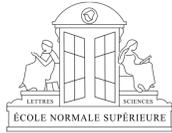


Training and timing local implicatures

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Scalar implicatures under embedding?

Scalar implicatures (SIs) strengthen sentences with the negations of alternatives:

X is connected to some of its circles +> *X is connected to not all of its circles*

An ongoing debate concerns whether inferences such as *some* +> *not all* and *or* +> *not 'and'* systematically arise in embedded positions:

Kai had the broccoli or some of the peas ? +> *Kai did not have all of the peas*

You must read the course notes or the summary ? +> *You must not read both*

Consensus emerging that the enrichment (be it SI or otherwise) is sensitive to contextual manipulations (e.g. Geurts and van Tiel 2013). Given previous work on SIs (Bott and Noveck 2004, among many others), also likely that the enrichment comes at a processing cost.

Idea: examine situations in which there is external pressure to strengthen the weak scalar meaning

X is connected to some or none of its circles

Vacuously true under the semantic meaning of *some*

X is connected to some or all of its circles

Violates Hurford's (1974) constraint under the semantic meaning of *some*

These sentences would be "saved" by local pragmatic enrichment of *some*. But questions arise:

1. Are participants able to perform enrichments of this kind?
2. If so, is it costly (as measured, for instance, by response time) to perform these enrichments?
3. Are these "local" enrichments supported by the same mechanisms that underwrite standard "global" enrichments?

Method

Self-paced reading, one word presented at a time.

After each sentence, participants saw a diagram (samples on right) and judged whether the sentence was true or false.

Training phase: Participants read 48 sentences of the form "*Q1 is connected to Q2 of its circles*":

12 each of *every...some*, *every...all*, *no...all* and *no...any*

Feedback on the truth-judgments was provided in two conditions, the **global** and **local** training conditions:

in **both conditions**, participants were given feedback that "*Every letter is connected to some of its circles*" was false in condition (i), because every letter was connected to all of its circles;

global participants were given feedback that "*Every letter is connected to some of its circles*" was true in condition (ii), but

local participants were told that it was false, because some letters were connected to all of their circles.

Testing phase: Participants responded to 52 further items:

28 of the same form as in the training phase

and 24 of the form *X is connected to Q of its circles*

with *X* denoting a letter (A-F)

and *Q* denoting *all*, *some*, *none*, or *some or none*.

Implementation

The experiment was implemented using Ixet Farm and

participants recruited via Amazon Mechanical Turk.

Conditions fielded separately: 126 participants recruited for

Global condition, 100 for Local condition

Key predictions

For "*...some or none...*" items, we predict local training causes

(i) more enrichments leading to rejections with "*all*" displays

(ii) slower processing at *some* but faster processing later.

Conclusion

These results indicate that: local enrichments from *some* can be drawn to rescue otherwise-deviant sentences;

prior training with local enrichments (in a different sentence context) increases participants' willingness to perform these enrichments;

local enrichments are costly at the point of computation but may yield payoffs in easier comprehension of later materials.

References

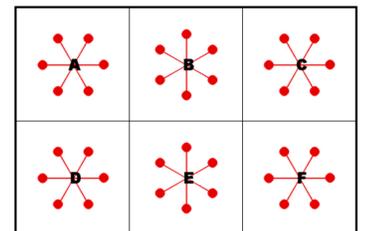
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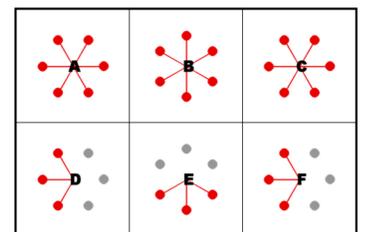
Sample displays

(i) Letters A-F, each connected to all of their circles



(ii) Letters A-C connected to all of their circles;

letters D-F connected to some (but not all) of their circles



Results

Participants' results were discarded *en bloc* if they achieved <90% accuracy on semantically uncontroversial items. Items were excluded if the reading time for any word > 1000ms.

Judgments: *X is connected to some or none...* in conjunction with an "all" display was rejected by 82% of Global and 92% of Local participants (the latter being significantly higher, $p < 0.01$)

Reading times: Raw RTs (ms) for the critical *...some or none...* items were as follows (colours distinguish what we considered *quantifier* and *spillover* regions for the subsequent analysis).

	some	or	none	of	its	circles
Global	317	319	340	356	346	392
Local	344	329	371	350	338	389

A linear mixed model disclosed a significant interaction of training by region (coefficient = 81.1, SE = 33.9, $t = 2.39$, $p < 0.05$) suggesting that Local participants were (relatively) slower to read the quantifier and faster to read the spillover region.