THE NATURE OF CROSS-TASK AND CROSS-STRUCTURE GENERALIZATION FOLLOWING SENTENCE COMPREHENSION TREATMENT IN APHASIA

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INTRODUCTION

- In a previous study (Kiran, Caplan, et al., 2012), two treatments, one based on sentence to picture matching (SPM) and the other based on object manipulation (OM), that train patients on the relationship between syntactic structure and the meanings of sentences were developed.
- We found the treatment to be effective in improving sentence comprehension of trained structures in fifteen patients with aphasia.
- More patients improved on the OM task than SPM task.

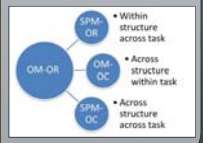
OBJECTIVES

- In this study, we compare acquisition of trained structures and generalization to untrained structures and tasks across the two treatment approaches (SPM/OM).
- Cross structure and cross task generalization is examined
- We also examine effects of treatment on a broader array of sentences.

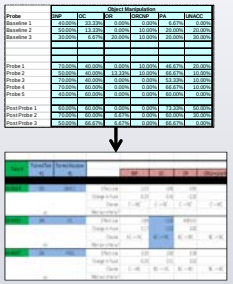
METHODS

- N =19 persons with aphasia
- Participants were identified on the basis of two screening tests for syntactic comprehension (SPM & OM) with sentence structures ranging from object relative to active sentences.
- A single subject multiple baseline design with order of task and structure counterbalanced across participants.
- Sentence comprehension was trained on the affected sentence type in one task-related protocol
- generalization was examined to other structures.

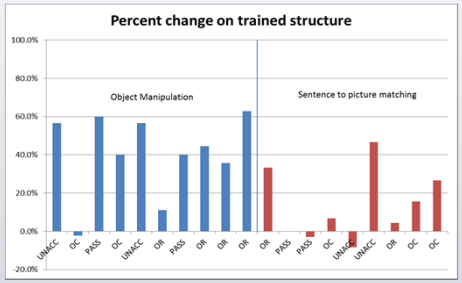
OM	SPM
Object Relative	Object Relative
Object Cleft	Object Cleft
Passive	Passive
Unaccusative	Unaccusative
ORCNP	ORCNP
3NP	3NP



DATA ANALYSIS

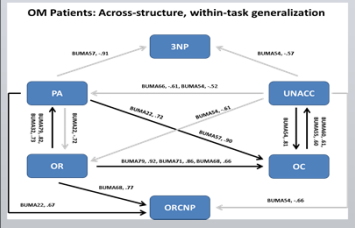


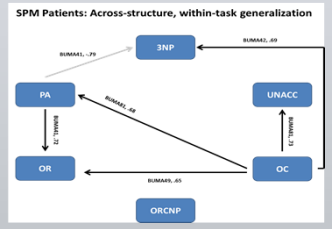
RESULT 1: Which treatment is more effective (Tx Data)

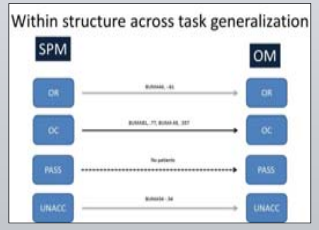


- All patients improve as a function of treatment (t (18) = 5.06, p <.001)
- OM treatment more effective than SPM (NS for effect size, but significant for % change (p= 0.00917)

RESULT 2: Generalization to untrained structures and tasks (Tx Data)

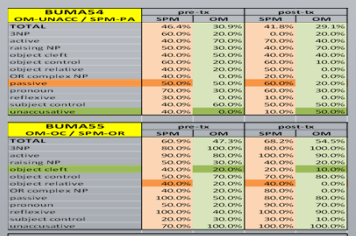






- Across structure within task generalization: Between OR <-> OC, OR <-> PASS, PASS <-> OC, OC -> UNACC.
- Within structure across task generalization: From SPM OC -> OM OC

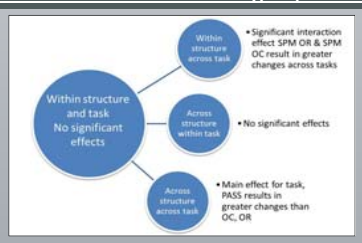
RESULT 3: Generalization to untrained sentence types (Screener Task)



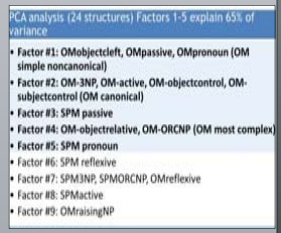
BUMA54 OM-UNACC / SPM-PA	pre-tx SPM	pre-tx OM	post-tx SPM	post-tx OM
TOTAL	46.4%	30.9%	41.8%	29.1%
3NP	60.0%	20.0%	0.0%	20.0%
active	40.0%	70.0%	70.0%	40.0%
raising NP	50.0%	30.0%	40.0%	20.0%
object cleft	40.0%	50.0%	40.0%	40.0%
object control	60.0%	20.0%	60.0%	10.0%
object relative	40.0%	0.0%	50.0%	0.0%
OR complex NP	40.0%	0.0%	20.0%	0.0%
passive	58.9%	50.0%	60.0%	20.0%
pronoun	70.0%	30.0%	60.0%	30.0%
reflexive	80.0%	0.0%	10.0%	0.0%
subject control	40.0%	60.0%	50.0%	50.0%
unaccusative	40.0%	0.0%	10.0%	50.0%

BUMA55 OM-OC / SPM-OR	pre-tx SPM	pre-tx OM	post-tx SPM	post-tx OM
TOTAL	60.9%	47.3%	68.2%	54.5%
3NP	80.0%	100.0%	80.0%	100.0%
active	90.0%	80.0%	100.0%	90.0%
raising NP	50.0%	30.0%	40.0%	20.0%
object cleft	40.0%	20.0%	20.0%	10.0%
object control	50.0%	70.0%	70.0%	80.0%
object relative	40.0%	20.0%	40.0%	0.0%
OR complex NP	40.0%	20.0%	80.0%	0.0%
passive	100.0%	50.0%	80.0%	80.0%
pronoun	50.0%	20.0%	90.0%	70.0%
reflexive	100.0%	40.0%	100.0%	90.0%
subject control	20.0%	30.0%	30.0%	10.0%
unaccusative	70.0%	100.0%	100.0%	100.0%

Patients improved on their respective trained structures from pre-tx to post-tx screeners: (T=4.276, p<.001)



1. Greater changes from SPM to OM
2. Greater effects of treatment PASS than OC and OR



Factor analysis on percent change: subcomponents reveal similarity in structure

CONCLUSIONS

- 19 patients underwent treatment.
  - 10 received OM treatment, 9 received SPM
- Patients improve as a function of treatment although OM appeared to be more successful than SPM training.
  - Differences emerge between the two tasks (Salis & Edwards, 2009)
- Across structure with task generalization
  - Between OR <-> OC, OR <-> PASS, PASS <-> OC, OC -> UNACC
  - Between different structures
- Within structure across task generalization
  - No generalization from OM -> SPM
  - From SPM -> OM, for OC only.
- Generalization to untrained structures on post-pre screener task
  - Results support the monitoring generalization effects
  - Training SPM results in greater cross task generalization than OM
- Factor analysis reveals 9 components with eigenvalues > 1 and with significant correlations among components.
  - Of these Factors 1-5 explain 65% of the variance
  - Factors reveal structures with similar structure and movement tend to change together as a function of treatment

REFERENCES

Kiran, S., Caplan, D., Sandberg, C., Levy, J., Berardino, A., Ascenso, E., Villard, S., & Tripodis, Y. (2012). Development of a Theoretically Based Treatment for Sentence Comprehension Deficits in Individuals With Aphasia. *American Journal of Speech Language Pathology, 21*(2), S88-102. PMC3348417.

Salis C., & Edwards, S. (2009). Tests of syntactic comprehension in aphasia: An investigation of task effects. Aphasiology, 23, 1215-1230.

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