# The Problem

- Some controversy exists concerning gender bias in the Cinderella story, such that women might be likely to retell this story in more detail than men.
- Another concern is that older individuals might be likely to retell this story more completely than younger individuals, because it is argued that fewer younger persons in the US are likely to have heard the story.
- Paradoxically, several highly regarded analyses of discourse in aphasia (Berndt et al., 2000, Thompson, 1997) have been tailored to the Cinderella story.

# **Research Questions**

- Do women produce more total utterances, more total words, and more diverse lexicons than men?
- Is age positively correlated with total utterances, total words, and lexical diversity?

# Participants

- All were from the AphasiaBank database.
- All were native English speakers.
- All aphasias resulted from stroke.
- There were no significant differences between persons with aphasia (PWA) and non-aphasic controls on: age, education, or numbers of men and women in the groups.
- There were no significant differences in severity of aphasia between males and females in the aphasic group.



- Participants were shown 25-page Cinderella picture book with text covered by white duct tape, and instructed to look through it, to remind them of the story.
- The book was then removed, and participants told the story from memory, in own words.
- CHAT (MacWhinney, 2000) format is used for transcribing narratives.
- Each transcript is checked by at least 2 transcribers who reach agreement on all aspects of transcription.

### **MORPHOLOGICAL TAGGING:**

- Automatically adds parts of speech to words
- CLAN command: mor \*.cha
- \*PAR:
- %mor: co|well n:prop|Cinderella aux|be&3S part|work-PROG prep|for pro|them.
- and them is I think &um the mother and the two little girls at the beginning. \*PAR:

### TOTAL UTTERANCES:

CLAN command: mlt +t\*PAR +d +re +u \*.gem

Gender	Aphasia type	ID	#Utterances	#Turns	#Words	Worde /Turp	Utterances/	Words/
					# 001 US	vvorus/Turn	Turn	Utterances
male	Anomic	adler01a	20	1	141	141	20	7.05
male	Conduction	adler02a	84	1	548	548	84	6.524
male	Wernicke	adler06a	13	1	91	91	13	7

### VOCD:

Gender	Aphasia type	ID	Types	Tokens	TTR	D_optimum_ values 1	D_optimum_ values 2	D_optimum_ values 3	D_optimum_ values aver- age
male	Anomic	adler01a	70	142	0.49	35.54	34.88	35.79	35.41
male	Conduction	adler02a	131	577	0.23	24.18	24.06	24.35	24.2
male	Wernicke	adler06a	45	84	0.54	26.22	26.7	26.15	26.36

### TOTAL WORDS:

- excludes unintelligible words and neologisms

Gender	Aphasia type	ID	Types (different words)	Tokens (total words)
female	Anomic	adler12a	125	307
female	Anomic	cmu03a	69	158
female	Conduction	elman02a	97	224

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# Is the Cinderella task biased for age or gender?

# Materials and Methods

• All sessions were videotaped and then transcribed.





# Language Analysis

&um well Cinderella &um is working for &um them .

%mor: conj:coo|and pro|them v:cop|be&3S

• **<u>VOC</u>** abulary **D**iversity (Malvern & Richards, 1997), a measure of lexical diversity • CLAN command: **vocd +t%mor +t\*PAR -t\* +s"**\*[\*--%%" +s"\*|--&%%" --s@"|--neo.|--unk" +d3 +re \* **gem cev** 

-с т	-2	70 70	т3	<b> &amp;</b> 70 70	5@	ne	0, u	тиз т	IC	.gem.cex	
							D		-		D optimum

### • CLAN command: **freq +t\*PAR +d3 -r6 \*.gem.cex +re --s**"[\* **n:uk**]" --s"xx" --s"xxx"

• calculated on word stems: e.g., happy, happily, unhappy = 1 lexical item

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## **STATISTICAL METHODS:**

- All statistical tests were one-tailed tests, using an alpha of p<.05 for significance.
- The sample size was adequate to detect at least medium effect size at power  $(1-\beta) + 0.80$ .
- t-tests were used to analyze group differences.
- Pearson correlations were used to analyze associations.

	Aphasia- All	Aphasia- Female	Aphasia- Male	Control- All	Control- Female	Control- Male
Ν	98	40	58	98	53	45
Age (yrs)	63.9 (12.0)	63.9 (14.1)	63.9 (10.3)	64.6 (14.1)	63.6 (13.9)	65.8 (14.3)
Total utterances	32.4 (20.4)	34.6 (20.9)	31.0 (20.0)	49.8 (36.6)	50.6 (30.9)	48.8 (42.6)
Total words	199.69 (148.3)	219.0 (161.9)	186.34 (138)	481.7 (291.1)	492.9 (267.6)	468.4 (319.2)
VOCD	35.0 (13.0)	37.8 (12.7)	33.0 (12.9)	57.2 (12.0)	55.5 (12.0)	59.3 (11.6)

# Significant Findings

### BETWEEN GROUPS

- Non-aphasic speakers' stories included more utterances than did those of aphasic speakers.
- Non-aphasic speakers used more words than did aphasic speakers.
- Non-aphasic speakers had greater lexical diversity than did aphasic speakers.

### WITHIN GROUPS: APHASIA

- Women's stories showed greater lexical diversity than did men's stories.
- Age (younger) was associated with more total utterances (r= -.18).

# WITHIN GROUPS: NON-APHASIC SPEAKERS

• Again, age (younger) was associated with more total words (r= -.27).

# Non-Significant Findings

# WITHIN GROUPS: CONTROLS

• Men and women did not differ on total number of utterances, total words, and lexical diversity.

# WITHIN GROUPS: APHASIA

• Men and women did not differ on total number of utterances and total words.

# References

Berndt, R., Wayland, S., Rochon, E., Saffran, E., & Schwartz, M. (2000). Quantitative production analysis: A training manual for the analysis of aphasic sentence production. Hove, UK: Psychology Press.

MacWhinney, B. (2000). The CHILDES project: Tools for analyzing talk. Third Edition. Mahwah, NJ: Lawrence Erlbaum Associates.

Malvern, D. D., Richards, B. J., Chipere, N., & Puran, P. (2004). Lexical diversity and language development. New York: Palgrave Macmillan.

# Results

# Conclusions

- The Cinderella story-telling task is not gender biased on measures of total utterances, total words, and VOCD in nonaphasic adults.
- The Cinderella story-telling task is also not gender biased in PWA on measures of total utterance and total words. However, men with aphasia used a more limited vocabulary than did women with aphasia.
- The negative association between age and total words (in the non-aphasic group) and total utterances ( in the PWA group) was significant, but weak.

## THUS, CINDERELLA REMAINS A USEFUL TOOL FOR EVALUATION OF DISCOURSE IN APHASIA.

Thompson, C. K., Ballard, K. J., Tait, M. E., Weintraub, S., & Mesulam, M. (1997). Patterns of language decline in nonfluent primary progressive aphasia. Aphasiology, 11, 297-321.