



Discourse Measures in Aphasia and Observer Ratings of Comfort and Typicality

Sarah Campbell, Nicole Williams, Sarah Grace Hudspeth, Della Franklin, Jessica D. Richardson
Neuroscience of Rehabilitation Laboratory, Department of Communication Sciences and Disorders
University of South Carolina, USA



Introduction

- Life-altering changes in communication abilities can occur in adulthood following brain injury. Communication difficulties experienced by persons with aphasia (PWAs) can reduce or prevent participation in a variety of life roles that require communication.¹
- As therapy and assessment approaches evolve to emphasize more functional discourse and conversational tasks, measures to adequately and efficiently chart response to treatment must be developed. Traditional language impairment measures may not predict improvement that is personally significant or socially relevant.^{2,3}
- Discourse measures (e.g., WPM, CIU, etc.), rather than traditionally administered assessment measures of limitations of body structure/function or activity, correlate significantly with listener ratings.^{3,4}
- Since participation in life activities is at least partially determined by the willingness of non-impaired individuals (e.g., caregivers, friends, family members, etc.) to communicate with persons with aphasia and their comfort in doing so,⁵ we believe we can gain some insight into the usefulness of discourse measures for predicting life participation by exploring which measure(s) correspond(s) to observer perceptions of typicality and comfort.
- Question 1: Are there differences in observer responses to different perceptual questions?
 - Specifically, are ratings of typicality (Typ), comfort while observing (C-o), prediction of comfort while conversing (C-c), and prediction of comfort while socializing/working (C-s), the same or different?
- Question 2: Do observers change their responses in a way that corresponds to speaker characteristics (e.g., severity)?
- Question 3: Are there differences between responses of experienced and naive observers?
- Question 4: What is the relationship between speech-language measures and observer ratings?
 - Specifically, are discourse measures strong predictors of observer perceptions?

Methods

Observers

- See Table 1. All observers reported English as their native language and adequate vision and hearing (corrected/uncorrected) necessary to watch videos.
- Experienced:** 69 observers (66 females, 3 males) who were acquainted with speech, language or hearing disorders through academic coursework, work experience, personal or family history.
- Naive:** 51 naive observers (27 females, 24 males) with no personal or academic experience with persons with communication disorders.

Speakers and Video Clips

- See Table 2. Nine adults (8 PWAs and 1 control) were selected from the **AphasiaBank** database.
- The speakers were chosen to represent a basic continuum of severity (from most impaired language to normal language), with both fluent and non-fluent subtypes represented.
- Video clips (ranging from 45s to 3min) displayed speakers describing a picture sequence (Breaking Window) and describing a procedure (Peanut Butter and Jelly Sandwich) during a standardized assessment (AphasiaBank protocol).

Procedure

- Observers watched and rated 9 video clips in groups or individually within a quiet environment.
 - Prior to rating, observers were given scoring sheets (4 questions per video), verbal instructions (Box 1), and a rating demonstration.
- Observers completed a magnitude estimation task (no modulus) during which they rated 4 questions following each speaker video clip. A left-to-right visual analog scale (VAS) was used.
- Observers were instructed to make subsequent ratings relative to the first rating. Video clips were presented in the same order to each listener.
 - Video clip 1 was replayed after video clip 5 for calibration.

Data Analysis

- Observer ratings were measured (distance from left hash on VAS).
- Raw measurements were used in a 2 (Group) x 4 (Question) x 9 (Speaker) mixed-design ANOVA to address Questions 1 and 2.
- Speaker speech-language measurements and scaled observer measurements^{6,8} were used in Pearson correlation to address Question 3.

Table 1. Observer Information

	Age Range		Speaker		Education	
	<20 - 30	31-55	Female	Male	Undergraduate	Graduate
Experienced	62	7	66	3	4	65
Naive	48	3	27	24	24	27

Table 2. Speaker Information

Speaker	Gender	Age (yrs)	Aphasia Type	WAB-R Score	MLU	TTR	Core Lexicon (46)	Main Concepts (48)
1	M	43	Global	27.3	2.82	.48	7	2
2	M	71	Wernicke's	28.2	5.65	.81	11	3
3	M	55	Broca's	59.7	1.66	.87	10	12
4	M	64	Broca's	60.7	3.98	.44	16	12
5	F	81	Conduction	61.7	5.69	.59	21	8
6	M	78	Anomic	73.5	6.05	.59	27	16
7	M	57	Wernicke's	74.4	5.12	.47	31	21
8	M	66	Broca's	77.6	3.85	.56	24	21
9	M	73	Control	100	10.27	.50	43	42

Box 1. Instructions

We are studying how people feel when observing speakers who are performing a narrative task. You will be asked to watch 9 video clips of narrative samples. The video clips vary in length. At the end of each sample, the video clip will be stopped. Your task is to watch each video clip carefully and then indicate your perception of the speaker by marking on a line. The mark reflects your perception about the way the person was speaking. For example, if in a social situation, how normal would their speech seem? In a social situation, how comfortable would you feel listening to them? There are no right or wrong answers, only a personal judgment.

Each subsequent video clip will be rated according to your judgment of the first video clip. For example, if you felt that observing video clip two made you feel twice as uncomfortable as video clip one, you should indicate that by rating video clip two relative to your rating of video clip one. If video clip three was somewhere in between one and two, you would mark it appropriately.

"Normal" and "Comfortable" will not be defined for you. Just mark on the line at the point that best indicates how you feel about that person's speech in that video clip.

You will rate each sample according to the following questions:

1. "This person's speech seemed normal."

Is this person's speech normal, abnormal, or somewhere between those two judgments? Indicate your feelings about the person's speech by marking on the line.

2. "I felt comfortable observing/listening to this person speak."

How comfortable did you feel watching and listening to the person speak on the video? If you were comfortable, provide a higher mark on the line. If you were uncomfortable as a listener, provide a lower mark on the line.

3. "I would feel comfortable having a conversation with this person."

How comfortable would you feel conversing (i.e. carrying on a conversation) with this person? If you think you would feel comfortable, provide a higher mark on the line. If you would feel uncomfortable as a conversation partner, provide a lower mark on the line.

4. "I would feel comfortable socializing or working with this person."

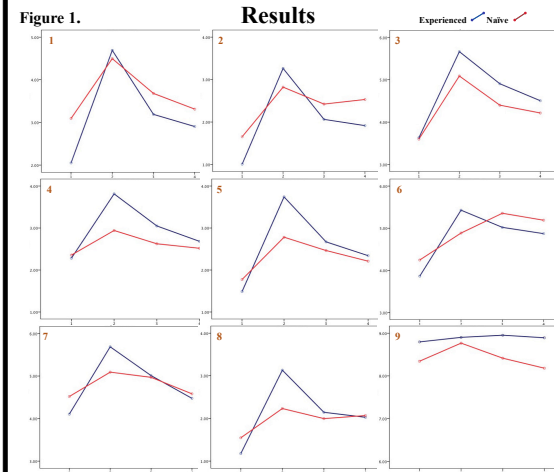
How comfortable would you feel socializing or working with this person? If you would feel comfortable most of the time, provide a higher mark on the line. If you would feel uncomfortable socializing or working with this person, provide a lower mark on the line.

Adapted from O'Brian et al., 2003

References

- Craice, M., Worrall, L., Hickson, L., & Morrison, R. (2003). Finding a focus for quality of life with aphasia: Social and emotional health, and psychological well-being. *Aphasiology*, 17(4), 333-353.
- Hilari, K. & Byng, S. (2009). Health-related quality of life in people with severe aphasia. *International Journal of Language and Communication Disorders*, 44(2), 193-205.
- Ross, K.B. & Wertz, R.T. (1999). Comparison of impairment and disability measures for assessing severity of, and improvement in, aphasia. *Aphasiology*, 13(2), 113-124.
- Doyle, P.J., Tison, D., Gada, A.J., & Kallayak, M. (1996). The relationship between objective measures and listeners' judgments of the communicative informativeness of connected discourse of adults with aphasia. *American Journal of Speech-Language Pathology*, 5, 53-60.
- Sarno, M.T. (1997). Quality of life in aphasia in the first post-stroke year. *Aphasiology*, 11(7), 665-679.
- Jaobis, B.J. (2001). Social validity of changes in informativeness and efficiency of aphasic discourse following Linguistic Specific Treatment (LST). *Brain and Language*, 78, 115-127.
- O'Brian, S., Packman, A., Omlow, M., Cream, A., O'Brian, N., & Bostock, K. (2003). Is listener comfort a viable construct in stuttering research? *Journal of Speech, Language, and Hearing Research*, 46, 503-509.

Acknowledgments: This research was supported in part by a grant from The Chapman Foundation.



Estimated marginal means for rating against question for each speaker (1-9); X-axis is perceptual question (1 = Typicality, 2 = Comfort-Conversion, 3 = Comfort-Conversation, 4 = Comfort-Social/Work); Y-axis is rating (in cm).

- Main effects for within-subjects factors (perceptual question and speaker) were significant at $p < .001$ (Greenhouse-Geisser corrected). However, these effects are qualified by significant interactions between Question x Group ($F[14.2, 273.57] = 4.848, p = .006$), Question x Speaker ($F[14.2, 1675.68] = 9.67, p < .001$), and Question x Speaker x Group ($F[14.2, 1675.68] = 2.34, p = .003$).
- Experienced observers: Simple effects observed for Question for all speakers with communication difficulty (Bonferroni-corrected $\alpha/9 = .005$), with pairwise comparisons significant (Bonferroni-corrected $\alpha/6 = .008$) for: 8/9 speakers (Typ v. C-o, Typ v. C-c); 8/9 speakers (Typ v. C-o, C-o v. C-c, C-o v. C-s).
- Naive observers: Simple effects observed for Questions for 5 of the 9 speakers, with pairwise comparisons significant for: 4/9 speakers (Typ v. C-o, Typ v. C-c); 3/9 for C-o v. C-c; 2/9 (Typ v. C-s, C-o v. C-s); and 1/9 (C-c v. C-s).

Table 3. Correlation of scaled ratings (Typ and C-c) and selected speaker variables

	WAB-R	MLU	TTR	Core Lexicon	Main Concepts
Typicality-Exp	$r = .705^*$ ($p = .017$)	$.680^*$ (.022)	-.219 (.285)	$.784^{**}$ (.006)	$.851^{**}$ (.002)
Typicality-Naive	$r = .673^*$ ($p = .023$)	$.680^*$ (.022)	-.253 (.256)	$.777^{**}$ (.007)	$.832^{**}$ (.003)
Comfort-Exp	$r = .677^*$ ($p = .023$)	$.597$ (.045)	-.142 (.358)	$.732^*$ (.0125)	$.799^{**}$ (.005)
Comfort-Naive	$r = .612^*$ ($p = .040$)	$.630^*$ (.035)	-.197 (.306)	$.703^*$ (.017)	$.762^{**}$ (.008)

*Significant at .05 level (1-tailed); **Significant at .01 level (1-tailed)

Discussion

- Questions about typicality and comfort seem to access separate, but related, constructs.
 - Differences appear when communication deficits are introduced (i.e., not for speaker 9). These differences are more apparent in experienced observers.
- Further, the concept of comfort seems to be multidimensional. Historically, listeners/observers have been asked to rate how comfortable they feel *listening* or *watching*, which is not the same as their prediction of how comfortable they would feel *interacting* with the speaker. The latter is likely to be a more informative social validity tool.
 - Comfort-conversing and Comfort-socializing are likely accessing the same construct.
- Experienced observers seem to be more sensitive to deviation from normality but more comfortable (for most speakers).
- Discourse measures, specifically our newly developed standardized and norm-referenced Core Lexicon and Main Concept measures, were the strongest predictors of observer ratings of Typicality and Comfort-Conversation.
 - These discourse measures can be non-transcription-based and may be useful and efficient tools for a variety of purposes, including making predictions about life participation.
 - Importantly, TTR, commonly used because of its ease, was not significantly correlated to observer ratings of Typicality and Comfort-Conversation.
- Future Directions:
 - Continue to investigate the relationship between discourse measures and observer perceptions.
 - More speakers (for a more complete continuum), randomize order of speakers, etc.
 - Determine if observer perceptions of typicality or comfort, when used alongside other speech-language measures, are useful for making predictions about life participation (e.g., Assessment of Living with Aphasia).