What primes what – an experimental framework to explore alternatives for SIs

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Background. Recent studies have shown that Scalar Implicatures (SIs) can be primed. Bott & Chemla (B&C, 2016) demonstrate that people make more pragmatic response in TARGET trials after STRONG priming trials, where they make the equivalent response, than after WEAK priming trials, where the pragmatic response is unavailable – see rows 1, 2 and 4 in Fig.1. Rees & Bott (R&B, 2018) further show that, compared to the WEAK priming trials, rates of pragmatic responses are also higher after ALT priming trials, where stronger alternatives to the expression involved in the TARGET trials are evaluated, see rows 1, 3a and 4 in Fig.1. These results, however, leave open the question whether STRONG and ALT primes boost the rate of pragmatic response, or WEAK primes lower it, or both. Here we address these open questions by adding novel baseline conditions to the set of comparisons. We also use Exp.3 to test different theories of alternatives.

Experiments. All three experiments used the same priming method and stimuli, and tested three types of expressions, AD-HOC, SOME and NUMBER (see Fig. 1). TARGET trials followed two prime trials and involved a forced choice between a card consistent only with the literal meaning and the option to select 'Better Picture?'. The latter choice indicates an enriched meaning is accessed. Our BASELINE trials were the same as the TARGET trials but did not follow any prime trials. Importantly, these trials were presented in a separate block, prior to the main block of prime and target trials, ensuring that prime trials could not have cross-item effects on the BASELINE trials. Responses were analyzed using mixed effects logistic regression (maximal random effects structure).

Exp.1 ($n = 56$) was a partial replication of B&C's Exp.2 comparing WEAK vs. STRONG with the addition of BASELINE. Results replicate the contrasts in B&C between WEAK and STRONG (see Fig.2, left). Crucially, BASELINE conditions reveal that STRONG primes increase pragmatic responses for AD-HOC, but not for SOME and NUMBER, suggesting that priming effects for the latter are actually due to below-baseline rates after WEAK primes. We also note that, for NUMBER, the presence of WEAK primes in the main block of trials seems to have lowered the rate of pragmatic responses after STRONG trials, suggesting that priming a lower frequency interpretation in a block of trials can have wider-ranging effects on decisions beyond the immediate triplet of interest.

Exp.2 ($n = 50$) was a control study designed to test whether the visual similarity between the cards used in the priming and target trials could explain (part of) the effects found in **Exp.1** (for similar concerns, see B&C and R&B). The materials and design were the same as in **Exp.1** except that we removed the linguistic stimuli from the WEAK and STRONG priming trials: participants were presented with a single card, either Weak or Strong, examined it and then clicked on it to proceed. Rates of pragmatic responses were about the same after these novel WEAK and STRONG primes and no different from the BASELINE condition for each type of sentence (see Fig.2, right).

Exp.3 ($n = 179$) follows up **Exp.1** by probing for any difference between Stronger (STR-ALT, as in R&B) and Non-Weaker (NW-ALT) alternatives for AD-HOC, see rows 3a and 3b in Fig.1. NW-ALT are predicted to have same effect as STR-ALT by structural theories of alternatives (e.g., Fox & Katzir, 2011, F&K). The ALT conditions for SOME and NUMBER always involved stronger alternatives. To minimize the risk that other primes affect choices to TARGET trials outside of the immediate triplet of interest, the STRONG, STR-ALT and NW-ALT conditions were split between groups: following the block of BASELINE trials, participants were tested on the WEAK priming condition plus one of the three priming conditions just mentioned. Focusing on the case of AD-HOC, the results from STRONG (Fig.3, leftmost panel) essentially replicate the results **Exp.1**; the results from STR-ALT (Fig.3, middle panel) reveal a priming effect above WEAK and BASELINE, showing that the salience of conjunctive sentences increased pragmatic responses for AD-HOC; by contrast, no such priming effects were found in NW-ALT for AD-HOC (Fig.3, rightmost panel).

Discussion. Our findings clarify the extent to which alternatives can prime SIs, by singling out for which type of SI and alternative it can happen. In particular, they provide evidence for priming by alternatives, but only for *ad-hoc* SIs. This refines the results of R&B, but contrasts with those of Waldon & Degen (W&D, 2020) who did not find above-baseline priming effects for *ad-hoc* SIs. We attribute the different outcomes to the fact that baselines in W&D were located in the same block as the prime and target trials, and so the baseline rates may have been increased in the presence of STRONG primes elsewhere in the testing block. In addition, our results reveal a contrast between STR and NW alternatives in their ability to prime *ad-hoc* SIs. These findings pose a challenge for theories that include both types of alternatives without distinguishing between them (e.g., F&K).

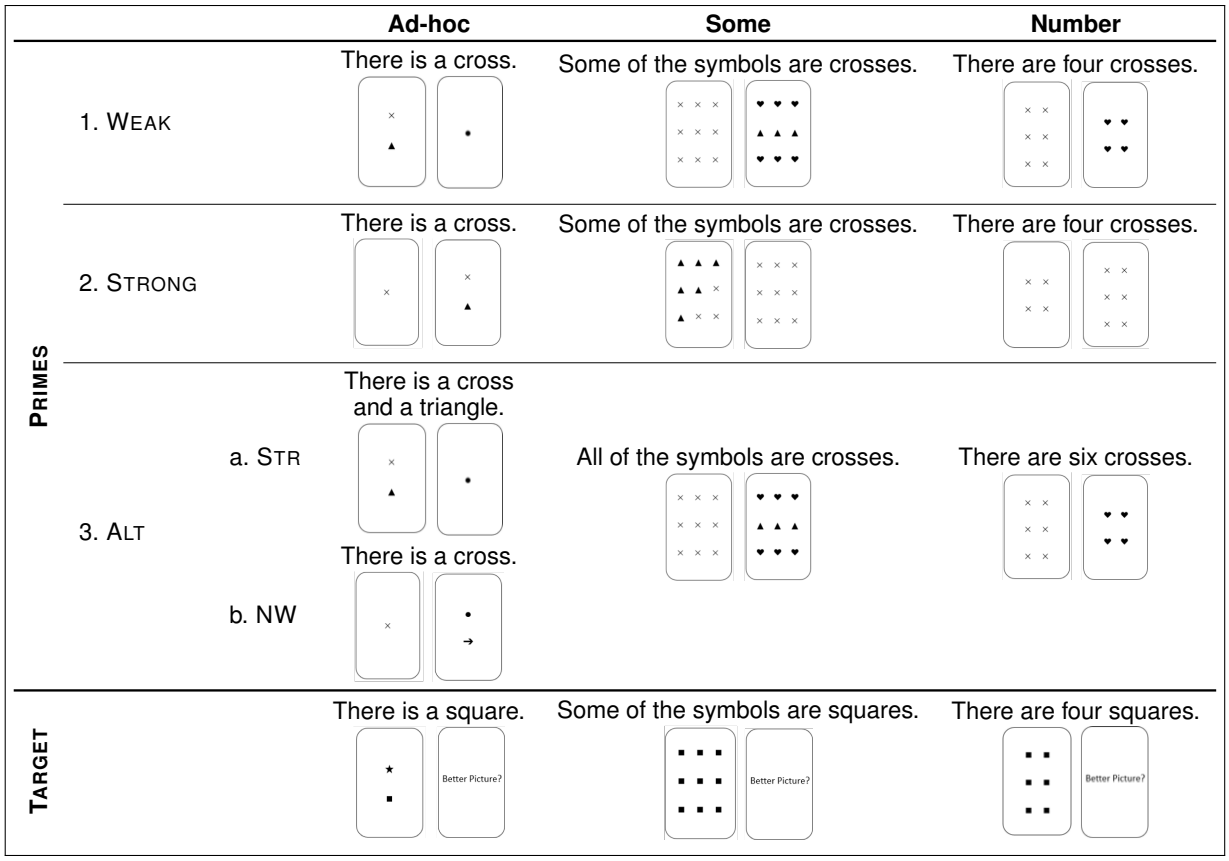

Figure 1: Example prime and target trials for each priming condition and expression type. In the prime trials, participants are asked to choose the card that best fits the sentence (the expected choice corresponds to the left card).

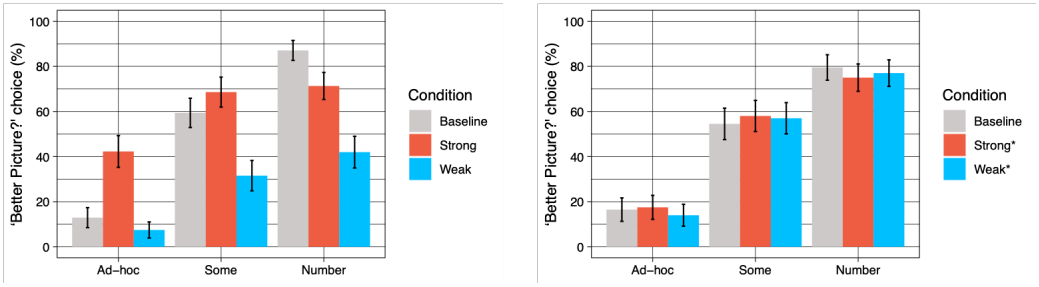

Figure 2: Results from Exp.1 (left) and Exp.2 (right). Error bars denote 95% confidence intervals.

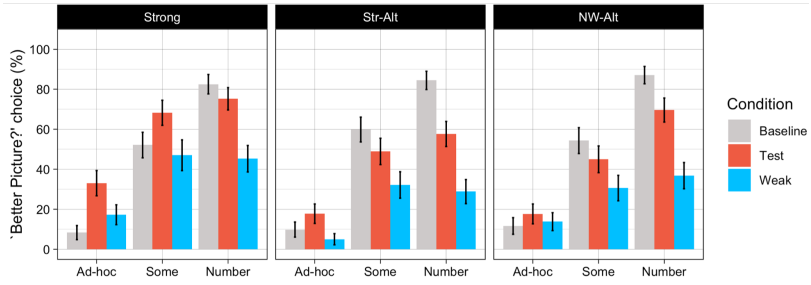

Figure 3: Results from Exp.3. Error bars denote 95% confidence intervals.

Selected references: Bott & Chemla, 2016, *Shared and distinct mechanisms in deriving linguistic enrichment* • Breheny, Klinedinst, Romoli & Sudo, 2018, *The symmetry problem: current theories and prospects* • Fox & Katzir, 2011, *On the characterization of alternatives* • Katzir, 2007, *Structurally-defined alternatives* • Rees & Bott, 2018, *The role of alternative salience in the derivation of scalar implicatures* • Trinh & Haida, 2015, *Constraining the derivation of alternatives* • Waldon & Degen, 2020, *Symmetric alternatives and semantic uncertainty modulate scalar inference*