

## Stories, Attention, Memory and Aphasia

Discourse can be broadly defined as connected speech; it includes “a set of utterances aimed at conveying a message among interlocutors... [it] may be the most elaborative linguistic activity” (Ska, Duong, & Joannette 2004; p. 302). Narratives are one type of discourse genre. The focus for this presentation is stories, which are highly structured *narrative* forms. Story processing requires comprehending the story characters, the events – including temporal and spatial shifts, as well as, the goals and internal responses of the characters and producing these story components in a structured coherent framework. This framework, then, should include an introduction (i.e., setting, characters, etc...), story events (e.g., the problem, response to it, action taken, etc...) and an ending that clearly states the story is over.

Narrative discourse processing requires a variety of cognitive processes. For example, Wright, Capilouto, and Carter (2009) found that performance on episodic memory, working memory, and attention measures significantly correlated with cognitively healthy older adults' (>70 years old) story telling and story comprehension abilities. The language deficits experienced by persons with aphasia (PWA) affect their ability to communicate at the discourse level. Subsequently, PWA may have difficulty sharing stories, participating in conversation, and recounting personal experiences successfully. Further, it has been well documented that though individuals with aphasia have primary language deficits they may also present with cognitive impairments; such as working memory and attention impairments (See Murray, 1999 and Wright & Shisler, 2005 for reviews). Finally, stories are a natural part of everyday communication and are often embedded in conversations; thus, it is clinically important and ecologically valid to investigate narrative discourse ability in adult with aphasia. The purpose of the current study, then, was to determine the extent to which performance on cognitive measures of attention and memory relate to story comprehension and production performance by participants with aphasia.

## METHOD

### Participants

To date 11 adults with aphasia have completed the study protocol. Inclusion criteria were as follows: (1) monolingual, English speakers; (2) at least 6 months post onset of stroke; (3) single, left-hemisphere cerebrovascular accident (CVA), and (4) sufficient hearing and visual acuity as indicated by passing hearing and vision screenings. Aphasia presentation was confirmed through performance on the Western Aphasia Battery-Revised (WAB-R; Kertesz, 2007) as well as clinical judgment. Group's mean WAB-R aphasia quotient (AQ) was 68.76 (SD = 13.97).

Twenty adults without neurological impairment served as the control group. Inclusion criteria were as follows: (1) aided or unaided visual acuity within normal limits, as indicated by passing a vision screening, (2) aided or unaided hearing acuity within normal limits, as indicated by passing a hearing screening, (3) reported negative history for cognitively deteriorating conditions such as Alzheimer's or Parkinson's, and (4) normal cognitive functioning as measured by the *Mini-Mental Status Examination* (MMSE; Folstein, Folstein, & McHugh, 1975).

### Story Task

Participants viewed and told the stories depicted in two wordless picture books then answered 15 multiple choice questions about the stories. The books included *Picnic* (McCully, 1984) and

*Good Dog Carl* (Day, 1985). The comprehension questions were comprised of factual and inferencing questions. Question development included feasibility testing to: (a) ensure questions could not be answered correctly above chance level without viewing the stimulus; (b) determine appropriateness of question and possible choices; and (c) ensure random presentation of questions did not bias an individual's response.

#### Language Measure: Story Proposition Analysis

All story tellings were orthographically transcribed from the audio or video recordings by research assistants. Ten percent of the story tellings were randomly selected for a second transcription to determine inter-rater and intra-rater word-by-word agreement; agreements were greater than 90%. To measure participants' story telling performance the number of story propositions conveyed for each story was determined. Participants' stories were compared to an *a priori* list of story propositions. The purpose of the story proposition analysis was to measure participants' accuracy and completeness for telling the story depicted in each wordless picture book. Inter- and intra-rater agreement for coding story propositions was calculated for 10% of the transcribed samples. All agreements were above 90%.

#### Cognitive Measures

For the participants with aphasia, the attention and memory measures were modified to account for right-sided weaknesses as well as spoken language requirements. To estimate attention ability, the Comprehensive Trail Making Test (CTMT; Reynolds, 2002) was administered. However, because PWA may have weakness in their writing hand or may have to use their non-dominant hand to complete the task, we used participants' completion time on Trail 1 as their baseline performance and subtracted that time from their completion time on Trail 5. The time, Trail 5 – Trail 1, served as the recorded score. Portions of the *Wechsler Memory Scale –III* (WMS-III; Wechsler, 1997) were administered to estimate participants' working memory and episodic memory ability.

## RESULTS

Preliminary analyses were performed to determine that participant groups did not differ for age and years of education completed. The groups did not differ for age,  $t(29) = .22$ ,  $p = .83$ , or years of education completed,  $t(29) = 1.39$ ,  $p = .18$ .

Prior to identifying group differences on the story proposition measure, performance on the story propositions for the control group were inspected to determine which propositions were conveyed by at least 70% of the control participants. Nine story propositions for *Picnic* and 13 story propositions for *Good Dog Carl* met this criterion. An unpaired t-test was performed to compare total number of story propositions conveyed across stories. The control group conveyed significantly more story propositions compared to the aphasia group,  $t(28) = 10.81$ ,  $p < .0001$ . Performance on the comprehension task was also compared. The control group performed significantly better on the comprehension measure (combined for both stories) compared to the aphasia group,  $t(26) = 2.76$ ,  $p < .05$ .

To address the study purpose, Pearson correlation coefficients were calculated to determine the relationship among the aphasia group's performance on the cognitive measures and the story

telling measures. No measures significantly correlated; however, the episodic memory score and comprehension measure approached statistical significance,  $r = .60$ ,  $p = .06$ . Finally, to determine if participant's severity of aphasia influenced their performance on the story telling tasks, Pearson correlation coefficients were calculated. The aphasia participants' WAB AQ significantly correlated with the number of story propositions conveyed,  $r = .76$ ,  $p < .01$ .

## CONCLUSIONS

The purpose of this study was to determine if performance on cognitive measures of attention and memory related to story comprehension and production performance by participants with aphasia. Results of the preliminary analyses indicate that severity of aphasia is a better predictor of performance on the story telling tasks than performance on the cognitive measures. These findings will be discussed in detail, as well as clinical implications of the results.

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