Expanding the Scope: Multimodal Dimensions in Aphasia Discourse Analysis

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Background

- In exploring macrolinguistic qualities in story retelling, it becomes clear that the **richness and depth in narratives extends beyond verbal expression** (Pritchard et al., 2015; Sekine et al., 2013).
- **Discourse analysis in aphasia has traditionally focused on verbal output**, neglecting other communication modalities, such as drawings, nonlinguistic sounds, and non-verbal expressions, that aid verbal productions.
- These **supplementary communication modes, vital for conveying narrative details, are excluded from conventional scoring systems**, potentially skewing the evaluation of individuals' storytelling abilities.
- Failing to account for these diverse expressions may undervalue the storytelling capacities of individuals with aphasia.
- Most aphasia research has examined multimodal communication in therapy, with **limited empirical investigations in language assessment**.
- This **study explores including these alternative communication forms in existing scoring systems**, thus enabling a more comprehensive and accurate assessment of the strengths and weaknesses within aphasic discourse.

Specific Aims and Hypothesis

- The study aimed to investigate **how integrating multimodal communication elements into discourse analysis affects the overall macrolinguistic quality of storytelling** among individuals with chronic aphasia compared to neurotypical healthy controls.

- *Hypothesis:* incorporating alternative modalities will improve macrolinguistic scores in aphasics' story retelling performances. We expect these scoring differences to be less pronounced among healthy controls.

Method

- **Participants:** Individuals with aphasia and age- and education-matched healthy controls
- **Tasks:** Retelling Cinderella (AphasiaBank; MacWhinney et al., 2011) and Bear and the Fly (Dutta 2020; Dutta et al., 2023; under review)
- **Analysis:** Conducted comparative analysis of discourse performances; Analyzed all language samples for macrolinguistic elements (e.g., physical gestures, writing, drawing)

- **Scoring systems:**

✓ Traditional verbal scoring focusing on verbal output

✓ Modified system including non-verbal modalities and/or AAC

Table 1. Demographic characteristics of participants.

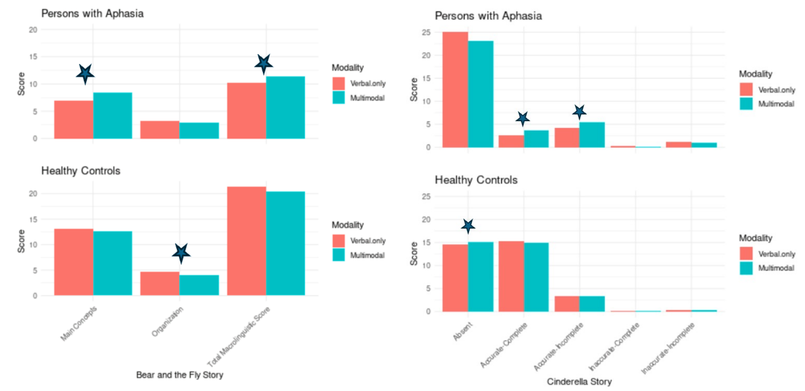
Variable	Persons with Aphasia	Healthy Controls	Group Comparison Statistic
Cinderella Story			
No. of Participants	15	15	
Age	64.21 ± 11.84	73.99 ± 9.32	U = 48, p = .054
Education	15.64 ± 4.37	15.46 ± 2.99	U = 98, p = .780
WAB-AQ	64.16 ± 16.29	-	
MMSE	-	59.8 ± 9.09	
Bear and the Fly Story			
No. of Participants	15	13	
Age	62.86 ± 10.46	60.07 ± 9.51	U = 85, p = .586
Education	17.53 ± 2.89	17.46 ± 3.29	U = 93.5, p = .865
WAB-AQ	75.01 ± 18.82	-	
MoCA	-	28.38 ± 1.19	

Table 2. Discourse variables derived from both story retelling tasks.

Macrolinguistic variable	Description	Scoring
Bear and the Fly story (Macrolinguistic Rubric, Loughnane, 2016; Loughnane & Murray, 2018)		
Main concepts	The total number of main ideas produced	Total possible score = 15
Organization	Providing relevant information, being topic-centered, using appropriate cohesion and length	Total possible score = 5
Total macrolinguistic rubric score	The total score for main concepts and discourse organization	Total possible score = 20
Cinderella story (Main Concept Analysis; Richardson & Dalton, 2016)		
Accurate & Complete (AC)	Contains all elements of the main concept on the checklist with no incorrect information	3 points
Accurate & Incomplete (AI)	contains no incorrect information, but leaves out at least one essential element of the main concept on the checklist	2 points
Inaccurate & Complete (IC)	Contains at least one incorrect piece of essential information (e.g., "knight" for "prince") but includes all essential elements of the main concept on the checklist	2 points
Inaccurate & Incomplete (II)	Clearly corresponds with a main concept on the checklist but includes at least one incorrect essential element and fails to include at least one essential element	1 point
Absent (AB)	Did not produce the main concept	0 points
Main concept score (MC)	Total main concept score	(3 x AC) + (2 x AI) + (2 x IC) + (1 x II)

Results

- **Between-group comparisons of verbal-only and multimodal scoring**
- For both stories, PWA scored lower on macrolinguistic variables compared to healthy controls across both scoring systems (verbal-only and multimodal scoring)
- **Within-group comparisons of verbal-only and multimodal scoring**



- **Differences in macrolinguistic scores based on aphasia severity**

	Verbal-only scoring			Multimodal scoring		
	MC	**Org**	**Total macro score**	**MC**	**Org**	**Total macro score**
			Bear and the Fly story			
WAB-AQ	.552	.522	**.547***	.510	.528	**.496***

	Cinderella story									
	AC	AI	IC	II	AB	AC	AI	IC	II	AB
WAB-AQ	.421	.342	.165	.262	**-.512***	**.482***	.435	.241	.019	**-.512***

Note. * = significant finding ($p < .05$).

Conclusion

- Multimodal scoring consistently yielded higher scores for PWA during both story retelling tasks compared to verbal-only scoring. **Non-verbal modalities enhance overall macrolinguistic quality** and offer alternative means of expression for PWA (Richardson & Dalton, 2016).
- **Individuals with aphasia predominantly utilize meaning-laden gestures**, such as iconic character and iconic-observer viewpoint gestures, during both story retelling tasks.
- Like Richardson et al. (2021), PWA with greater aphasia severity tended to exhibit lower macrolinguistic scores in both assessment approaches.
- Considering multimodal communication is important in assessing discourse performance among PWA (e.g., Caute et al., 2021). Tailoring assessments based on aphasia subtypes can provide insights and inform targeted interventions for better communication outcomes.

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