

## Contextual effects on the processing of Hungarian pre-verbal focus sentences: an eye-tracking study

Tamás, Káldi and Anna, Babarczy – Research Institute for Linguistics (HAS)

The interpretational characteristics of the Hungarian pre-verbal focus (preVf) has been subject to heated debate for a long time. While the view that preVf tends to have an exhaustive interpretation (exhaustivity henceforth) is not generally questioned, the status of exhaustivity is. The current study uses eye-tracking to investigate the effects of linguistic context on the processing of preVf. Specifically, we examine the hypothesis that exhaustivity emerges as a result of implicature generation.

An array of empirical studies revealed that exhaustivity is variable, emerges late in processing and may be context dependent, and thus concluded that exhaustivity has implicature status (Onea & Beaver 2011, Kas & Lukács 2013, Geröcs et al, 2014). Furthermore, based on eye-tracking data Káldi et al (2016) claim that exhaustivity has the status of *scalar* implicature, where the exhaustive reading corresponds to the upper-bounded, whereas non-exhaustive reading to the lower bounded interpretation. Káldi et al (2016) compared the interpretational characteristics of preVf and lexically marked focus sentences (*only-f*, henceforth) in two visual-world experiments: one experiment used a forced-choice sentence-picture matching task while the other one posed no restriction on the number of images that could be chosen. The results revealed that eye-gaze converged on the exhaustive images at the same rate in both sentence conditions in the forced choice task, whereas in the multiple choice task fixation patterns showed hesitation between the exhaustive and non-exhaustive images in the preVf sentence condition relative to the *only-f* sentence condition in the post-verb period (starting approx. 1000ms after the focused element). One important limitation of this study, however, is that the context-dependence of exhaustivity could only be inferred indirectly, as it emerged as a result of the manipulation of the experimental task, and not because of the linguistic context in which preVf (and *only-f*) sentences had to be interpreted.

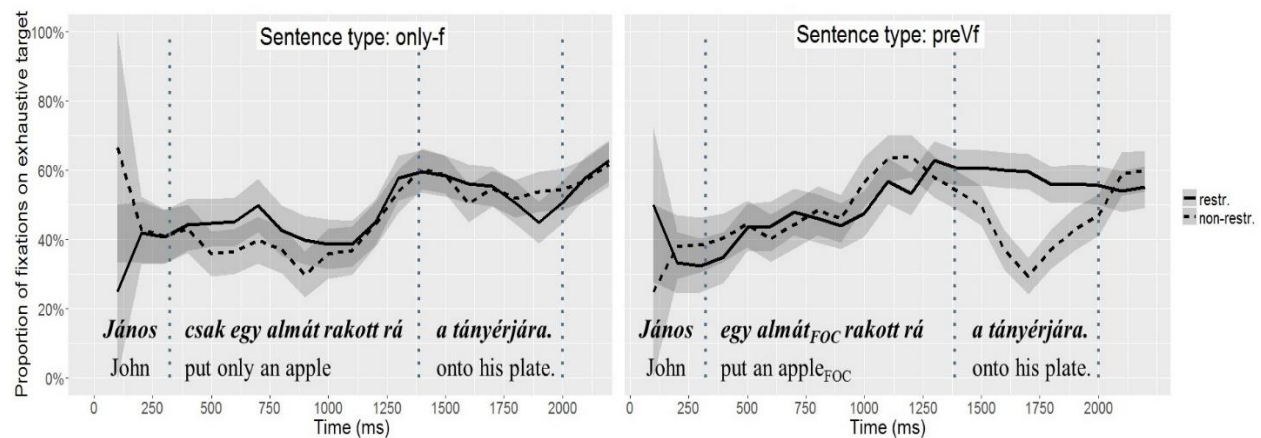
To overcome this limitation, we have conducted a visual-world experiment in which we introduced a direct manipulation of the linguistic context. Each critical trial included three sentences (see table): the Introductory sentence listed the possible referents in the universe of discourse, the second sentence either restricted the number of choices (restrictive condition) or not (non-restrictive condition), and the third, Test sentence contained either an *only-focus* (*only-f* condition) or a preVf sentence (preVf condition).

<b>Intro.</b>	<i>Az asztalon volt egy tál tele gyümölcsökkel. Volt benne egy csomó alma, körte, barack.</i> There was a bowl full of fruit on the table. There were a lot of apples, pears, peaches.
<b>Cont.</b>	<i>Minden vendég rakhatott a tányérjára ezek közül EGYET/NÉHÁNYAT.</i> Every guest could put ONE/SOME fruit(s) onto their plates.
<b>Test</b>	<i>János (csak) egy almát rakott rá a tányérjára.</i> John put (only) an apple onto his plate.

In each trial participants listened to the three sentences consecutively, and were shown a set of four images simultaneously with the last sentence. The set of four images contained an exhaustive target (e.g. an apple), a non-exhaustive target (an apple & a pear), and an exhaustive and a non-exhaustive distractor. The experimental task was to choose the image or images that best corresponded to the linguistic stimuli. 21 adult native Hungarians participated in the experiment. We

measured looks to the four images while participants heard the Test sentences. As the emphasis of the current study is the processing related differences between the two types of focus construction, we predicted that in the case of *only-f* sentences we will not see a difference in the proportion of looks to the exhaustive target in the two context conditions, as lexically marked focus should be insensitive to such variation. In the case of preVf sentences, however, we expected eye-gaze patterns to differ between the restrictive and the non-restrictive context conditions in the post-verb Interest Period (IP) (approx. 1000ms post focused NP onset). Based on Huang & Snedeker (2009) and Káldi et al (2016) divergence in this IP can be regarded as a correlate of implicature generation.

As predicted, the results of the experiment revealed no divergence in the proportion of fixations on the exhaustive target image in the two context conditions for the *only-f* sentences, whereas the proportion of fixations indicates a high degree of hesitation in the case of preVf sentences in the post-verb IP in the non-restrictive context condition relative to the restrictive condition (Context x Sentence Type x IP interaction ( $F(2, 40) = 4.19, p = .02$ ) in GLM with all three variables as repeated measures factors). Based on the results we conclude that processes related to the exhaustive interpretation of preVf sentences are context dependent. Additionally, we consider these results as further evidence supporting the pragmatic status of the exhaustive interpretation of preVf sentences.



## References

- Gerőcs Mátyás, Babarczy Anna & Surányi Balázs 2014. Exhaustivity in Focus: Experimental Evidence from Hungarian. In: Joseph Emonds & Markéta Janebová (eds.): *Language Use and Linguistic Structure*. Olomouc: Palacky University. 181–94.
- Kas Bence & Lukács Ágnes 2013. Focus sensitivity in Hungarian adults and children. *Acta Linguistica Hungarica* 60(2): 217–45.
- Káldi Tamás & Babarczy Anna 2016. A magyar fókusz és a skaláris implikaturák: Egy szemmozgáskövetéses kutatás eredményei. In: Kas Bence (ed.): *„Szavad ne feledd!”* 190 – *Tanulmányok Bánréti Zoltán tiszteletére*. Budapest: MTA Nyelvtudományi Intézet. 333–46.
- Huang, Y., & Snedeker, J. 2009. On-line interpretation of scalar quantifiers: Insight into the semantics-pragmatics interface. *Cognitive Psychology*, 58, 376–415.
- Onea, Edgar & Beaver, David 2011. Hungarian focus is not exhausted. In: Ed Cormany, Satoshi Ito & David Lutz (eds.): *Proceedings of the 19th Semantics and Linguistic Theory Conference*. eLanguage. 342–59.