Cinderella Narratives by Persons with Aphasia: The Production of Nouns, Verbs, and Main Ideas

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Introduction

Speech-language pathologists are interested in functional communication skills of persons with aphasia (PWAs). Confrontation naming tells us something about a person's lexical retrieval ability, but does not necessarily mean that verbal communication at the discourse level will be successful.

Johnson et al. (2012) and Dillow et al. (2013) performed word-level analyses of narratives produced by PWAs. The current study examines narratives of PWAs using a discourse-level analysis to explore whether the ability to produce core single nouns and verbs in a narrative is related to the ability to produce main ideas of the story.

Johnson et al. (2012): Compared PWAs' confrontation naming to production of core nouns and verbs in telling the Cinderella story
Nouns: *Strong positive correlation (r = .56, p < .001)*
Verbs: *Weaker positive correlation (r = .26, p = .045)*

Dillow et al. (2013): Compared the number of verbs produced by controls and PWAs in telling the Cinderella story
Controls produced significantly more verbs than PWAs (t(88) = -13.58, p<.001)
Subjects with Broca's aphasia produced significantly fewer verbs than other PWAs (Wernicke's, Conduction, Anomic).

Research Questions

1) Do persons with different types of aphasia differ in the number of core nouns, core verbs, or main ideas they produce while telling the Cinderella story?

2) Is there a positive correlation between the number of core nouns or core verbs produced and the number of main ideas produced?

Hypotheses

1) Persons with Anomic and Conduction aphasia will produce more core nouns, core verbs, and main ideas than subjects with Broca's or Wernicke's aphasia.

2) There will not be a strong correlation between the number of single core nouns or single core verbs and the number of main ideas produced.

References

Dillow, E., Ford, K., & Richardson, J. (2013). *Core verb use in persons with aphasia during Cinderella retelling*. Poster presented at the South Carolina Speech-Language-Hearing Association convention http://talkbank.org/AphasiaBank/posters/13SC-Richardson.pdf

Grimes, N., Williams, D., Story, J. & Russell, H. (2005). *Walt Disney's Cinderella*. New York: Random House.

Johnson, K., Kurland, J., Parker, J., Fromm, D., & MacWhinney, B. (2012). *Nouns and verbs in naming and storytelling tasks in aphasia: Verbs are another story.* Poster presented at the Clinical Aphasiology Conference, Lake Tahoe, CA.

MacWhinney, B., Fromm, D., Holland, A., Forbes, M., & Wright, H. (2010). Automated analysis of the Cinderella story. *Aphasiology, 24,* 856-868.

MacWhinney, B., Fromm, D., Forbes, M., & Holland, A. (2011). AphasiaBank: Methods for studying discourse. *Aphasiology, 25,* 1286-1307.

Subjects

Controls and PWAs who participate in the AphasiaBank project are administered a variety of tests including the Cinderella narrative discourse task. AphasiaBank contained test results from 290 unique PWAs when the database was accessed on July 18, 2013 (www.talkbank.org).

Participation Inclusion/Exclusion Criteria:

- Diagnosis of aphasia
- Adequate vision and hearing
- English-speaking monolingual
- Left hemisphere damage post-stroke
- Aphasia duration ≥ 6 months
- No history of other neurological conditions

	Anomic	Broca's	Conduction	Wernicke's	TOTAL
N	27	22	19	9	77

Time Post-Onset M = 6.13 years (SD = 5.51)*
Years of Education M = 15.3 years (SD = 2.68)
Years SLP Tx M = 3.43 (SD = 4.06)*
Mean Age 62.9 years (SD = 10.6)
Gender 33 Female, 44 Male
Ethnicity 69 Caucasian, 8 African American
Handedness 72 Right, 4 Left, 1 Ambidextrous

** No significant difference among groups*

Noun, Verb, and Main Idea Analysis

Using the CLAN program (MacWhinney et al., 2011), transcripts of Cinderella narratives from the 77 PWAs were analyzed for the presence of the core (top 20) nouns and verbs produced by control subjects (Johnson et al., 2012).

We identified 25 main ideas from the transcripts of 102 control participants from the AphasiaBank database, and then tallied the number of main ideas produced by the 77 PWAs. Inter-rater reliability for # of main ideas produced was calculated for 10.3% (n = 8) of PWAs. For scores that differed by ≤ 1 main idea, inter-rater reliability was 75%.

Core (Top 20) Nouns & Verbs Produced by Controls (Johnson et al., 2012)

Nouns

Cinderella	Pumpkin	Stepsister
Prince	Dress	Horse
Fairy	Glass	Carriage
Slipper	Time	Foot
Ball	Stepmother	Mouse
Godmother	Daughter	Mother
Midnight	House	

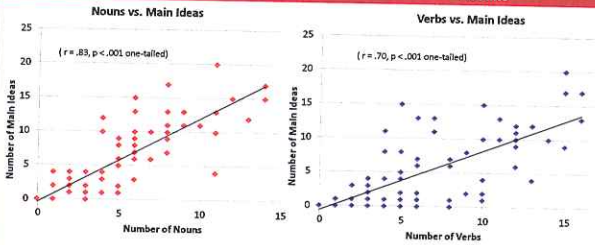
Verbs

Be	Come	Dance
Have	Live	Look
Go	Make	Want
Do	Try	Leave
Get	Fit	Turn
Find	Marry	Say
Will	Run	

25 Identified Main Ideas

Cinderella has a stepmother	Cinderella attends the ball
Cinderella has stepsisters	Cinderella dances with the prince
Step family (mother/sister) treats Cinderella badly	Wife for prince needed/wanted
The magic ends at midnight	The prince falls in love with Cinderella
There is a ball	Cinderella runs away from the ball at midnight
Young women/Cinderella's household are invited to the ball	Cinderella leaves behind one of her slippers/shoes at the ball
The stepsisters go to the ball/party/gala	The prince searches for Cinderella
Cinderella is not allowed to go to the ball	The slipper does not fit the stepsisters
The fairy godmother has magical powers/makes magic	Cinderella tries on the slipper
The fairy godmother makes a carriage	The slipper fits Cinderella
The carriage is made out of a pumpkin	Cinderella and the prince get married
The fairy godmother gives/makes a dress for Cinderella	They live happily ever after
There is an imbalance in amount of work Cinderella does compared to others	

Results



Results of a step-wise multiple regression analysis showed that nouns most strongly accounted for the variability in main idea production, followed by verbs. Total number of words and WAB AQ did not contribute to the variability in number of main ideas produced.

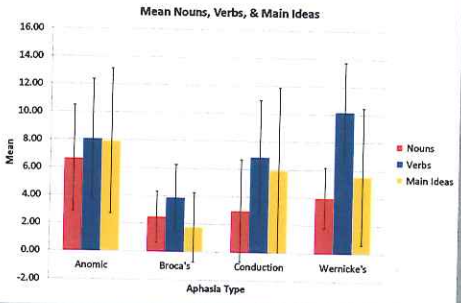
Variables	r^2	p
Nouns	.69	< .001
Nouns + Verbs	.76	< .001

Results of one-way ANOVAs showed a significant difference among the types of aphasia in terms of:

- number of nouns produced (F (3,73) = 7.75, p < .001)
- number of verbs produced (F (3,73) = 8.15, p < .001)
- number of main ideas produced (F (3,73) = 6.83, p < .001)
- severity of aphasia (WAB AQ) (F (3,73) = 69.12), p < .001)

Post-hoc testing (Dunnett T3) revealed that Broca's aphasia was more severely aphasic (lower WAB AQ) than all other aphasia types, and Conduction and Wernicke's was more severely aphasic than Anomic.

Aphasia Type	Mean WAB AQ	SD
Broca's	52.30	10.78
Anomic	86.21	6.15
Wernicke's	64.20	7.27
Conduction	70.67	8.12



Post-Hoc Analyses and ANCOVA Results

Post-hoc analyses (Dunnett T3) for unequal variances revealed:

- Subjects with Broca's aphasia produced significantly fewer nouns than subjects with Anomic aphasia or Conduction aphasia.
- Subjects with Wernicke's aphasia produced significantly fewer nouns than subjects with Anomic aphasia.
- Subjects with Broca's aphasia produced significantly fewer verbs than subjects with Anomic aphasia or Wernicke's aphasia.
- Subjects with Broca's aphasia produced significantly fewer main ideas than subjects with Anomic aphasia.

ANCOVA controlling for WAB AQ revealed:

- Number of main ideas produced does not differ significantly by aphasia type when you control for aphasia severity (F (3,72) = .596, p = .62) and neither does number of core nouns produced (F (3, 72) = .542, p = .66).
- Number of core verbs produced DOES differ significantly by aphasia type when you control for aphasia severity (F (3,72) = 4.411, p = .007, ω^2 = .10). The measure of association (ω^2) showed that aphasia type accounts for only 10% of the total variance in the number of core verbs produced, controlling for the effect of severity of aphasia. Post-hoc testing revealed that subjects with Wernicke's aphasia produced significantly more verbs than subjects with Broca's aphasia (F (1,72) = 11.62, p = .001), and the effect size was 1.46.

Discussion

- Persons with different types of aphasia did not differ in the number of core nouns or main ideas they produced while telling the Cinderella story when you control for aphasia severity.
- Persons with different types of aphasia DID differ in the number of core verbs they produced while telling the Cinderella story when you control for aphasia severity; persons with Wernicke's aphasia produced more core verbs than those with Broca's aphasia.
- Further analyses revealed no significant difference between subjects with Broca's and Wernicke's aphasia in terms of number of light verbs or number of words produced, so neither of these factors can explain why subjects with Wernicke's aphasia produced more core verbs than those with Broca's aphasia.
- There was a significant strong positive correlation between the number of core nouns produced and the number of main ideas produced (r = .83), and there was a significant strong positive correlation between the number of core verbs produced and the number of main ideas produced (r = .70).
- Results of a step-wise multiple regression analysis revealed that number of core nouns produced accounted for the most variability in number of main ideas produced (69%), with the addition of number of core verbs produced increasing the amount of variability accounted for (76%).
- Severity of aphasia appears to be more related than type of aphasia to the number of core nouns and main ideas produced in a narrative discourse task, but this does not apply to the number of core verbs produced.
- Since production of single core nouns was so strongly related to production of main ideas, clinicians might be able to use a core noun count to determine how much of the gist of a story will be conveyed by a PWA.

Disclosure

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