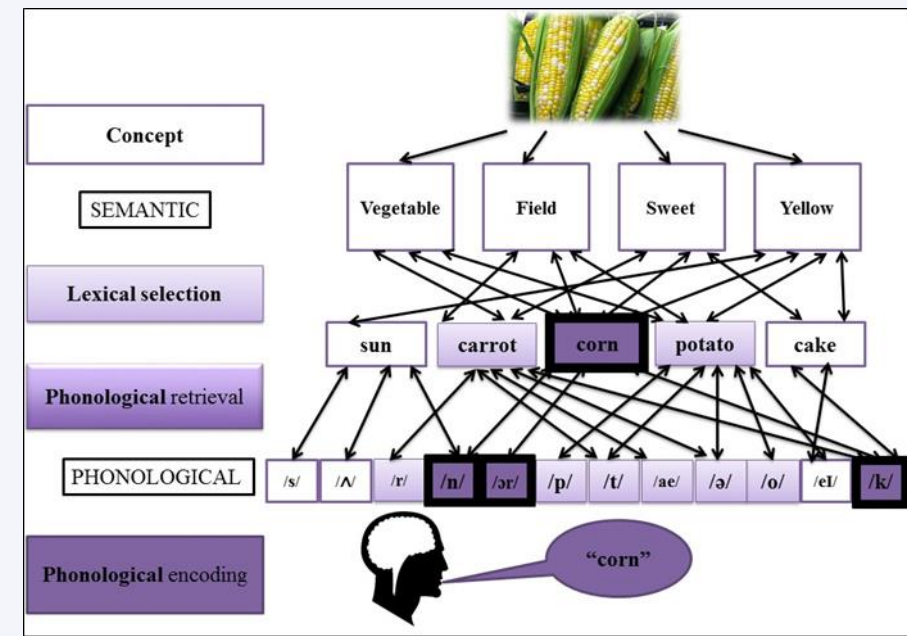
Reorganization · Regrowth · Recovery

INTRODUCTION

- Generalization is the ultimate goal of language rehabilitation.
- Without it, clinicians must train every item, in every context, which is not practical or feasible (Thompson, 1989).
- Anomia is the most "pervasive" symptom of aphasia (Goodglass & Wingfield, 1997).
- Naming process includes a number of steps (e.g., Dell et al., 1997)

- Treatments such as semantic feature analysis (SFA) (e.g., Boyle & Coehlo, 1995) have been developed to target different stages of this process.
- Kiran & colleagues pioneered typicality-based SFA treatment, which has resulted in generalization to untrained within-category items (e.g. Kiran & Thompson, 2003).
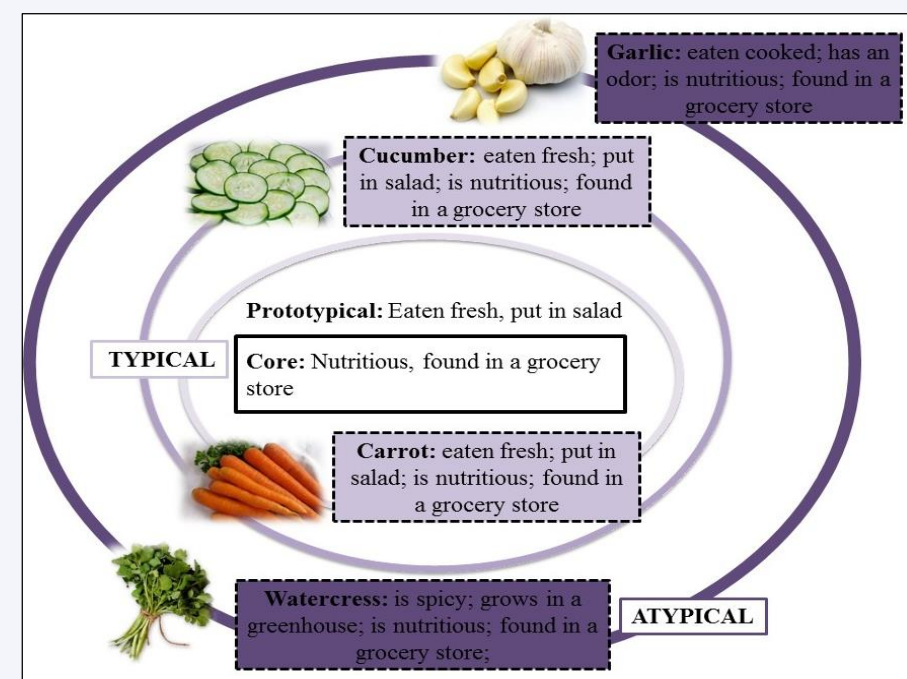
- Generalization patterns from typicality-based SFA treatment warrant further examination(e.g., Stanczak et al., 2006).

RESEARCH QUESTIONS

1. Do persons with aphasia (PWA) demonstrate greater improvement in their trained categories relative to their monitored categories after treatment?
2. Do PWA show greater generalization to untrained typical items than untrained atypical items after treatment?
3. Do PWA demonstrate "near transfer" to untrained tasks of semantic and phonological processing after treatment?
4. Do PWA show "far transfer" to global language skills after treatment?

METHODS

- 19 PWA following left-hemisphere stroke participated in this study.

Aphasia Subtypes

	Age	MPO	WAB AQ	Baseline Naming
Mean	61.7	57.0	64.9	37.9
SD	11.3	50.3	24.1	26.0
Range	42-79	8.0-152.0	25.2-95.2	1.1-73.9

- Anomic
- Broca's
- Conduction
- Wernicke's
- Global
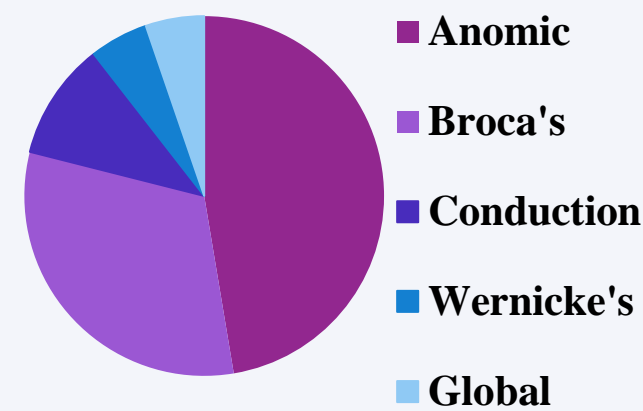
Selection criteria:
- Stable performance of ≤ 75% average accuracy in two different half-categories (e.g., Atypical *Birds*) on 180-item confrontation naming screener

Design:
- Single-subject experimental design with group-level analyses

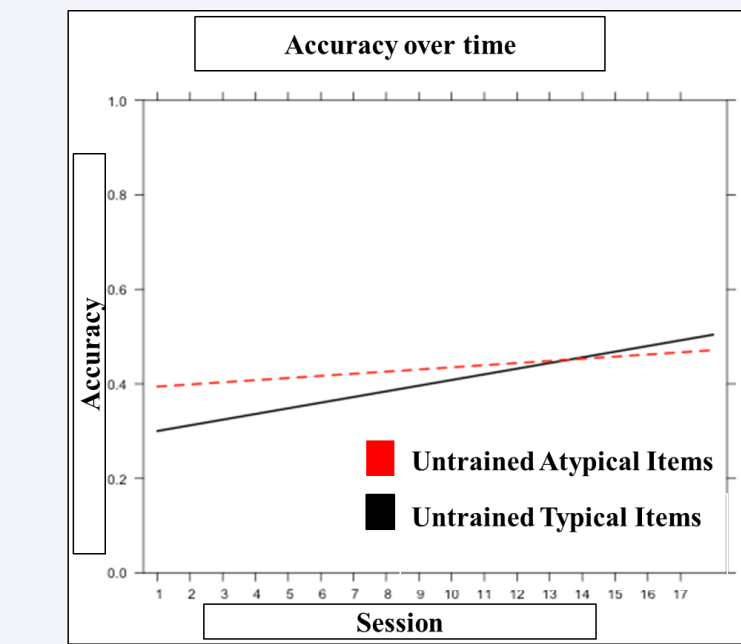| Pre-treatment	Typicality-based SFA treatment	Post-treatment (same as Pre)
• Battery of standardized tests • Set of 9 behavioral tasks • 180-item naming screener (3x)	1. Category sorting 2. 1st naming attempt 3. Analyze/written semantic features of item 4. 2nd naming attempt Progress measured via weekly naming probes	• Battery of standardized tests • Set of 9 behavioral tasks • 180-item naming screener (3x)

RESULTS

RQ1: Treatment Effects

Accuracy over time

- Atypical Trained Items
- Typical Trained Items
- All Monitored Items
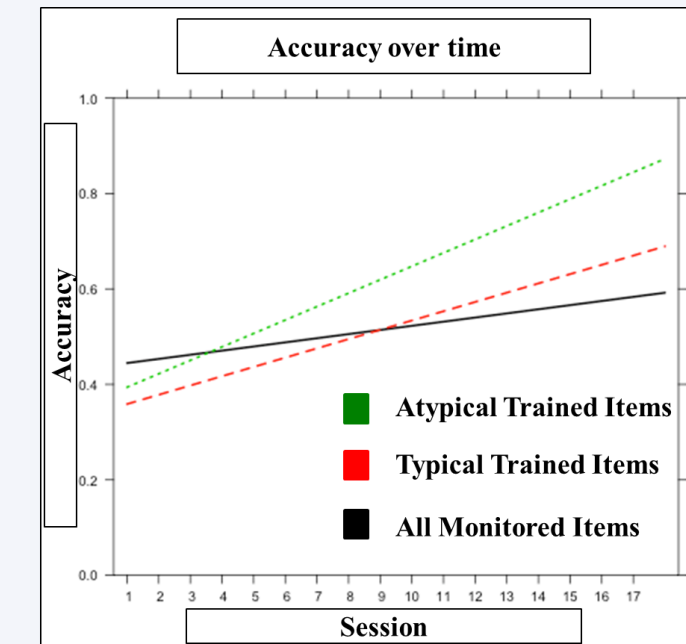
Trained items improved at a significantly greater rate than monitored items over time, ($F_{(4, 1223)}$= 25.28, p<.001), regardless of typicality (Typical: β =.010, t(1,738) = 5.00, p<.001, Atypical: β =.020, t(1,487) = 8.02, p< .001).

RQ2: Generalization Effects

Accuracy over time

- Untrained Atypical Items
- Untrained Typical Items

Untrained typical items improved at a significantly greater rate over time than untrained atypical items ($F_{(1, 580)}$= 7.49, p =.006, β =.007, t(580) = 2.74).

RQ3: Near Transfer Effects

Mean Accuracy on Behavioral Tasks (n=17)

Mean Reaction Time on Behavioral Tasks (n=17)
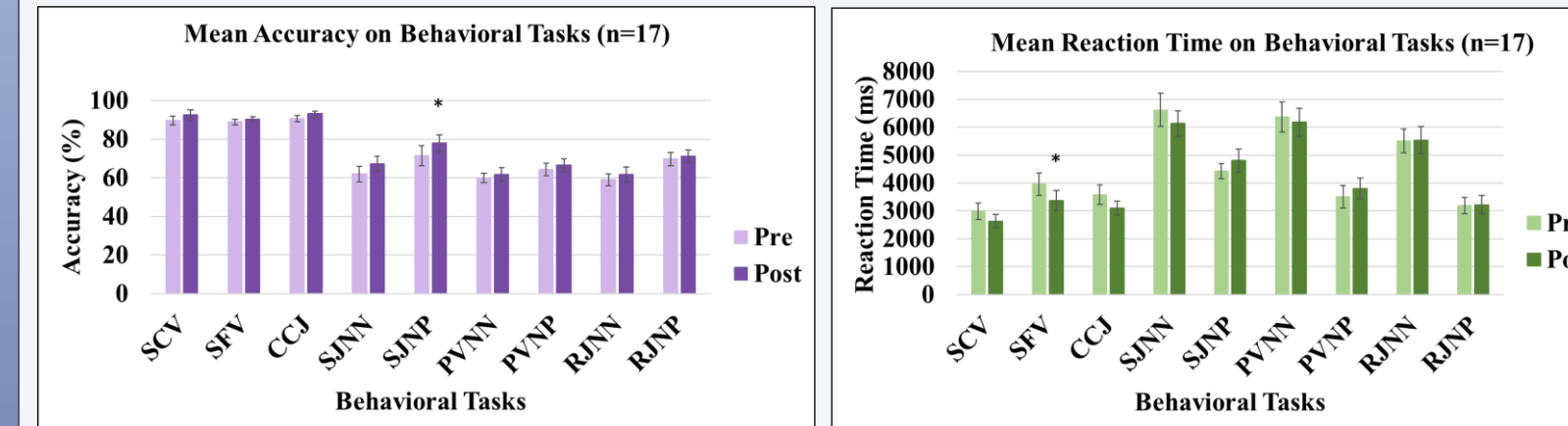
Significant gains were seen on accuracy on a syllable judgment task (i.e., untrained task of phonological processing)(W=25, Z=-1.99, p=.049, r=.48).

Participants were significantly faster on a semantic feature verification task post-therapy (W=110, Z=2.17,p=.029, r=.53).

RQ4: Far Transfer Effects

Mean Accuracy on Standardized Outcome Measures (n=19)
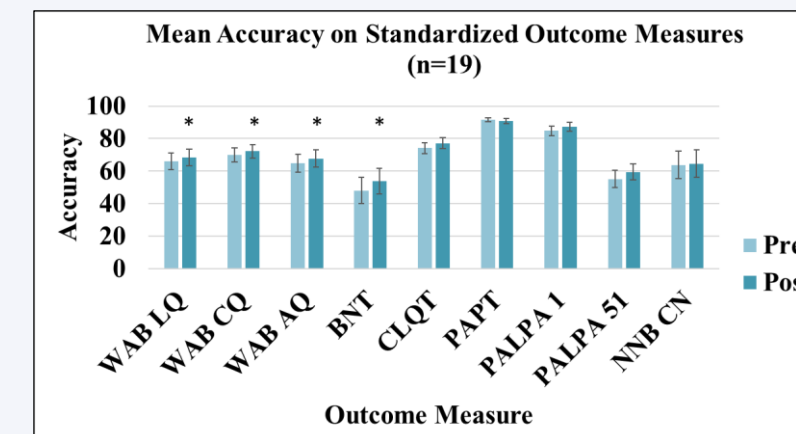
Significant gains were seen on several measures of language processing: WAB-LQ, CQ, AQ & BNT (W=27, Z=-2.74, p=.004, r=.63; W=28, Z=-2.70, p=.005, r=.62; W=24, Z=-2.86, p=.003, r=.66; W=32.5, Z=-2.52, p=.010 r=.58, respectively).

DISCUSSION

- Typicality-based SFA treatment resulted in positive acquisition effects and multiple levels of generalization for individuals with chronic aphasia of varying subtypes & severities making it an efficient choice for patients & clinicians alike.
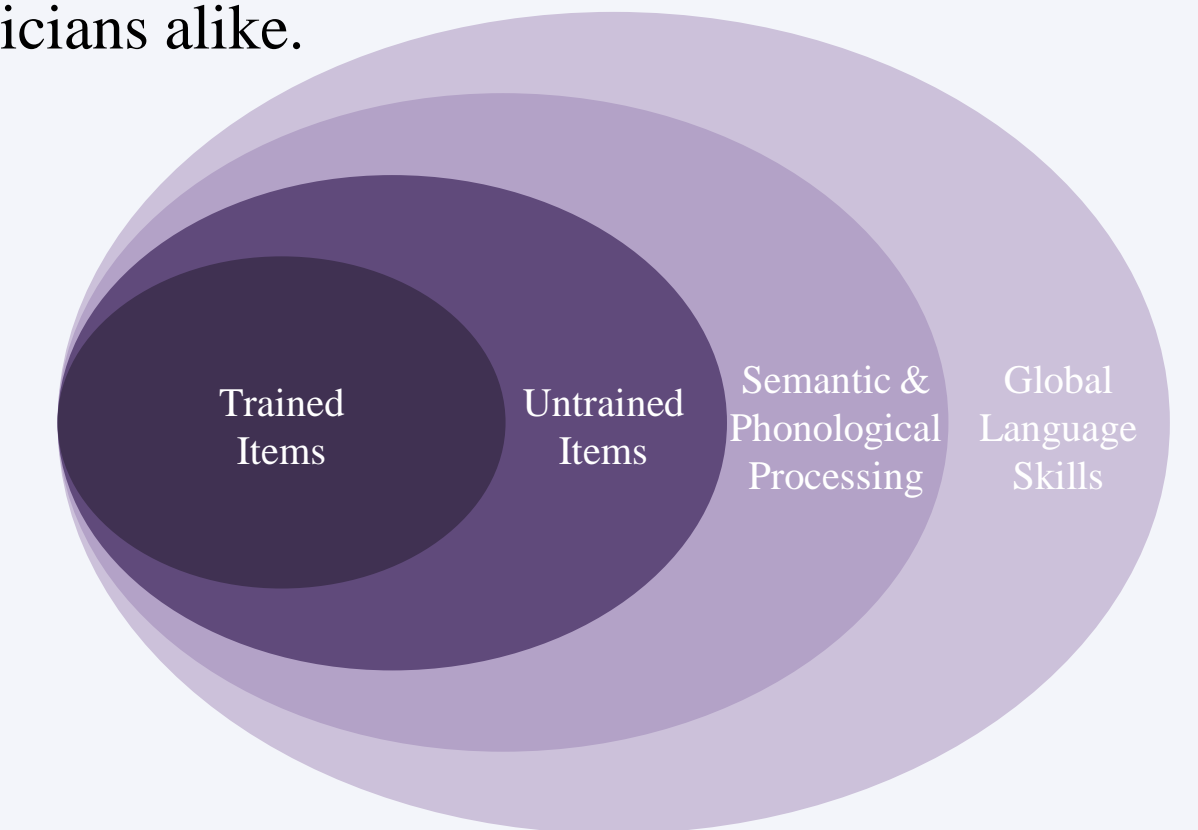
- Yet, not all participants showed robust treatment and generalization effects & significant gains were not seen on all untrained measures and tasks.
- Future research should focus on what factors underlie individual variability in response to this treatment (e.g., cognitive factors).

SELECTED REFERENCES

Boyle, M., & Coelho, C. A. (1995). Application of semantic feature analysis as a treatment for aphasic dysnomia. *American Journal of Speech-Language Pathology, 4*(4), 94–98.

Dell, G. S., Schwartz, M. F., Martin, N., Saffran, E. M., & Gagnon, D. A. (1997). Lexical Access in Aphasic and Nonaphasic Speakers. *Psychological Review, 104*(4), 801–838.

Kiran, S., & Thompson, C. K. (2003). The Role of Semantic Complexity in Treatment of Naming Deficits: Training Semantic Categories in Fluent Aphasia by Controlling Exemplar Typicality. *Journal of Speech, Language, and Hearing Research, 46*(4), 773–787.

Goodglass, H., & Wingfield, A. (1997). *Anomia: neuroanatomical and cognitive correlates*. San Diego, CA: Academic Press.

Rosch. (1975). Cognitive Representations of Semantic Categories. *Journal of Experimental Psychology: General, 104*(3), 192–233.

Stanczak, L., Waters, G., & Caplan, D. (2006). Typicality-based learning and generalisation in aphasia: Two case studies of anomia treatment. *Aphasiology, 20*(2–4), 374–383.

Thompson, C. K., Shapiro, L., Kiran, S., & Sobecks, J. (2003). The role of syntactic complexity in treatment of sentence deficits in agrammatic aphasia: The complexity account of treatment efficacy (CATE). *Journal of Speech, Language, and Hearing Research, 46*(3), 591–60.

Thompson, C. K. (1989). Generalization Research in Aphasia: A Review of the Literature (Vol. 18, pp. 195–222). Presented at the Clinical Aphasiology Conference, College-Hill Press.

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