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An examination of retrieval practice and production training in the treatment of word-comprehension deficits in aphasia.

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Krysta L. Duquette*, Taylor P. Foley, and Erica L. Middleton

Language and Learning Lab, Moss Rehabilitation Research Institute, Elkins Park, Pennsylvania, United States

***corresponding author, duquettk@einstein.edu**

Word comprehension deficits in aphasia can complicate many linguistic processes, and are difficult to treat. Recent studies suggest that practice retrieving names from long-term memory (retrieval practice) more durably strengthens future naming ability in people with aphasia compared to errorless learning (i.e., word repetition), which eschews retrieval practice [1,2,3]. The current study examined the effects of a receptive form of retrieval practice and a non-retrieval comparison treatment (restudy) on word comprehension deficits in aphasia. We also examined whether errorful comprehension items that receive naming treatment (retrieval practice versus word repetition) show improvements on a later comprehension test, a form of generalization termed *task transfer*.

Methods

Twelve people with chronic stroke aphasia (PWA) with a word comprehension deficit completed the study (see Table 1). The stimuli consisted of 408 picture pairs, each comprised of one target image of a common object (e.g., backpack) and one semantically-related foil image (e.g., lunchbox). Errorful pairs were selected for each PWA in an item selection phase for matched assignment into the conditions. A designation of correct, both during item selection and during the comprehension tests following treatment, required both accepting as correct a target picture (*backpack*) for the target word ("backpack"), and rejecting the foil picture (*lunchbox*) for the target word ("backpack") on nonconsecutive trials [4].

All 12 participants completed a comprehension training module, 8 of whom also completed a naming training module because of sufficient errorful pairs to populate the full design. A single training module involved one training session followed by both a 1-day and 1-week comprehension test on those items. In the comprehension module, for comprehension retrieval practice, the participant chose between the target and foil image given the target word; for restudy, the target image was highlighted at target word onset. In the naming module, for production retrieval practice the participant attempted to name the target image; for word repetition, the target image and word were presented and the word was orally repeated by the participant. All trials ended in correct-answer feedback. Matched sets of untreated items were probed at the comprehension tests following each module.

Results

Mixed logistic regression applied to the group of 12 participants revealed robust treatment benefit from both types of comprehension training relative to untreated items (all p's<.01) at both test timepoints with no difference between comprehension retrieval practice and restudy. In the naming module, a robust treatment benefit was observed after production retrieval practice at the 1-week test, and after word repetition at both timepoints (all p's<.05) relative to untreated items. An analysis of retention of gains from the 1-day to 1-week test revealed better retention of accuracy in the production retrieval practice versus word repetition condition ($p < .05$).

Conclusion

The two forms of comprehension-based training were equally efficacious, and significant task transfer was observed from production training to comprehension performance. Production retrieval practice conferred more durable learning, compared to word repetition, similar to studies on naming treatment in aphasia [1,2,3]. Implications for aphasia treatment and models of word comprehension are discussed.

References

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Table 1. Neuropsychological characteristics of the participants.

Variable/Test	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	Average
Age (Years)	69	73	62	66	74	69	58	55	49	54	56	76	63.4
Gender	F	M	M	F	M	F	M	M	F	F	M	M	
Months Post-Onset	20	63	13	8	90	48	56	38	13	135	127	37	54.0
Western Aphasia Battery scores:													
Aphasia Subtype	Anomic	Anomic	Conduction	Anomic	Transcortical motor	Broca's	Broca's	Anomic	Anomic	Anomic	Anomic	Anomic	
AQ	89.2	91.2	73.8	90.1	69.8	68.6	46.7	80.7	79.4	88	89.7	92.7	80.0
Fluency	9	9	6	9	4	4	4	8	5	9	9	9	7.1
Auditory Comprehension	9.4	9.3	8.8	8.6	6.9	8.3	6.15	8.45	9.1	9.2	9.15	9.55	8.6
Picture Naming	83	70	64	66	70	69	35	43	74	70	87	79	67.5
Semantic Comprehension	69	91	89	77	78	77	81	66	84	73	77	67	77.4
Word Comprehension	71	91	91	72	92	66	78	75	79	70	63	87	77.9
Synonym Matching	67	97	97	70	100	60	70	57	73	77	70	67	75.4
Phoneme Discrimination	90	85	92.5	N/A	97.5	88	92.5	98	92.5	88	83	85	90.2

Note. *AQ* = Western Aphasia Battery Aphasia Quotient, score out of 100 (Kertesz, 1982). WAB Fluency and Auditory Comprehension subtests have a maximum score of 10. *Aphasia Subtype* = Aphasia subtype as determined by the WAB. *Picture naming* = Percentage of correct responses on The Philadelphia Naming Test, an oral picture naming test (Roach et al., 1996). *Semantic Comprehension* = percentage of correct responses on the Camels and Cactus test, a nonverbal picture-picture association test for nonverbal semantic comprehension (Bozeat et al., 2000). *Word Comprehension* = percentage of correct responses on The Peabody Perceptive Vocabulary Test, a word-picture association test for nonverbal word comprehension (Dunn & Dunn, 1997). *Synonym Matching* = percentage of correct responses on the Synonymy Triplets test, a nonverbal synonym matching assessment of nouns and verbs (Martin, Schwartz, & Kohen, 2006). Phoneme Discrimination = percentage of correct responses on the Auditory Discrimination Test, an assessment of minimal pair phoneme discrimination (Martin, 1996).