

## The activated set of focus alternatives facilitates the processing of ellipses

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It is well-known (see e.g., [1]) that parallelism between two conjuncts of elliptical coordinative structures leads to easier processing of the second conjunct. In addition, information structure, especially focus marking, crucially affects the interpretation and processing of ellipses [1,2,3]. In Rooth's alternative semantic theory (see [4]), focus activates a set of alternatives that is salient to the comprehenders at the current discourse state (e.g., [5]). We ran an eye-tracking study (n=57) to investigate how and when the activated set of focus alternatives affects the on-line processing of German elliptical structures. Moreover, we checked whether alternative activation requires (i) a particular structural marking, or (ii) is achieved by focus alone, by comparing the comprehension of elliptical utterances following focus cleft sentences and canonical sentences with default focus, respectively. Our experiment had a 2x2 design with the factors *focus* (cleft/default) and *unelided constituent* (subject/object) as exemplified in (1). In the first conjunct of (1a,b), the subject stands in narrow focus induced by clefting; in (1c,d), no element was focused syntactically i.e., readers had to assign default focus. In the second conjunct, everything except the object (1a,c), or subject (1b,d) was elided. The target items were preceded by a context to ensure that readers got the focus-background reading of the clefts in (1a,b); in (1c,d), the subject of the first conjunct representing new information is likely to receive focus. The statistical analysis was carried out using linear mixed models with several standard eye-tracking measures as dependent variables. We predicted an interaction of focus and unelided constituent such that the unelided subject in (1b) gets integrated more easily into the discourse due to its membership in the activated set of alternatives triggered by the clefted subject of the form *x called the father* (in line with the ellipsis licensing condition of [6]) in comparison to conditions where the unelided constituent is either a member of another alternative set of the form *Lisa and Jonas called x* as in (1a), or where no or a probably insufficiently activated alternative set is evoked as in (1c,d). The data showed facilitation effects at the region containing *außerdem*, where readers may already have processed parafoveally the next word (the high-frequency case-marked determiner which reveals whether the following constituent will be a subject/object). Significant interactions of *focus* and *unelided constituent* arose in the first-pass and right-bound reading time, and in total fixation time such that *außerdem* was processed faster when the unelided subject occurred in the cleft focus condition compared to the default focus condition.

In sum, we present evidence that comprehenders used the set of alternatives activated by a cleft during online ellipsis processing which led to an early processing facilitation when the unelided constituent of the second conjunct belonged to the set of alternatives evoked by the focused element of the first conjunct. Comprehenders did not use the set of alternatives in the default focus conditions because there was no reliable focus cue that justified either a strong activation of the alternatives or an activation at all. This finding suggests that readers computed an alternative focus set before entering the second conjunct and, therefore, they were not surprised when an alternative of the form *x called the father*, which addresses the same wh-question '*who called the father?*' like the first conjunct, occurred in the second conjunct of the sentence.

(1) Context: Die Frau auf der Straße hört, dass nach dem Vater gerufen wurde  
'The woman in the street hears that the father had been called.'

- a. Es sind Lisa und Jonas, die den Vater gerufen haben und **außerdem den Jungen**, bemerkt die Frau.  
it are Lisa and Jonas that the.acc father called have and moreover the.acc boy notices the woman
- b. Es sind Lisa und Jonas, die den Vater gerufen haben und **außerdem der Junge**, bemerkt die Frau.  
it are Lisa and Jonas that the.acc father called have and moreover the.nom boy notices the woman
- c. Lisa und Jonas haben den Vater gerufen und **außerdem den Jungen**, bemerkt die Frau.  
Lisa and Jonas have the.acc father called and moreover the.acc boy notices the woman
- d. Lisa und Jonas haben den Vater gerufen und **außerdem der Junge**, bemerkt die Frau.  
Lisa and Jonas have the.acc father called and moreover the.nom boy notices the woman

### References:

- [1] Carlson, K. (2001). The Effects of Parallelism and Prosody in the Processing of Gapping Structures. *Language and Speech*, 44 (1): 1-26. [2] Carlson, K., Dickey, M.W., Frazier, L., and Clifton, C. (2009). Information structure expectations in sentence comprehension. *Quarterly Journal of Experimental Psychology*. [3] Kertz, L. (2010). Ellipsis Reconsidered. PhD thesis. University of California, San Diego. [4] Rooth, M. (1992). A theory of focus interpretation. *Natural Language Semantics*, 1(1):75-116. [5] Byram-Washburn, M., Kaiser, E., and Zubizarreta, L.M. (2011). Focus Facilitation and Non-Associative Sets. In: *Proceedings of the 15th Workshop on the Semantics and Pragmatics of Dialogue*, pages 94-102. Los Angeles, California, 21-23 September 2011. [6] Reich, I. (2006). Toward a uniform analysis of short answers and gapping. In: *Proceedings of the 2004 Texas Linguistics Society Conference*, pages 69-78.