The Role of Relative Frequency in the Production of Prepositional Phrases in Aphasia in Czech

Michal Láznička

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Michal Láznička[1]*

[1] Department of Linguistics, Charles University, Prague, Czechia

*corresponding author, michal.laznicka@ff.cuni.cz

Introduction

Usage-based construction grammar views language as a network of constructions (form-meaning pairings) shaped by individual linguistic experience (Diessel, 2019). Type, token, and relative frequency of use is seen as a crucial factor influencing both language representation and processing. This approach has been recently applied to the analysis of language in aphasia with very promising results (e.g. Gahl, 2002; Hatchard & Lieven, 2019), suggesting that it might have more explanatory power compared to traditional rule-based approaches. In this paper, I present an analysis of prepositional phrases in a corpus of connected speech of Czech speakers with aphasia. The corpus created by the author contains transcripts of conversational, narrative, descriptive, and procedural discourse elicited from 11 individuals with aphasia (mild to moderate, fluent and non-fluent).

Methods

A subcorpus of two picture descriptions and a story retelling task was used in the analysis. This subcorpus was also used to generate fluency profiles of the individual participants using mean length of utterance, number of disfluencies, and several other measures. All prepositional phrases (PP) produced with no disfluencies (filled or silent pauses, repetitions) were extracted which resulted in a total of 202 phrases. These PPs were analyzed using frequency data from a corpus of spoken Czech and a corpus of movie subtitles (bigram frequency of preposition and complement noun, cumulative frequency of the complement lemma, and relative frequency of the word forms of the complement).

Results

The analysis has shown that 10 of the 11 participants were able to produce at least some instances of PP without any disfluencies. A substantial number of these PPs expresses spatial relations and has similar frequency characteristics: the complement noun has a high relative frequency of occurrence in the grammatical case governed by the preposition and a high backward transitional probability of the sequence *P N*. For example, the PP *v kleci* 'in the cage' was successfully produced even by participants with very low level of fluency. The form *kleci* 'cage-locative' is the most frequent word form of the corresponding lemma, as shown in Table 1.

Conclusions

The results provide some support for the usage-based model of language representation and processing. High relative frequency and probability of occurrence reflects a higher level of entrenchment which requires fewer processing resources, resulting in a higher probability of success in production even in individuals with relatively low levels of fluency

overall. The analysis also provides new insights on the manifestation of aphasia in Czech, which is an underrepresented language in aphasia research, and opens new avenues for a more focused therapy. I will also present the results of a comparison with instances produced with disfluencies. This analysis is still in progress. I predict that it will provide additional evidence showing that less frequent contexts are more prone to difficulties in language production.

References

Diessel, H. (2019). The Grammar Network: How Linguistic Structure Is Shaped by Language Use. Cambridge University Press.

Gahl, S. (2002). Lexical biases in aphasic sentence comprehension: An experimental and corpus linguistic study. Aphasiology, 16(12), 1173-1198.

Hatchard, R., & Lieven, E. (2019). Inflection of nouns for grammatical number in spoken narratives by people with aphasia: how glass slippers challenge the rule-based approach. Language and Cognition, 11(3), 341-372.

Table 1. Four most frequent word forms of the lemma *klec* 'cage'

Word form	Case	Number	Token frequency	Relative frequency
kleci	locative	singular	330	0.29
klece	genitive	singular	328	0.29
klec	nominative	singular	168	0.15
klec	accusative	singular	131	0.12
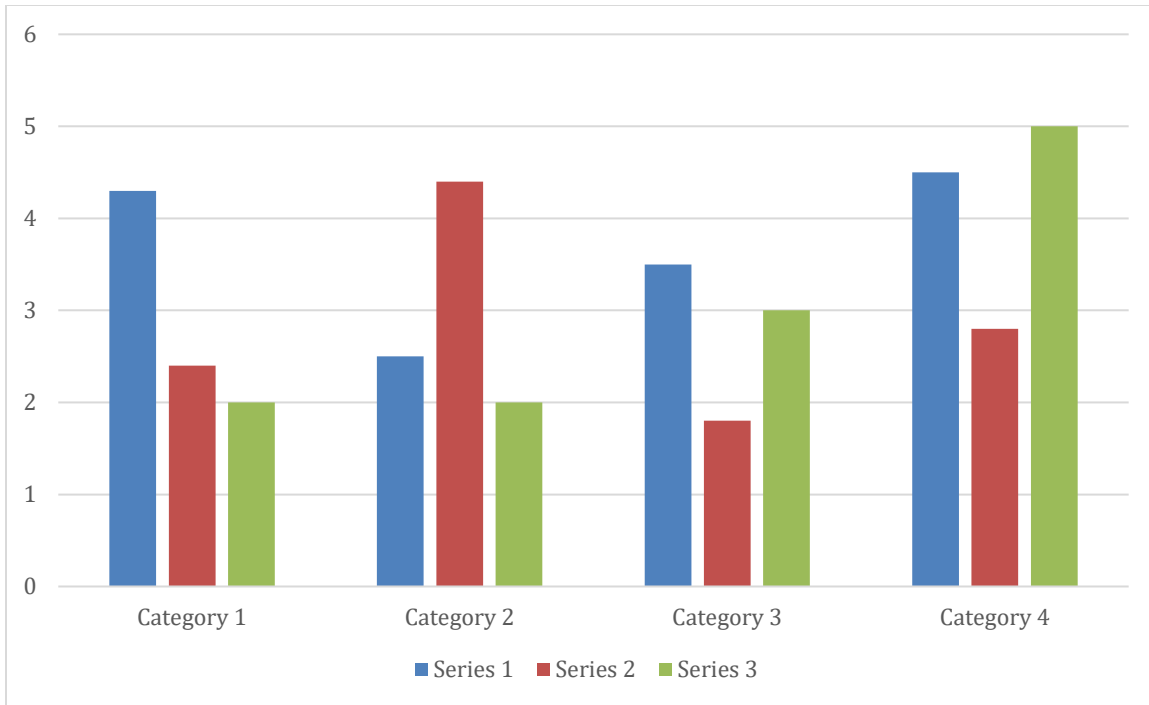
Figure 1. Example figure body text

Table 1. Example table body text

College	New students	Graduating students
	Undergraduate	
Cedar University	110	103
Elm College	223	214
Maple Academy	197	120
Pine College	134	121
	Graduate	
Cedar University	24	20
Elm College	43	53
Maple Academy	3	11
Pine College	9	4
Total	**745**	**646**