Alternatives in broad-scope focus: Testing Rooth's theory on VP-constituents

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Speakers often choose to mark some information as new or contrastive by means of focus. Rooth's (1992) theory explains its semantic contribution as providing an additional level of alternative meanings to the element that is focused. Over the past decade, research in psycholinguistics has found that comprehenders activate and represent alternatives to single focused nouns (see Gotzner & Spalek, 2019 for an overview). However, the focused element may be larger and can scope over, for example, a VP containing the verb and its object (Erteschik-Shir, 2007). No study to-date has tested whether in cases of broad VP-scope focus, alternative meanings are activated and represented during comprehension. In our study, we attempted to answer this question by means of two web-based probe recognition experiments.

Rooth's (1992) theory provides a clear prediction for cases of broad focus. Just as in narrow focus, alternatives are defined as the set of contextually restricted elements of the same semantic type. In focused VPs, e.g. *caught the hare*, the semantic type of alternatives is <e,t> and the resulting contextually relevant set might, in this case, be {λ.x [x shot the boar]; λ.x [x cooked the deer]}. We predicted that if the recent results concerning the application of Roothian semantics to the online comprehension of focus generalise to cases of broad VP-scope focus, henceforth the *semantic type activation hypothesis*, we should observe the activation and representation of alternatives to both the verb and the noun within the focused phrase.

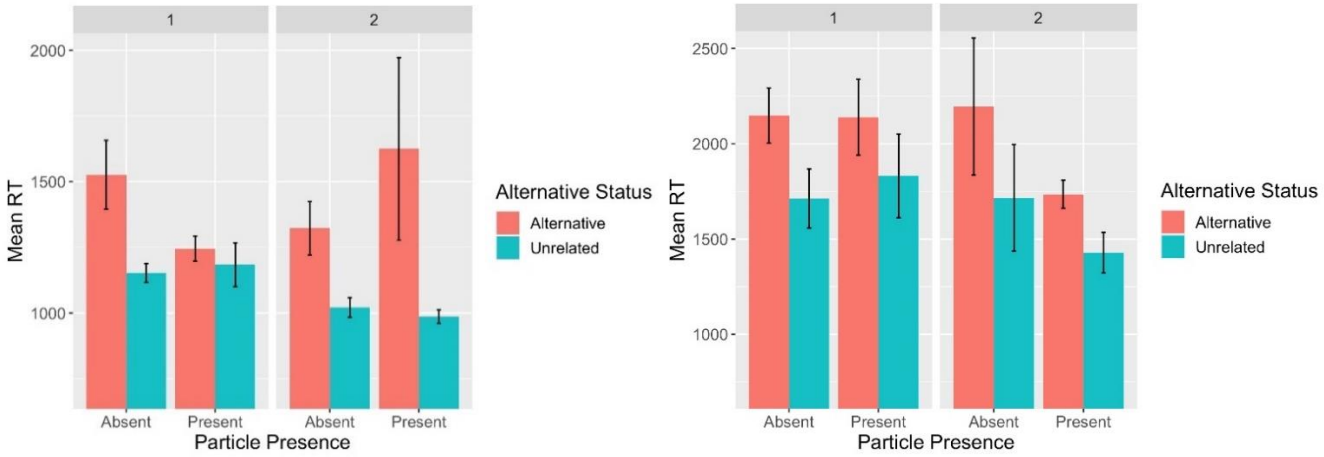
Our two probe recognition experiments testing this prediction were based on Gotzner, Wartenburger, and Spalek (2016), who found that comprehenders take longer to reject unmentioned yet plausible alternatives to focused nouns compared to unrelated probes, and crucially, that the presence of the focus particle *only* causes further interference. If comprehenders represent alternatives to both the verb and the noun within a focused VP this interference effect for *only* should be present in the rejection times of unmentioned alternatives to both as well. Our participants were exposed to 40 discourses in RSVP mode exemplified by the following:

1) Nigel is a hunter.
2) In the forest, Nigel could catch and cook the hare and the pheasant.
3) Nigel surely cooked the pheasant.
4) No, he only/_ caught the hare.

In Experiment 1 (N=62), alternatives to the noun within the focused phrase (*hare*) were probed. Probes were either unmentioned alternatives (*boar*) or unrelated words (*malt*). Alternatives to the verb (*caught*) were probed in Experiment 2 (N=60) with *shot* and *applied* as alternative and unrelated words, respectively. We fitted Bayesian hierarchical models to log reaction times including an interaction of particle presence, alternatives status and trial. The model of Experiment 1 showed compelling evidence that unrelated probes were rejected more quickly than unmentioned alternatives ($\beta = .03$, CrI [.01,.06]). Further, there was compelling evidence for an interaction between alternative status and the presence of *only* ($\beta = .06$, CrI [.03,.09], see Figures 1A and 2A), reflecting early trials. In Experiment 2, unrelated verbs were rejected more quickly than alternatives ($\beta = .11$, CrI [.07,.15]) but there were no further reliable effects (see Figures 1B and 2B). We take the observed interference effects of focus particles to be indicative of focus alternatives being represented and selected among (e.g. Gotzner et al, 2016). At the same time our findings are inconsistent with the semantic type activation hypothesis, as they suggest that *only* accesses noun but not verb alternatives. More research is needed to determine whether comprehenders represent alternatives to the entire focused VPs and how focus-related effects change across the course of an experiment. We aim to do this in future work by (a) probing entire phrases (e.g. *caught the hare*), and (b) conducting in-lab cross-modal lexical decision experiments that could measure the activation of alternatives more directly.

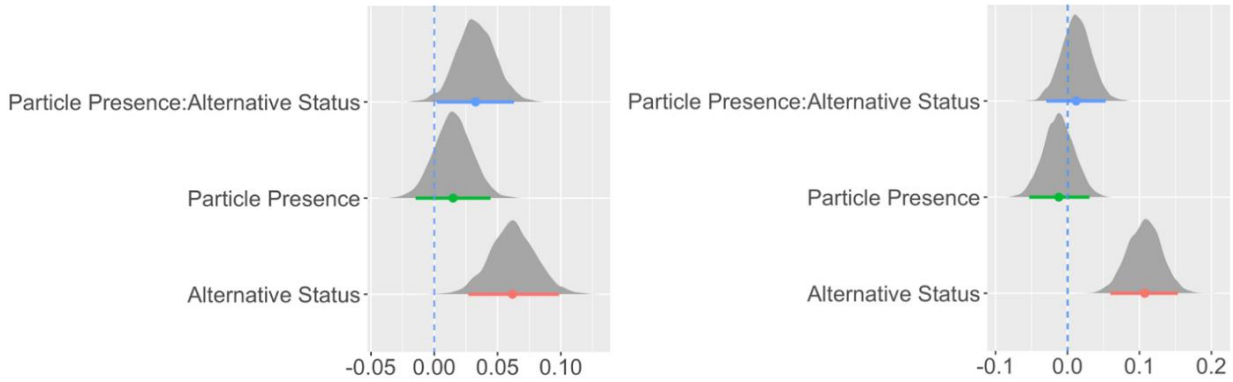
Figures 1A and 1B: Means and SEM of reaction times across first and second half of trials[1] in Exp. 1 on nouns (left) and Exp.2 on verbs (right).

(A) (B)



Figures 2A and 2B: Posterior probability for alternatives status and particle presence interaction, particle presence and alternative status in Exp. 1 (left) and Exp. 2 (right)

(A) (B)



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[1] Note: We split the results by block to show the large variation observed but the Bayesian analysis did not provide compelling evidence for an interaction of manipulated variables and block.