Focus alternatives are available early: no influence from semantic priming or particle choice

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I. Summary: Successful interpretation of focus requires a comprehender to infer the set of alternatives intended by the speaker [1]. Prior studies have endorsed a two-stage model of this process [2, 3, 4]. Under this view, an initial context-insensitive stage of semantic priming provides a second context-sensitive stage with the lexical activation necessary to represent focus alternatives as such. We present results from two cross-modal probe recognition experiments in English which challenge this view. Under both exhaustive (*only*; Exp. 1) and additive (*also*; Exp. 2) focus particles, we found that alternative status influenced the speed of recognition for probe words that were not semantically primed by their focus. Counter to the predictions of the two-stage model, we observed this effect immediately after focus was encountered (0ms SOA).

II. Background: In the first stage of the two-stage model, immediately after encountering focus, semantic priming takes place activating a large set of *associates* (i.e., words semantically primed by the focus). In the second stage, a context-sensitive mechanism selects relevant alternatives from among these associates and maintains their activation, eventually yielding the alternative set. In line with this, prior studies found that, after encountering focus, relevant alternatives were only represented following a delay [2, 3, 4]. However, none of these studies tested contextually relevant *non-associate* alternatives (i.e., those not semantically primed by their focus). Such alternatives are crucial as an initial stage of semantic priming could not provide them with the necessary activation for inclusion in the alternative set.

III. Experiment 1 (*only*): Subjects (N=61) listened to discourses such as (1) which mentioned an associate alternative, a non-associate alternative, and a non-associate non-alternative control [5]. Immediately after encountering focus (0ms SOA) subjects performed speeded recognition of these words as written probes. On average, subjects were faster to correctly recognize associate (M=1077ms, SE=17) and non-associate alternatives (M=1085ms, SE=17) than controls (M=1258ms, SE=19). We fit a Bayesian linear mixed model to our results (see Table 1). Our model revealed very strong evidence that response times to the control and both alternative probes differed, but no evidence that reponse times to the associate and non-associate alternatives differed.

IV. Experiment 2 (*also*): In the first experiment, the presence of focus was signaled by an exhaustive focus particle (*only*). Interpreting this particle requires a comprehender to negate a proposition containing each alternative. It is possible that the computation of this negation triggered the observed early advantage for non-associate alternatives. To address this possibilitity, we modified the stimuli from experiment 1 with an additive focus particle (*also*; see 2). However, subjects (N=59) were still, on average, faster to correctly recognize associate (M=1043ms, SE=19) and non-associate alternatives (M=1044ms, SE=17) than controls (M=1189ms, SE=20) immediately after the presentation of focus. Further, a Bayesian linear mixed model (see Table 2) revealed very strong evidence that response times to the control and both alternative probes differed, but no evidence that reponse times to the associate and non-associate alternatives differed.

V. Discussion: Across two cross-modal probe recognition experiments, we found that alternatives elicited faster response times than non-alternatives. We found no evidence that response times to alternatives differed on account of semantic priming from focus. Further, these results were observed immediately after the presentation of focus. It is unclear how a two-stage model in which alternatives are formed from a subset of semantic associates could explain the observed advantage for non-associate alternatives. In addition, the replication of these results in the second experiment suggests that the early advantage for non-associate alternatives does not depend upon an exhaustive interpretation of focus. Together, the results of these two experiments suggest that, in limiting investigation to associate alternatives, the prior literature had obscured the early onset of focus-sensitive processing.

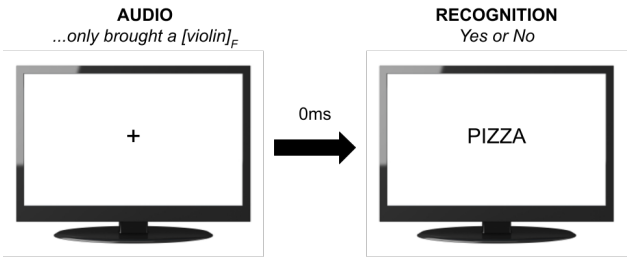

Figure 1: Schema of the cross-modal probe recognition task

(1) **A:** Andy used a muffin and a pistol as props in a movie that he was directing
B: No, he only used a [cake]$_F$

(2) **B':** He also used a [cake]$_F$

(3) **Associate Alternative:**
MUFFIN
Non-associate Alternative:
PISTOL
Control:
MOVIE

Parameter	Median	89% CrI	BF
Intercept	1.943	[1.937, 1.948]	Inf
Control vs. Alternatives	-0.024	[-0.028, -0.019]	>100
Associate alt vs. Non-associate alt	0.002	[-0.002, 0.006]	0.584

Table 1: Experiment 1. Results from the Bayesian linear mixed effects regression model on log response times with full random effect structure. Only correct responses analyzed.

Parameter	Median	89% CrI	BF
Intercept	1.938	[1.930, 1.946]	Inf
Control vs. Alternatives	-0.022	[-0.030, -0.013]	>100
Associate alt vs. Non-associate alt	0.000	[-0.006, 0.006]	0.315

Table 2: Experiment 2. Results from the Bayesian linear mixed effects regression model on log response times with full random effect structure. Only correct responses analyzed.

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