

Title and Authors:

Story Retell Procedure: Validating Different Severity Levels in Aphasic Story Retells

Christine T. Matthews^{1,2}, Malcolm R. McNeil^{1,2,3}, Patrick J. Doyle^{1,2}, Hillel J. Rubinsky¹,
Tepanta R.D. Fossett², William D. Hula^{1,2}

¹ VA Pittsburgh Healthcare System Geriatric Research Education & Clinical Center

²University of Pittsburgh Department of Communication Science and Disorders

³University of Pittsburgh Medical Center Department of Otolaryngology

Background:

- One method of measuring processing resources that are shared among or between tasks (concurrent costs) is through differential performance on dual-tasks where independent manipulations of task difficulty are performed.
- In order to explore this sharing of processing resources between two tasks, a range of stimulus difficulties must be established for each of the tasks.
- Among the dual-tasks available for use within the *Resource Allocation Paradigms of Pittsburgh (RAPP)* (Doyle & McNeil, 1998), there is a visual-manual tracking task and a story-level language comprehension/retell task.
- The language comprehension/retell task stimuli were developed by having one non-brain-injured adult and one adult each with mild, moderate, and severe aphasia retell 12 stories from the Story Retell Procedure (SRP) (Doyle, McNeil, Park, Spencer, Goda, Cottrell & Lustig, 1998). These stories were subsequently analyzed to determine the percentage of information units per minute (%IUs/min) comprising each story. It was hypothesized that the story told by the normal adult speaker would contain the highest %IUs/Min, thus making it the easiest to understand and the story told by the speaker with severe aphasia would have the lowest %IUs/Min, making it the most difficult to understand.

Purpose:

- The purpose of this study was to determine whether the stories obtained from these 4 speakers represented 4 increasingly more difficult-to-understand versions of the same stories, as measured by the %IUs/Min in the retellings of these stories by non-brain-injured participants. Such findings would permit four levels of task difficulty that may be systematically manipulated during dual-task studies of language and attention.

Experimental Question:

- Is there a significant difference ($p < .05$) in the story retellings of non-brain-injured participants across the four story difficulty levels as measured by %IUs/Min?

Participants:

- 20 non-brain-injured participants

- 42 – 74 years of age (M = 54.89, SD = 10.46)
- Negative history of neurological, communication or psychiatric disorders
- Passed hearing, vision, memory, and language screenings
- ≥ 12 years of education

Stimuli:

- Twelve pre-recorded story-retellings (Brookshire & Nicholas, 1997) obtained from 1 non-brain-injured adult and 1 adult each with mild, moderate and severe aphasia.
- Aphasia severities were categorized by performance on the *Porch Index of Communicative Ability (PICA)* (Porch, 1981), *Revised Token Test (RTT)* (McNeil & Prescott, 1978), and 20 normal listener’s judgments on a Direct Magnitude Estimate (McNeil, Doyle, Goda, Park, Szwarc, Spencer & Carroll, 1999).

Table 1. Clinical characteristics of the stimuli producers with aphasia

<u>Subject</u>	<u>Age</u>	<u>MPO</u>	<u>RTT Percentile</u>	<u>ABCD ratio</u>	<u>RCPM</u>	<u>PICA Overall Percentile</u>	<u>PICA Verbal Percentile</u>
Mild	52	17	92	100	36	87	91
Moderate	55	30	63	100	32	75	71
Severe	71	94	5	100	22	43	37

Procedures:

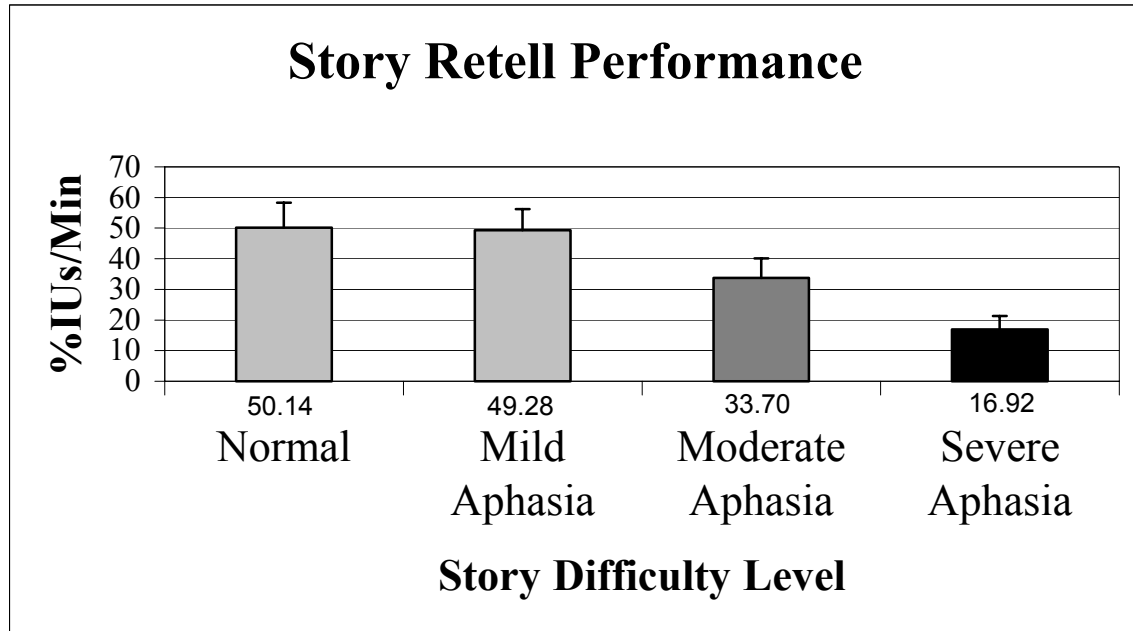
- Sound files containing each of the stories, which were approximately 2 minutes in duration, were presented auditorily via headphones.
- Following presentation of the sound file, subjects retold the story in their own words
- The subject’s retell of the story was digitally recorded and later analyzed for %IUs/Min.
- Each story form (i.e., three of the 12 stories) was quasi-randomly assigned such that no subject heard a given story form more than once, and that each subject heard one form produced by each of the four speakers.
- The amount of information conveyed during the story retells was quantified by the percentage of information units per minute (%IUs/Min) in subjects retellings and served as the dependent variable for all comparisons.
- An IU (information unit) is defined as an identified word or phrase, or its acceptable alternative, derived from the story that conveys relevant and accurate information about the story (McNeil, Doyle, Fossett, Park & Goda, 2001)

Results:

- Results of the single factor repeated measures ANOVA revealed a significant ($p < .05$) main effect ($F_{3,57} = 162.27$; $p < .001$) of story difficulty level
- Post-hoc pair-wise comparison using the Bonferroni adjustment revealed significant differences between the mild, moderate, and severe story levels, as well as between the normal, moderate, and severe story levels

- No significant difference in the %IUs/Min was found between the normal reading of the SRP stories and mild aphasic severity retell levels

Figure 1 Average percentage (plus one SD) of the information units per minute produced by 20 normal subjects from each of the stimulus stories derived from one normal reading of SRP stories and from three subjects' retellings of the stories classified by the severity of their aphasia.



Conclusions:

- The stimulus stories obtained from the normal and aphasic speakers resulted in three difficulty levels.
- There were no differences among subjects retellings of the stories obtained from the normal speaker and the speaker with mild aphasia. However, all other pair-wise comparisons were significantly different.
- These findings support the use of the 3 identified story difficulty levels as valid, mandatory task stimuli for dual-task studies.

Acknowledgments:

This study was funded by the VA Rehabilitation Research and Development Service, project # B2265R

References:

Brookshire, R.H., and Nicholas, L.E. (1997). *Discourse Comprehension Test* (Rev. ed.). Minneapolis, MN: BRK Publishers
 Doyle, P.J. & McNeil, M.R. (1998) Resource Allocation Paradigms of Pittsburgh.

- Program demonstration presented to the 1st VA Rehabilitation Research and Development Conference, Washington DC, 1998.
- Doyle, P.J., McNeil, M.R., Park, G., Goda, A., Rubenstein, E., Spencer, K., Carroll, B., Lustig, A., & Szwarc (2000). Linguistic validation of four parallel forms of a story retell procedure. *Aphasiology*, 14, 537-549.
- McNeil, M.R. & Prescott, T.E. (1978). *Revised Token Test*. Austin, TX: Pro-Ed.
- McNeil, M.R., Doyle, P.J., Goda, A.J., Park, G., Szwarc, L., Spencer, K., Carroll, B. (1999). Normal listener's severity judgments and comprehension of aphasic discourse: Validating a dual-task instrument for the assessment of spoken language handicap. Poster presentation to the VA Rehabilitation Research and Development Conference, Pittsburgh, PA, 1999.
- McNeil, M.R., Doyle, P.J., Fossett, T.R.D., Park, G.H. & Goda, A.J. (2001). Reliability and concurrent validity of the Percent Information Unit (%IU) scoring metric for the RAPP Story Retelling Procedure. *Aphasiology*, 15(10/11), 991-1006.
- Porch, B.E. (1981). *Porch Index of Communicative Ability*. Palo Alto, CA: Consulting Psychologists Press.