Story Narrative in Anomic Aphasia: Analysis of Story Grammar Components

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Background

•Narratives are often the basis of daily conversational interactions.

•When narrative skills are compromised, functional conversation is negatively impacted.

•Anomic aphasia is primarily characterized as a word-finding disorder; narrative coherence can also be impacted in this population.[1]

•In order to continue progressive development of interventions for persons with anomic aphasia (PWaAs), more information regarding narrative strengths and weaknesses in this population is needed.

•Deficits may be so minor that they are not apparent on traditional standardized assessment measures, but it should not be assumed that they do not exist and do not affect functional communication abilities.

•Story grammar analysis is a well-known and commonly used method of analyzing narrative discourse in several clinical populations.

•Aims:

- 1) To determine if PWaAs differ from their non-brain injured peers (NBIs) on discourse and story grammar measures.
- 2) To explore the relationship between story grammar and other discourse measures.

•PWaAs with the highest WAB-R AQ scores were selected for this study. These individuals should be the PWAs most similar to control subjects, so a finding of differences in story grammar elements would support the sensitivity of the measures.

Methods

Database

• Cinderella story transcripts of 14 NBIs and 14 PWaAs were retrieved from the **AphasiaBank** database.

- Matched for gender, race/ethnicity, age, years of education, and handedness.
  - •NBIs: Age = 60.8 years (range = 36 – 82.3, *SD*=12.5)
    Education = 15.4 years (range 11-22 years, *SD*=2.85)
    7 males, 14 white, 14 right-handed
  - •PWaAs: Age = 58.5 years (range 34.4 – 83.2, *SD*=13.3)
    Education = 14.9 years (range 12-21 years, *SD*=1.95)
    7 males, 14 white, 14 right-handed
    WAB-R AQ = 91.3 (range = 88.3 – 93.4, *SD*=1.54)

Story Grammar Coding

•The Cinderella story was chosen based on its length and complexity, making it a better comparison to conversational speech than other types of discourse (i.e. procedural, picture description).

•Transcripts were divided into relevant concepts (i.e., utterances about the story that contained a subject, one main verb, and object (if appropriate).

- May contain subordinate clauses, but must contain ONLY ONE MAIN verb.[2]

• Relevant concepts (RCs) received a story grammar code.[3] See Table 1.

•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
- **Story Efficiency** = ratio of total number of RCs with story grammar code to total number of tokens in transcript
- **Core Lexicon**[4] = 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

•Aim 2: Spearman's Rank Order Correlation (rho)

Table 1. Story Grammar Components[3].

Component	Description
1. Setting	Habitual or static states of characters and locations. •Major setting, Minor setting •Cinderella is friends with all the animals. •The prince needs to get married. •They yells at the little girl all the time. •The new wife was /dɛlɪs/… mean.
2. Initiating Events	The immediate cause for a response on the part of the protagonist. •Natural Occurrence, Action, Internal Event, Verbalization •They got an invitation for the ball. •The prince showed up at Cinderella's house. •Well, the fairy godmother came along. •And all of a sudden the clock started to the clock began to strike at midnight.
3. Response	The psychological state of the character after the initiating event or a verbal response to the situation. •Affective response, Goal, Cognition •Cinderella was so sad. •She remembers the fairy godmother said she must be home by midnight. •Prince wanted to find her. •And eleven fifty, [she] panicked.
4. Plan	Statements that specify a character's strategy for obtaining the goal. •He will use the glass slipper that she lost. •Well, you will need horses and a coach to ride. •He want to see if she, she wear, will, she will wear the sleeper, the glass slipper. •We have to find the person who can fit this shoe.
5. Attempt	The character's overt action(s) to obtain the goal. •The fairy godmother gets Cinderella into the carriage. •The two evil stepsisters try on the slipper. •So the stepmother, stepsisters try to hear, fit the slipper. •The animal, the birds, the… sneak Cinderella the keys.
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. •Natural occurrence, Action, End State •She lost one of her glass slippers. •Cinderella and the prince lived happily ever after. •Oh, the other sister-in-laws were too big for the foot. •The slipper is fitting the, on the /sɪndəɹɛlədz/.
7. Reaction	The way the character feels or reports feeling about the outcome; the character's thoughts regarding success or failure. •Affect, Cognition, Action •The prince is upset that she ran away. •The prince realizes Cinderella is the one. •The girls, the, the sisters there were very very surprised. •The stepmother and the sisters gasp.

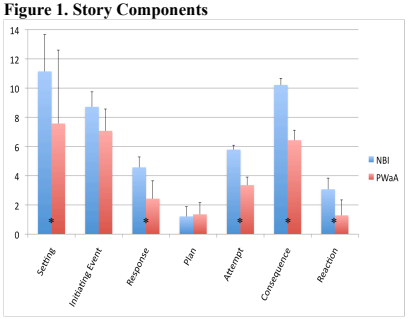
Blue text indicates NBI participants' examples of story grammar components. Red text indicates PWaAs participants' examples.

References

1. Andreetta, S., Cantagallo, A., & Marini, A. (2012). Narrative discourse in anomic aphasia. *Neuropsychologia, 50*(8), 1787-1793.
2. Nicholas, L.E., Brookshire, R.H. (1995). Presence, completeness, and accuracy of main concepts in the connected speech of non-brain-damaged adults and adults with aphasia. *Journal of Speech, Language, and Hearing Research, 38,* 145-156
3. Roth, F. &Spekman, N. (1986). Narrative discourse: Spontaneously generated stories of learning-disabled and normally achieving students. *Journal of Speech and Hearing Disorders, 51*, 8-23.
4. Richardson, J.D., Hudspeth, S.G., & Dillow, E.D. (in prep). Does use of a core lexicon predict narrative adequacy as measured by main concept production?

Results

Figure 1. Story Components



Wilcoxon Signed-Rank Tests (one-tailed) were conducted do determine if NBIs demonstrated larger values for:

Story length

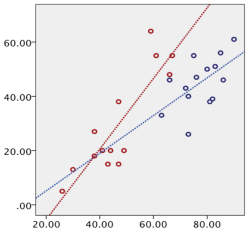
- $z = -2.482$, $p = .007$

Story Efficiency – n.s.

Story Components

- **Setting**, $z = -1.666$, $p = .048$
- **Initiating Event**, n.s.
- **Response**, $z = -1.825$, $p = .034$
- **Plan**, n.s.
- **Attempt**, $z = -2.493$, $p = .006$
- **Direct Consequence**, $z = -2.173$, $p = .015$
- **Reaction**, $z = -2.848$, $p = .002$

Figure 2. Relationship between Core Lexicon and Story Length



Spearman's Rank Order Correlations (one-tailed) were conducted to determine if a positive relationship existed between core lexicon and story length values.

- **Non-brain-injured**, $r_s(12) = .56$, $p = .019$
- **Persons with anomic aphasia**, $r_s(12) = .79$, $p < .001$

X-axis is Core Lexicon; Y-axis is story length.

Discussion

•Communication deficits were not captured by WAB-R AQ scores in our PWaAs, as all were performing near ceiling.

•Story grammar analysis reveals significant differences between the non-brain-injured controls and persons with "mild" anomic aphasia in this study.

•A reduction in the number and type of story components negatively impacts story length and story coherence.

•Word-finding deficits, the hallmark of anomic aphasia, are likely responsible for reduced usage of story components (microlinguistic deficits contributing to macrolinguistic deficits[1]).

- •The correlation between story length and core lexicon is much greater in PWaAs than NBIs, and one interpretation is that reduced vocabulary drives reduced story in PWaAs.

•Traditional naming therapy is unlikely to result in improved narrative performance in this population (PWaAs who are already at or near ceiling). 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. If increased life participation is truly the goal of speech-language intervention, then narrative discourse, and not traditional assessment measures, would be a better candidate for decision-making regarding treatment termination.

- • Future directions includes assessment of a corpus of individuals in the AphasiaBank database who received a score of Not Aphasic by WAB, but who clearly have communication deficits following stroke that impact their daily lives.