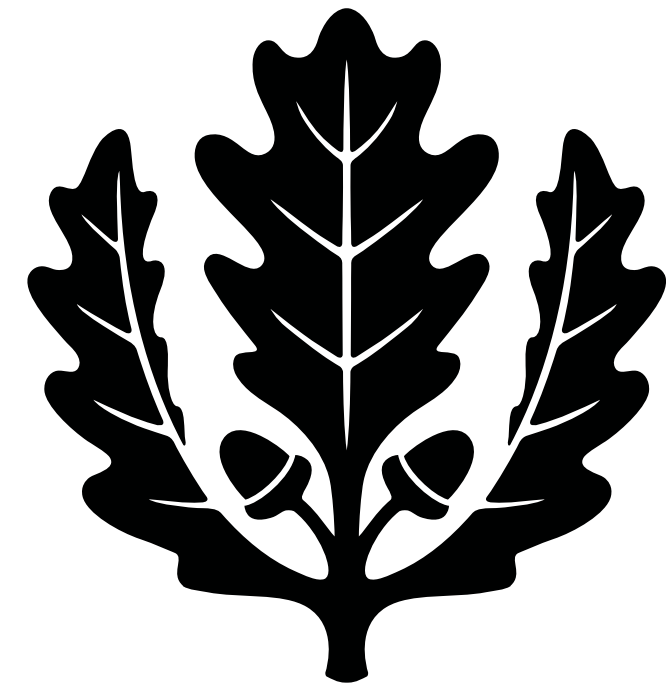


The Role of Semantic Gesture Content for Macro-Linguistic Production in Anomic Aphasia

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INTRODUCTION

- Persons With Aphasia (PWA) routinely have language production problems including narrative discourse following stroke
- Discourse involves multi-interrelated levels of language production (e.g., Sherratt, 2007)
- Discourse impairment at the micro-linguistic level can have negative consequences for macro-linguistic performance
- Anomic Aphasia is characterized by word retrieval problems
 - Lexical impairments → Lower global coherence (Andretta et al., 2012)
- Hand gestures are tightly integrated with spoken language and aid communication (McNeill, 1992)
- Active gesture can assist in the cognitive effort for certain tasks (Goldin-Meadow et al., 2001):
 - Language Production (Beilock & Goldin-Meadow, 2010)
 - Comprehension (Kelly et al., 2010)
 - Mental Abacus (Frank & Barner, 2012)
 - Lexical Retrieval (Kelly et al., 2009)
 - General Learning (Broaders et al., 2001)
- PWA often show an increased gesture rate (Sekine et al., 2013)
- Theorized to be a method of cognitive compensation for a loss of cognitive-linguistic function (Rose, 2006)
 - Recruit ancillary neural networks (Andric et al., 2013)

Pilot Studies From Our Lab:

- Observed no relationship between gesture frequency and increased discourse production in PWA
 - Broca's aphasia (Jenkins, Coppola, & Coelho, 2015)
 - Anomic aphasia (Jenkins, Coppola, & Coelho, 2016)

Question:

- Can type of gesture (McNeill, 1992) produced by PWA account for discourse production?
 1. **Representational:** Hands resemble a particular referent through hand shape and/or movement
 2. **Beat:** Hands fall on prosodic and rhythmic points of concurrent speech and bear little semantic content

Hypothesis:

- Representational gestures are associated with increased performance on micro- and macro-linguistic measures

METHOD

Participants:

- 19 PWA (14 male; mean age 54.8) diagnosed as Anomic on Western Aphasia Battery (WAB; Kertesz, 1982)

Narrative Task:

- Retell the Cinderella story after viewing wordless story book
- Narratives were obtained from AphasiaBank (MacWhinney, 2000)



Discourse Analyses:

1. Length (i.e., T-units; Hunt, 1965)
2. Lexical Diversity (Covington & McFall, 2010)
3. Syntactic complexity (Lê et al., 2011)
4. Narrative organization (Lê et al., 2011)
5. Local and global coherence (Van Leer & Turkstra, 1999)

Gesture Analyses:

- **Identification:** Hand movements with a clear preparation, stroke of movement, and retraction (McNeill, 1992) on a scale of 1 (low, beat-like) to 5 (high, representational-like) based on their form
- **Rating of Semantic Content: Beat Filter:** Distinguishes beat vs. representational gestures (McNeill, 1992)
 - Beat movements tend to be more centrally located to the body, with very minimal trajectory and movement

Statistical Analysis:

- Bivariate correlation analysis between Beat Filter Ratings and Discourse Measures

RESULTS

- Significant correlation between representational gestures and local ($p < .05$) and global ($p < .05$) coherence
- No other significant correlation with other discourse measures (narrative length, lexical diversity & diversity, syntactic complexity, and organization)
- Representational gestures did not significantly correlate with gesture frequency

		Beat Score	Global Coh	Local Coh
Beat Score	Pearson Correlation	1	0.457	0.503
	Sig. (2-tailed)	-	$p = .049$	$p = .028$
Global Coh	Pearson Correlation		1	0.49
	Sig. (2-tailed)		-	$p = .033$
Local Coh	Pearson Correlation			1
	Sig. (2-tailed)			-

DISCUSSION

- Frequent hand use may have some benefit for micro-linguistic production
 - Positive impact on lexical retrieval in Anomia (e.g., Jenkins, Coppola, & Coelho, 2016)
- Gesture type (representational vs. beat) seems to relate to macro-linguistic production
- Rich movement of the hands recruits other areas of the brain often not employed for oral language tasks (e.g., Goldin-Meadow et al., 2001)
- Findings suggest particular aspects of gesture that may improve cognitive and communicative function via language interventions
- HOW we use our hands, not how OFTEN we use them, seems to improve discourse performance

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