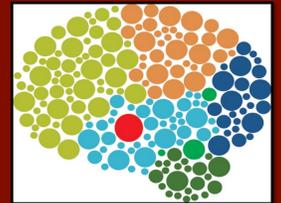




# Story Grammar Analysis in Persons with Mild Aphasia

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## Background

- Narratives are often the basis of daily conversational interactions. When narrative skills are compromised, functional conversation is negatively impacted.
- Narrative coherence can be impacted in persons with anomic aphasia (PWaAs).<sup>1</sup>
- Narrative abilities of individuals who have had a stroke (and perhaps previous aphasia diagnosis) but who perform within normal limits on standardized aphasia assessment measures (e.g., “not aphasic by WAB” or “NABW”) have not been characterized.
- In order to continue progressive development of interventions for PWaAs and NABWs, more information regarding narrative strengths and weaknesses is needed.
  - These individuals have little to no therapeutic options, but still have difficulty in conversation, may not be able to return to work, and may demonstrate reduced life participation.
- Story grammar analysis is a well-known and commonly used narrative analysis method.
- **Aim 1:** To determine if there are differences between PWaAs, NABWs, and non-brain-injured controls (NBIs) on production of story grammar components during telling of the Cinderella story.
- **Aim 2:** To examine the relationship between story grammar measures and an easily and quickly derived discourse measure called CoreLex.

## Methods

### Database

- Thirty Cinderella story transcripts (10 per group) were retrieved from the **AphasiaBank**<sup>2</sup> database, matched for gender, race/ethnicity, age, years of education, and handedness. See **Table 1**.

Table 1	PWaA	NABW	NBI
Age	53.7 (+/- 12.7)	60.9 (+/- 14.2)	59.5 (+/- 14)
Education	15.2 years (+/- 1.79)	15.7 (+/- 2.06)	15.4 (+/- 2.07)
Gender	6 male, 4 female	6 male, 4 female	6 male, 4 female
WAB-RAQ	91 (+/- 1.68)	96.4 (+/- 2.21)	--

### Story Grammar Coding

- Transcripts were divided into relevant concepts (RCs) (i.e., utterances about the story that contained a subject, one main verb, and object).
  - May contain subordinate clauses, but must contain ONLY ONE MAIN verb.<sup>3</sup>
- RCs received a story grammar code.<sup>4</sup> See **Table 2**.
- The following were calculated:
  - **Story Length** = total number of RCs that received a story grammar code
  - **Story Component Usage** = frequency of use of seven different story components
  - **Core Lexicon (CoreLex)**<sup>5</sup> = the total number of words spoken in the transcript that have been identified in previous research as the core lemmas spoken by 50% of AphasiaBank control participants (e.g., Cinderella, prince, clean, wand, etc.)

### Data Analysis

- Aim 1: Wilcoxon Signed-Rank Tests (two-tailed)
- Aim 2: Spearman’s Rank Order Correlation (rho) (two-tailed)

**Table 2. Story Grammar Components<sup>3</sup>**

Blue text indicates NBI participants’ examples of story grammar components. Red text indicates PWaAs and NABW participants’ examples.

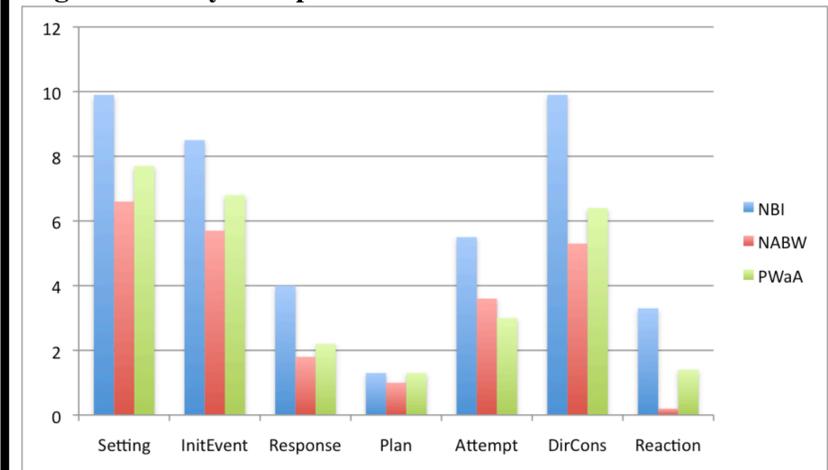
Component	Description
1. Setting	Habitual or static states of characters and locations. <ul style="list-style-type: none"> <li>• Major setting, Minor setting</li> <li>• Cinderella is friends with all the animals.</li> <li>• The prince needs to get married.</li> <li>• They yell at the little girl all the time.</li> <li>• The new wife was /delis/... mean.</li> </ul>
2. Initiating Events	The immediate cause for a response on the part of the protagonist. <ul style="list-style-type: none"> <li>• Natural Occurrence, Action, Internal Event, Verbalization</li> <li>• They got an invitation for the ball.</li> <li>• The prince showed up at Cinderella’s house.</li> <li>• Well, the fairy godmother came along.</li> <li>• And all of a sudden the clock started to the clock began to strike at midnight.</li> </ul>
3. Response	The psychological state of the character after the initiating event or a verbal response to the situation. <ul style="list-style-type: none"> <li>• Affective response, Goal, Cognition</li> <li>• Cinderella was so sad.</li> <li>• She remembers the fairy godmother said she must be home by midnight.</li> <li>• Prince wanted to find her.</li> <li>• And eleven fifty, [she] panicked.</li> </ul>
4. Plan	Statements that specify a character’s strategy for obtaining the goal. <ul style="list-style-type: none"> <li>• He will use the glass slipper that she lost.</li> <li>• Well, you will need horses and a coach to ride.</li> <li>• He want to see if she, she wear, will, she will wear the sleeper, the glass slipper.</li> <li>• We have to find the person who can fit this shoe.</li> </ul>
5. Attempt	The character’s overt action(s) to obtain the goal. <ul style="list-style-type: none"> <li>• The fairy godmother gets Cinderella into the carriage.</li> <li>• The two evil stepsisters try on the slipper.</li> <li>• So the stepmother, stepsisters try to hear, fit the slipper.</li> <li>• The animal, the birds, the... sneak Cinderella the keys.</li> </ul>
6. Direct Consequence	The character’s success or failure at attaining the goal(s); any changes in the sequence of events resulting from the character’s actions. <ul style="list-style-type: none"> <li>• Natural occurrence, Action, End State</li> <li>• She lost one of her glass slippers.</li> <li>• Cinderella and the prince lived happily ever after.</li> <li>• Oh, the other sister-in-laws were too big for the foot.</li> <li>• The slipper is fitting the, on the /smda:eladz/.</li> </ul>
7. Reaction	The way the character feels or reports feeling about the outcome; the character’s thoughts regarding success or failure. <ul style="list-style-type: none"> <li>• Affect, Cognition, Action</li> <li>• The prince is upset that she ran away.</li> <li>• The prince realizes Cinderella is the one.</li> <li>• The girls, the, the sisters there were very very surprised.</li> <li>• The stepmother and the sisters gasp.</li> </ul>

### References

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## Results

**Figure 1. Story Components**



- NBIs had the numerically highest values for all story grammar variables.
- NBIs were significantly different from NABWs for Story Length ( $z=-2.395, p=.017$ ), “Setting” ( $z=-2.144, p=.032$ ), “Response” ( $z=-2.109, p=.035$ ), “Direct Consequence” ( $z=-2.145, p=.032$ ), and “Reaction” ( $z=-2.810, p=.005$ ).
- NBIs were significantly different from PWaAs for Story Length ( $z=-2.091, p=.037$ ), “Attempt” ( $z=-2.322, p=.020$ ), and “Reaction” ( $z=-2.539, p=.011$ ).
- The only significant difference observed between PWaAs and NABWs was for the story component “Reaction”,  $z=-2.280, p=.023$ .
- Spearman rho results for CoreLex – Story Length relationships are as follows: NBI,  $r_s(8) = .567, p=.043$ ; and identical results for NABW and PWaA,  $r_s(8) = .784, p=.004$ .

## Discussion

- Communication deficits were not captured by WAB-RAQ scores in our PWaAs and NABWs, as all were performing at or near ceiling.
- Story grammar analysis revealed significant differences between NBIs, NABWs and PWaAs in this study.
  - Reduced story components (and thus length) likely results in reduced story coherence in NABWs and PWaAs.
  - NABWs have a profile more similar to PWaAs than NBIs.
- Word-finding deficits may contribute to reduced usage of story components (microlinguistic deficits contributing to macrolinguistic deficits<sup>1</sup>).
  - The correlation between story length and CoreLex is greater in PWaAs and NABWs than NBIs, and one interpretation is that reduced vocabulary drives the reduced story in these individuals.
- Traditional word retrieval therapy (e.g., naming) is unlikely to result in improved narrative performance in these populations. Word-finding in narrative and conversation would be most beneficial.
- Story grammar and other discourse analyses consistently reveal marked differences between PWAs and controls, even when treatment has been suspended because of high levels of performance.
  - Narrative discourse, and not traditional assessment measures, may be a better candidate for decision-making regarding treatment termination, more consistent with the shifting focus to life participation and quality of life as treatment outcomes.

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