



The Relationship Between Discourse Efficiency,
Informativeness, and Behaviors Associated with
Lexical Retrieval Difficulty in People with Mild
Anomic Aphasia

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The relationship between discourse efficiency informativeness, and behaviors associated with lexical retrieval difficulties in people with mild anomic aphasia

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Introduction

Discourse informativeness and efficiency are common targets of discourse analysis (Brisebois et al., 2020; Doyle et al., 1995; Leaman & Edmonds, 2019; Nicholas & Brookshire, 1993); however, the multi-dimensional nature of discourse can make it difficult to capture specific variables such as these without considering their interrelationship with other linguistic and cognitive functions in discourse production (Fromm et al., 2017; Marini et al., 2011; Wright & Capilouto, 2012). Behaviors such as false starts (t* t* table), filled pauses (uh, um) and silent pauses can be considered markers of difficulty in lexical retrieval or language planning in people with aphasia (Obermeyer et al., 2020; Whitney & Goldstein, 1989) and could impact various aspects of discourse. This project evaluated if measures indicating lexical retrieval difficulty predict informativeness and efficiency in the discourse of individuals with mild anomic aphasia.

Methods

This study utilized data from Aphasia Bank (MacWhinney et al., 2011). Participants included 26 individuals with anomic aphasia. The Average Aphasia Quotient from the Western Aphasia Battery was 86.81 ($SD=4.66$; range=78.3 to 93.4). The average participant age was 62.1 ($SD=11.06$) years at the time of testing and mean years of education was 14.92 ($SD=2.65$).

Discourse transcripts from the cat and tree (single picture), window (sequential picture) and umbrella (sequential picture) picture descriptions were compiled from Aphasia Bank. Transcripts were coded for correct information units, or words that are accurate and relevant to the stimuli (CIUs, Nicholas & Brookshire, 1993) and complete utterances (Edmonds et al., 2009) which determine if the utterance is relevant (+REL) and contains subject-verb-object structure. For this study, only the +REL was used. Percentages were calculated for both CIUs and +REL. These outcomes served as measures of informativeness/relevance. CIUs/min was calculated as a measure of efficiency. Percent pause time (total pauses 2 seconds or more/total transcript time) filled pauses (uh um), and false starts (t* t*) were utilized as measures indicating lexical retrieval difficulty. Transcript coding and reliability was completed by trained research assistants.

Results

Linear regression models with simultaneous entry of predictors were completed for each dependent variable (%CIUs, CIUs/Min, %REL). Predictors for all models included filled pauses, false starts, and percent pause time. The model for %CIUs was significant at

$p=.006$ with false starts being a significant predictor ($p=.004$). In the second model CIUs/min was the dependent variable. This model was significant ($p=.000$) with false starts ($p=.001$) and percent pause time ($p=.006$) significantly contributing to the model. The %REL model did not reach significance. See Table 1 for summary statistics.

Conclusions

False starts were predictive of word level informativeness and efficiency (%CIUs, CIUs/min) in the discourse of people with mild anomic aphasia. Percent pause time was also predictive of efficiency (CIUs/min). We did not find a significant relationship between behavioral measures of lexical retrieval difficulty and the utterance level measure of relevance (%REL). These findings support a relationship between false starts and the ability to produce relevant discourse at the word level and provide more insight into how breakdowns in lexical retrieval can manifest in discourse.

References

- Brisebois, A., Brambati, S. M., Désilets-Barnabé, M., Boucher, J., García, A. O., Rochon, E., ... & Marcotte, K. (2020). The importance of thematic informativeness in narrative discourse recovery in acute post-stroke aphasia. *Aphasiology*, *34*(4), 472-491.
- Doyle, P. J., Goda, A. J., & Spencer, K. A. (1995). The communicative informativeness and efficiency of connected discourse by adults with aphasia under structured and conversational sampling conditions. *American Journal of Speech-Language Pathology*, *4*(4), 130-134.
- Fromm, D., Forbes, M., Holland, A., Dalton, S. G., Richardson, J., & MacWhinney, B. (2017). Discourse characteristics in aphasia beyond the Western Aphasia Battery cutoff. *American Journal of Speech-Language Pathology*, *26*(3), 762-768.
- Leaman, M. C., & Edmonds, L. A. (2019). Revisiting the Correct Information Unit: Measuring informativeness in unstructured conversations in people with aphasia. *American journal of speech-language pathology*, *28*(3), 1099-1114.
- MacWhinney, B., Fromm, D., Forbes, M., & Holland, A. (2011). AphasiaBank: Methods for studying discourse. *Aphasiology*, *25*, 1286–1307.
- Marini, A., Andreetta, S., Del Tin, S., & Carlomagno, S. (2011). A multi-level approach to the analysis of narrative language in aphasia. *Aphasiology*, *25*(11), 1372-1392.
- Nicholas, L. E., & Brookshire, R. H. (1993). A system for quantifying the informativeness and efficiency of the connected speech of adults with aphasia. *Journal of Speech, Language, and Hearing Research*, *36*(2), 338-350.
- Obermeyer, J. A., Leaman, M. C., & Edmonds, L. A. (2020). Evaluating Change in the Conversation of a Person With Mild Aphasia After Attentive Reading With Constrained Summarization-Written Treatment. *American Journal of Speech-Language Pathology*, *29*(3), 1618-1628.

Wright, H. H., & Capilouto, G. J. (2012). Considering a multi-level approach to understanding maintenance of global coherence in adults with aphasia. *Aphasiology*, 26(5), 656-672.

Whitney, J. L., & Goldstein, H. (1989). Using self-monitoring to reduce disfluencies in speakers with mild aphasia. *Journal of speech and Hearing Disorders*, 54(4), 576-586.

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Table 1. Summary of Regression Analyses

Dependent Variable	R ² and Adjusted R ²	Std. Error of Estimate	F value of ANOVA	p value of ANOVA	Intercept	Predictor Variables	B	t statistic and p value of predictor
Percent Correct Information Units (%CIUs)	R ² = .386, Adj. R ² =.312	.12513	F(3, 25) = 5.241	.006*	.705	%pause time	0.26	t=1.071, p=.294
						false starts	-0.039	t=-3.222, p=.004*
						filled pauses	-0.014	t=-1.944, p=.063
Correct Information Units per Minute	R ² =.547, Adj. R ² =.492	15.10242	F(3, 25) =10.055	.000	84.92	%pause time	-86.899	t=-2.971, p=.006*
						false starts	-5.38	t=-3.9672, p=.001*
						filled pauses	-1.27	t=-1.503, p=.145
Percent Utterances that are Relevant (%REL)	R ² =.256, Adj. R ² =.167	0.16845	F(3, 25) =2.874	0.056	0.764	%pause time	0.078	t=.239, p=.813
						false starts	-0.039	t=-1.481, p=.151
						filled pauses	-0.014	t=-2.400, p=.024*

Note. *p<.05; Std.=standard; %CIUs=percent of correct information units; adj=adjusted; %pause time= percent of pause time; CIUs/min= correct information units per minute; %mazes= percent of mazes.