Shared mechanism underlying non-embedded and embedded enrichments: evidence from enrichment priming

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Recent studies have shown that the enrichment of *some* to *some but not all* can occur in the scope of non-monotone quantifiers (Potts et al., 2015; Chemla & Spector, 2011). Classical (neo-)Gricean accounts fail to predict the availability of this locally enriched interpretation. Thus, the embedded enrichment of *some* has to be the result of other mechanisms. Under the grammatical theory the enrichment operation is computed by inserting a silent operator *exh* in the syntactic representation of the sentence (a-b). Thus, the grammatical account would suggest a shared mechanism or representation in deriving non-embedded and embedded enrichment.

(a) *exh* [some of the symols are hearts]

(b) [On exactly one row]$_x$ [*exh* [some of the symbols are hearts on x]]

Here we investigated empirically whether there is evidence for shared level of representation between non-embedded and embedded enrichments. Structural priming methods were used previously to tap into almost all levels of representations (Pickering & Ferriera, 2008). Bott & Chemla (2016) interpreted the priming effect within and between different types of global enrichments as evidence for a shared derivation mechanism. By adopting Bott & Chemla's sentence-picture matching task, we found non-embedded and embedded enrichments can prime each other. This indicates that there is indeed a shared representation or mechanism between non-embedded and embedded enrichments.

Exp.1 20 native British-speaker participated in a sentence-picture matching task with 16 dual-prime/target items and 48 filler trials. For each prime trial, participants were presented with a sentence paired with two pictures, they were asked to click on the picture that makes the sentence true. There were two different forms of priming: A. non-embedded *some* prime and embedded *some* target (fig.1); B. embedded *some* prime and non-embedded *some* target (fig.2). As in Bott & Chemla (2016), each target trial was preceded by two prime trials to boost the effect of prime. There were two prime types. Weak primes displayed a weak picture (false for interpreting 'some' implying *not all*) and a false picture. Strong primes displayed a weak picture and a strong picture (true for both literal and enriched readings). Thus, the participants were primed by the unenriched interpretation in the weak prime and the enriched interpretation in the strong prime. There were two types of target sentences, the embedded *some* and the non-embedded *some*. The target sentences were always presented with a weak picture and a covered picture (better picture?). If there is a shared derivation mechanism between non-embedded and embedded enrichment, it would predict that, for the priming form A in particular, the rate of enriched-reading responses in the target trial (choosing the covered picture) should be higher after strong primes than weak primes.

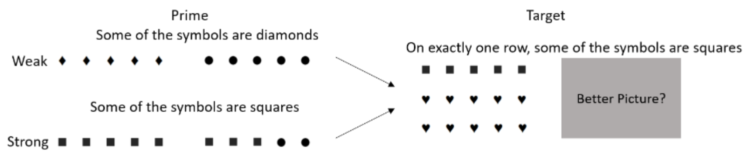


Fig.1 Example stimuli for exp.1: Non-embedded prime -> Embedded target

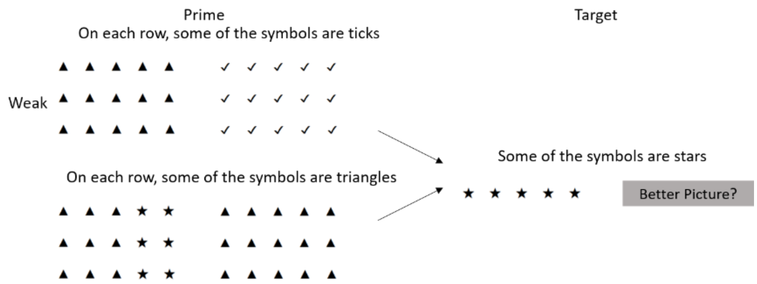
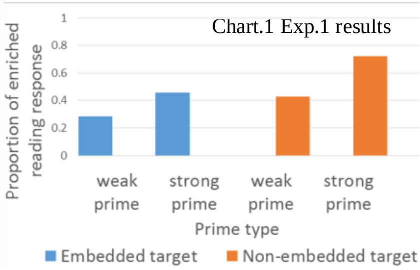


Fig.2 Example stimuli for exp.1: Embedded prime -> Non-embedded target

Exp.1 Results 33/304 target responses were removed because primes were not completed as expected. We coded 'covered picture' response as 1 and the other as 0. Chart 1 shows the proportion of enriched reading responses in every condition. Logistic mixed effects modelling of the data revealed a main effect of priming. Compared to weak primes, strong primes caused a higher rate of enriched responses in the target trials (β=1.88, p=.008). However, it is possible that enriched responses in the embedded target trials were a mixture of local enrichments and global enrichments, i.e. 'On exactly one row, some symbols are stars and it's not true that on exactly one row all symbols are stars'. Therefore we ran exp.2 to test to what extent the global reading confounded exp1.'s results.



Exp.2 The materials were similar to Exp.1 with one key difference, that the embedded target sentence was paired with a picture false on any available reading except the local one (fig.3). In exp.2, 'uncovered picture' responses were purely for the local enriched reading, whereas 'covered picture' responses might be for a mixture of literal and global enrichments. *Predictions*: For the embedded target condition, if the enriched response rates observed in exp.1 mainly reflected the availability of the global enrichments, we predict a decrease in blue bars because in exp.2, enriched response rates, namely given 'uncovered picture' response, purely reflect the rate of local enriched reading; If the enriched response rates in Expt. 1 reflected the availability of locally enriched meaning, priming should be replicated in exp.2. Another group of 20 were tested.

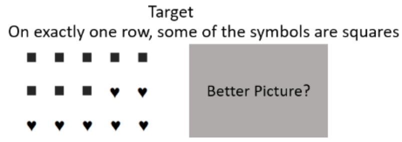
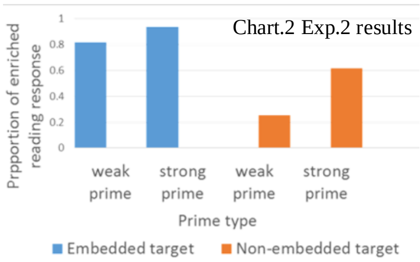


Fig.3 Example stimuli for exp.2: Embedded target trial

Exp.2 Results: 35/320 target responses were removed. Chart 2 showed the proportion of enriched responses, note that for embedded target trials, we coded 'uncovered picture' responses as 1 and the other as 0. The rate of enriched responses in exp.2 was much higher than that in exp.1, suggesting that the local enriched reading was available and it was unlikely that the results in exp.1 reflected the global reading confound. We replicated the results of exp.1, that there was a main effect of priming (β=1.83, p=.003). This confirmed that there was an effect of priming, in particular, the strong non-embedded enrichment could prime the embedded enrichment.



Conclusion We find that non-embedded enrichments prime embedded enrichments in the scope of a non-monotonic quantifier. Following from Bott & Chemla (2016), the enrichment priming can be viewed as evidence for a shared mechanism between non-embedded and embedded enrichments. These results are consistent with the grammatical approach of enrichment derivation, as it could be that a syntactic constituent that containing *exh* was primed in both embedded and non-embedded cases. It is less clear what the account in Potts et al. (2015) predicts with global primes and local targets, since (1a) does not require the mechanism of lexical adjustment. These results are compatible with Chemla et al. (2016) that there is no processing cost difference between global and local enrichment, suggesting there is a single mechanism between the two.

Reference: [1] Bott, L &Chemla, E. 2016. Journal of Memory and Language. [2] Chemla, E & Spector, B. 2011. Journal of Semantics. [3] Chemla, E., Cummins, C. & Singh, R. (2016) Journal of Semantics. [4] Pickering, J. & Ferreira, S. (2008) Psychological Bulletin. [5] Potts, C., Lassiter, D., Levy, R. & Frank, M. (2015) Journal of Semantics.