Priming relevant and non-relevant features in metaphorical and literal contexts

This paper presents evidence for a continuity approach to predicate interpretation, based on cross-modal priming evidence. According to [1,2,3], hearers compute the speaker's meaning for an utterance like (1b,d) by selecting those features of CACTUS, which the speaker meant to convey. Here we assume that the same approach holds for (1a,c) and that the primary aim of both metaphorical and literal comprehension processes is to compute speaker's goals that may select potential implications from the predicate's semantic representation.

1. He/It is a cactus.
   a. John fell into a large plant. It was a cactus.
   b. Al's boyfriend is an awkward character and hard to come close to. He is a cactus.
   c. Max forgot to water his friend's house plant while she was away. But it's ok. It is a cactus.
   d. Al's boyfriend likes nothing more than to spend his summers in the desert. He is a cactus.

[4] conducted a cross-modal priming study for metaphors in context where target words were relevant Distinctive Features (DFs) and non-relevant Superordinates (SUPs) (John is a *cactus* – SPIKE/PLANT). Priming effects were found at all ISIs (0ms, 400ms & 1000ms) for DFs and at ISIs 400ms for SUPs (though marginal at 0ms). [5] reported a similar study with literal sentences in which targets were strong and weak associates (cactus – SPIKE/DRY), tested in neutral and weak-associate biasing contexts. Similar to [4], priming was found for both kinds of features at earlier ISIs, but only for relevant features at later ISIs. Taken together, these studies indicate similar patterns for both Lit. and Met. contexts, but neither the prime sentences/context nor target types were the same. Our first aim was to conduct a better controlled comparison between Lit and Met contexts, by using sentences placed in contexts which result in either a literal or metaphorical interpretation (e.g., 2 & 3), and by controlling different types of non-relevant features in addition to relevant features (See **Table 1**).

Items: Following [4, 5], we did a distinctive feature listing task, a brief definition task and a simple association task to select distinctive features (DFs), superordinates (SUPs) and strong associates (SAs). Selected DFs had a lower frequency rank than selected SUP and SA targets. The latter were ranked highest among elicited responses. LSA analysis showed no difference in association between Prime words and any of the three target types. We then constructed 24 strongly constraining literal and metaphorical context sentences so that DFs are related to clear coherence relations and SUPs & SAs are non-relevant (See **Table 1**).

2. Maria's friends looked after her when she was in a difficult situation. They are gems.
3. The objects he dug out of the ground in Brazil impressed every collector. They are gems.

Table 1.

Prime	Distinctive features	Superordinates	Strong associates
Gems	Precious	Stone	Diamond

Cross-modal priming task: Participants (N=360, native English) first listened to context sentences and then made lexical decisions to visual target words offset at either 0ms, 400ms or 1000ms from the Prime. They were employed in a 3 (ISI) * 2 (context) * 3 (target type) * 2 relatedness (related, control) design. Only ISI was a between-group factor. A different set of 12 metaphoric contexts & 12 literal contexts paired with English-like non-words were included as fillers.

Results: A generalized linear mixed-effects model for each ISI showed: **(1). At 0ms**, there was a *context*target type*relatedness* interaction (p<.001). Follow-up analysis showed in literal contexts, no priming was found for any target type; in metaphorical contexts, there was a *target type*relatedness* interaction (p<.001). Priming was found only for DFs (p=.01). **(2)**. **At 400ms**, overall, there was a two-way interaction between *target type* & *relatedness* (p<.001). Follow up analysis on each target type showed priming for DFs (p=.002) and SUPs (p=.03), not for SAs (p=.3). **(3)**. **At 1000ms**, there was a *context*target-type*relatedness* interaction (p=.01). In both literal and metaphorical contexts, there was a *target type & relatedness* interaction (both *p's*<.001); priming was found for only DFs (Lit, p=.005; Met p=.03). (see **Figure 1**).

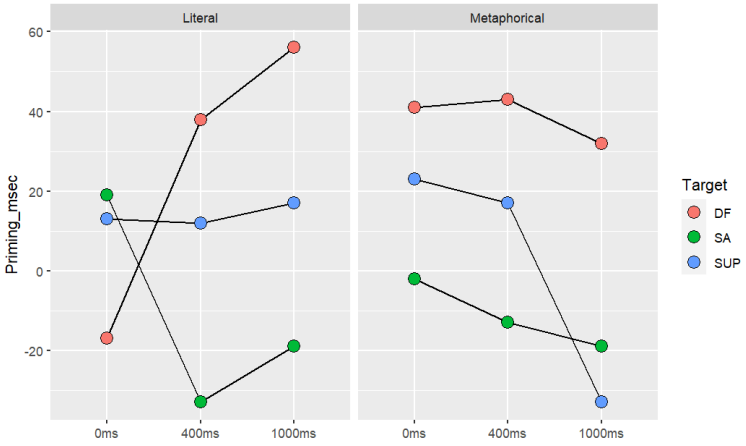

Figure 1. Priming of three types of target words in literal and metaphorical contexts

Discussion: Overall, we find comparable patterns in Lit. and Met. contexts, with clear priming advantages for relevant DFs compared to non-relevant core (SUP) and associate (SA) features. Unlike [4,5], we account for any limited priming for non-relevant features in terms of probabilistic models of the hearer's problem of deciding which set of features the speaker intends, similar to [2,3]. Priming effects of non-relevant features result from strength of priors on feature sets and goal uncertainty. In particular, SUP features such as PLANT for *cactus* are more related to frequently relevant category prototype features, so that even though contexts make a subset of features relevant, the high prior on those defining features makes the posterior for these implications compete with the intended relevant ones. In discussion we will reflect on model details in [2,3] and consider whether their 'literalness prior' (P(c)) needs in fact to be conditioned on a 'wonkiness' variable as per [6]. Also the role of any 'salience' term in speaker's model (see [3]), in light of relative prominence of 'low salient' SUP features. We attribute the lack of priming at 0ms in the literal context for even relevant distinctive features to the fact that our literal contexts overall may not have been as constraining as metaphorical contexts (e.g., "*There were water stations every two miles at that event. It was a marathon").*

References: [1]. Sperber, D. & Wilson, D. (1986). *Proceedings of the Aristotelian Society 86,* 153-172. [2]. Kao *et al*. (2014). *Proc. of CogSci* 36 (36), 719-724. [3] Mayn & Demberg (2022). *Proc. of CogSci* (44), 3154-3160. [4]. Rubio Fernandez, P. (2007). *Journal of semantics* 24(4), 345-371. [5]. Rubio-Fernández, P. (2008). *Journal of semantics* 25(4), 381-409. [6] Degen *et al*. (2015). Proc. of Cogsci.