

Semantic Aspects of Verb Production in Various Discourse Tasks in People with Nonfluent Aphasia

Hyejin Park, Ph.D.,¹ Jessica Obermeyer, Ph.D., CCC-SLP,² & Myriam Kornisch, Ph.D.¹

¹Communication Sciences and Disorders, University of Mississippi; ²Communication Sciences and Disorders, University of North Carolina at Greensboro

Introduction

Background:

People with nonfluent aphasia (PWA-NF) often have verb production difficulty due to impaired morpho-syntactic abilities. Yet, few studies have evaluated how the semantic weight of verbs can impact their production in this population (Barde et al., 2006; Gordon & Dell, 2003; Gordon, 2008; Morean, 2017).

Inconsistent Findings on Heavy and Light Verb Production in PWA-NF

- o Difficulty with light verbs due to agrammatism (Bencini & Roland, 1996; Gordon & Dell, 2003; Gordon, 2008)
- o No difference between light and heavy verb production (Morean, 2017)

Discourse Task Effects

- o Cognitive-linguistic demands & Picture presence
 - o Complexity of story grammar
 - o No scaffolding without a picture support
 - o Lexical-semantic facilitation from visual cues
 - o Being descriptive for the picture scene
- ➔ impaired morpho-syntactic skills of PWA-NF could be more sensitive to task-related effects
- ➔ No studies have evaluated discourse task effects on semantic aspects of verbs in PWA-NF compared to PWOA

Purpose of the Study:

To investigate whether discourse elicitation tasks affect the production of total and semantic weight of verbs in people with nonfluent aphasia compared to people without aphasia

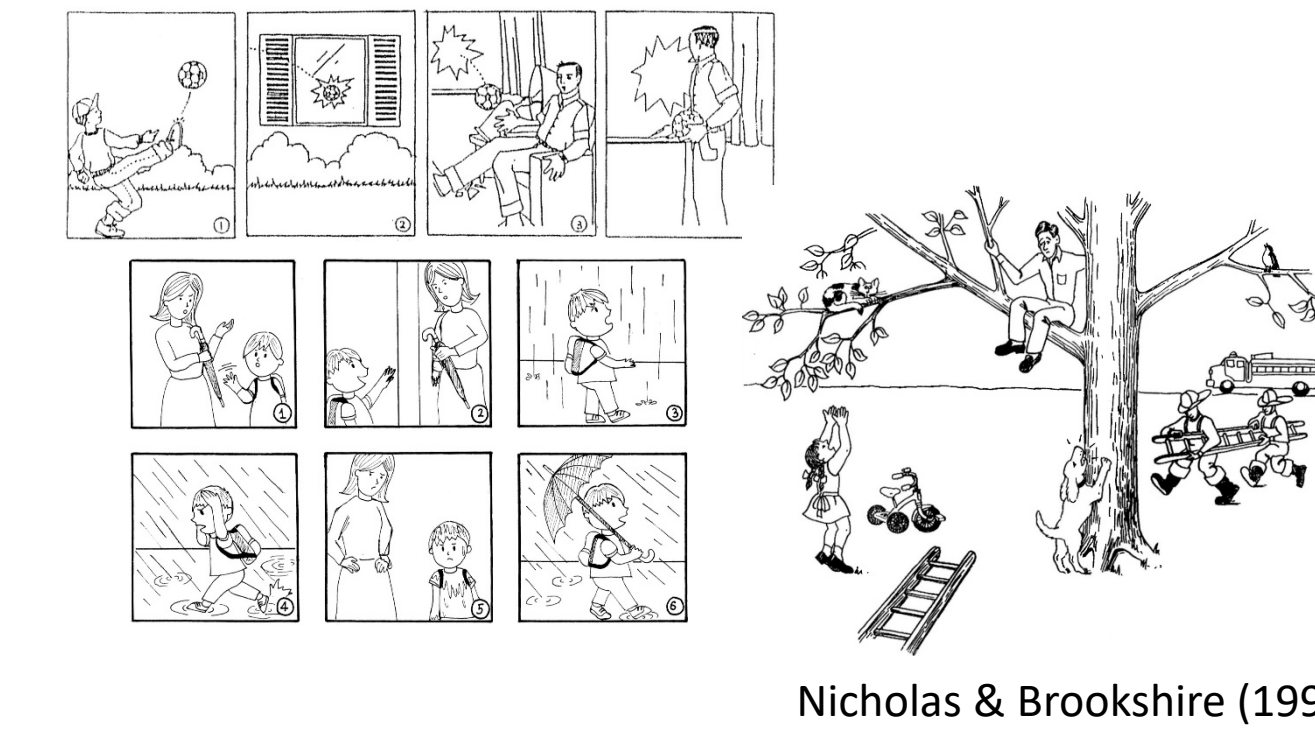
Methods

Participants from AphasiaBank

- 30 people with nonfluent aphasia (29 Broca's & 1 TCM)
- 32 people without aphasia (matched for age and years of education)

Discourse Tasks

- o Important **Event** recount
- o **Window** sequential picture description
- o **Umbrella** sequential picture description
- o **Cat** rescue single picture description
- o **Cinderella** storytelling



Verb Types based on Semantic Weight

- o **Heavy verbs:** Provide complex semantic representations
- o **Light verbs:** Provide minimal semantic representations (go, come, do, have, make, put, take, give, get)
- o **Be-copulas:** Provide no semantic representations (linking verbs)

Dependent Measures

- o Proportion of heavy verbs (%heavy) = #heavy verbs / #total verbs
- o Proportion of light verbs (%light) = #light verbs / #total verbs
- o Proportion of be-copular (%be-copular) = #be-copular verbs / #total verbs
- o Heavy to light verb ratio (heavy/light) = #heavy verbs / #light verbs
- o Total verbs per utterance (verbs/utt) = #heavy verbs / #utterances

Analysis: Generalized linear mixed model (GLMM) with pairwise comparisons (2 Groups x 5 Tasks)

Discussion

Verb Production in PWA-NF

- Reduced total verb production compared to PWOA
- Relatively preserved heavy verb production
- Reduced light verb production compared to PWOA
- Over-reliance on be-copular verbs for PWA-NF in Window, Umbrella, and Cat
 - PWA-NF may be more descriptive in tasks with pictures

Discourse Task Effects

- Trend of higher %heavy verbs and lower %light verbs in tasks with a picture in both groups
 - Lexical-semantic facilitation due to visual cues
- Higher %be-copular in Event in PWOA
 - May be due to the flexibility of verb selection in the task

Limitations & Future Directions

- Large variations in PWA-NF → Need to control for their severity or symptoms
- Not direct task comparisons due to limited methodological control

Clinical Implication

- Supporting evidence of discourse task effects on language production (Fergadiotis & Wright, 2011; Glosser et al., 1988; Olness, 2006; Stark, 2019; Stark & Cofoid, 2021; Wright & Capilouto, 2009)
- Purposefully select a discourse task based on the interest of verb measures
- These findings highlight the importance of verb production as a treatment goal for PWA-NF and suggest considering the semantic weight of verbs (heavy vs. light) should be considered as a variable when setting treatment targets.

Results

%Heavy verbs

- PWA-NF = PWOA, $F(1, 289)=.010, p=.920$
- Significant task effects, $F(4, 289)=4.836, p<.001$
- No interaction, $F(4, 289)=.221, p=.926$

%Light verbs

- PWA-NF < PWOA, $F(1, 289)=24.000, p<.001$
- Significant task effects, $F(4, 289)=6.736, p<.001$
- No interaction

%Be-copular

- PWA-NFA > PWOA, $F(1, 289)=14.373, p<.001$
- Significant task effects, $F(4, 289)=4.252, p=.002$
- No interaction, $F(4, 289)=.660, p=.621$

Heavy to Light Verb Ratio

- PWA-NF < PWOA, $F(1, 216)=5.104, p=.025$
- No task effects, $F(4, 216)=1.975, p=.099$
- Significant interaction, $F(4, 216)=2.903, p=.023$

Verbs/Utterance

- PWA-NF < PWOA: $F(1, 300)=318.902, p=.000$
- No task effects, $F(4, 300)=1.306, p=.268$
- Significant interaction, $F(4, 300)=4.228, p=.002$

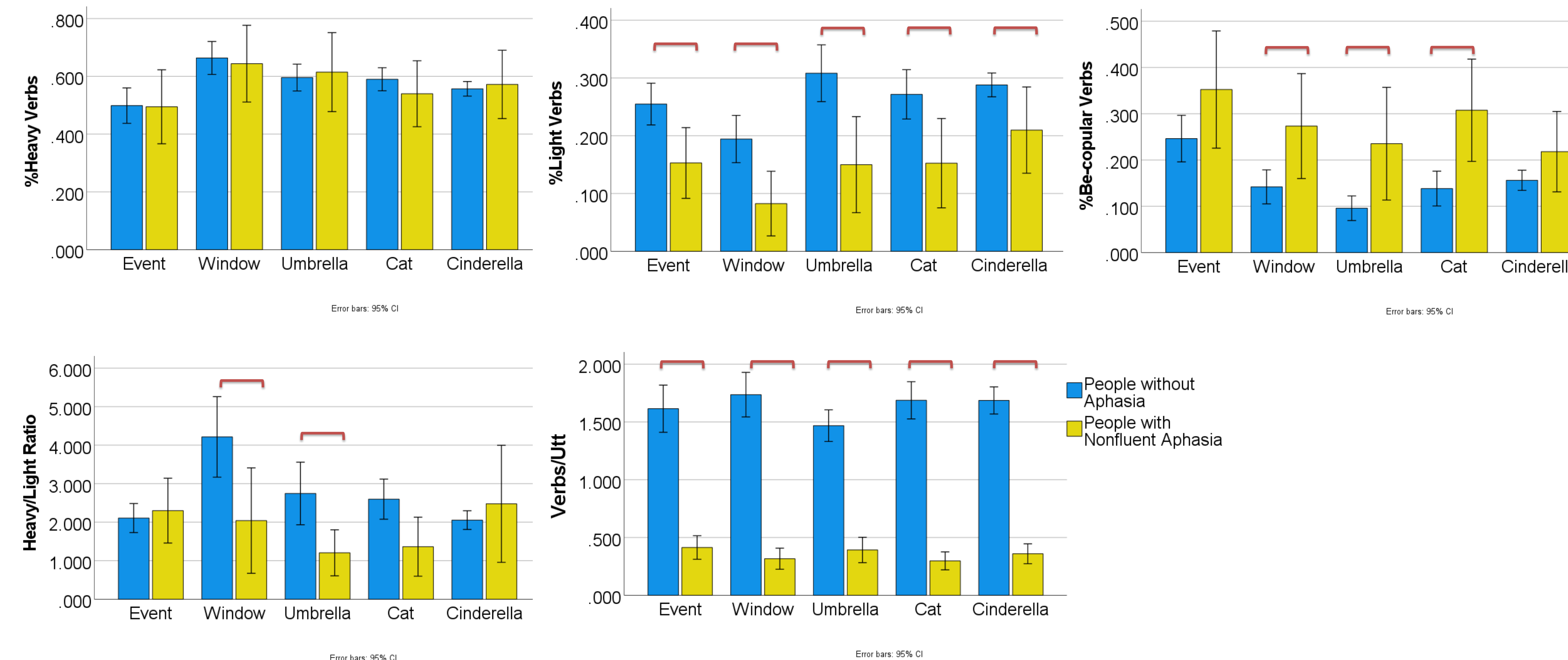


Table 1. Verb Measure Comparisons between Tasks in each Group

Group	Task comparison	%Heavy	%Light	%Be	Heavy/light	Verbs/utt	
People without Aphasia	Event vs. Window	vs. Umbrella	$p=.001^*$	$p=.061$	$p=.027^*$	$p=.000^*$	$p=.077$
		vs. Cat	$p=.052$	$p=.099$	$p=.002^*$	$p=.165$	$p=.033^*$
		vs. Cinderella	$p=.068$	$p=.603$	$p=.022^*$	$p=.285$	$p=.289$
		vs. Cinderella	$p=.244$	$p=.305$	$p=.057$	$p=.890$	$p=.297$
	Window vs. Umbrella	vs. Cat	$p=.174$	$p=.000^*$	$p=.327$	$p=.001^*$	$p=.000^*$
vs. Cinderella		$p=.140$	$p=.017^*$	$p=.938$	$p=.001^*$	$p=.476$	
vs. Cinderella		$p=.033^*$	$p=.004^*$	$p=.763$	$p=.000^*$	$p=.465$	
Umbrella vs. Cat	vs. Cinderella	$p=.906$	$p=.257$	$p=.368$	$p=.756$	$p=.001^*$	
	vs. Cinderella	$p=.433$	$p=.529$	$p=.201$	$p=.124$	$p=.002^*$	
Cat vs. Cinderella	$p=.433$	$p=.613$	$p=.704$	$p=.223$	$p=.986$		
People with Nonfluent Aphasia	Event vs. Window	vs. Umbrella	$p=.007^*$	$p=.032^*$	$p=.160$	$p=.942$	$p=.170$
		vs. Cat	$p=.043^*$	$p=.916$	$p=.024^*$	$p=.170$	$p=.764$
		vs. Cinderella	$p=.423$	$p=.990$	$p=.387$	$p=.264$	$p=.102$
		vs. Cinderella	$p=.204$	$p=.082$	$p=.010^*$	$p=.751$	$p=.442$
	Window vs. Umbrella	vs. Cat	$p=.456$	$p=.023^*$	$p=.427$	$p=.295$	$p=.284$
vs. Cinderella		$p=.059$	$p=.032^*$	$p=.582$	$p=.403$	$p=.792$	
vs. Cinderella		$p=.137$	$p=.000^*$	$p=.267$	$p=.755$	$p=.546$	
Umbrella vs. Cat	vs. Cinderella	$p=.230$	$p=.927$	$p=.170$	$p=.798$	$p=.182$	
	vs. Cinderella	$p=.445$	$p=.099$	$p=.747$	$p=.100$	$p=.640$	
Cat vs. Cinderella	$p=.652$	$p=.088$	$p=.092$	$p=.162$	$p=.386$		