The neural computation of scalar implicature

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Scalor Implicature
Mary did some of her homework.
⇒ Mary did not do all of her homework.

EEG findings
Noveck & Posada (2003):
Some houses have bricks. Some turtles have shells.
SI violation ≠ N400

Nieuwland et al. (2010):
Some people have pets...
Some people have lungs...
SI violation ⇒ N400

background

questions & motivations
1. Does SI violation always result in N400s?
2. What is signature of SI calculation?
Method suggested by work showing SIs less likely in conditional antecedents (Chierchia, Fox & Specter, 2012):
If you eat some of your beans, you can have dessert.
Compare "some" in declaratives and conditionals.

method

results (brief) & discussion
1. At trigger ("some of"): no sig. interactions
Consistent with automatic SI processing
(Lieven, 2000; see also: Chierchia et al., 2012)
or Insufficient power. Hint of frontal positivity for dec-some in both exps.

Exp. 1:

2. At "the rest": frontal, long-lasting positive deflection for cond-some.
Note: No N400

a) Supports claim that implicatures less likely in antecedents of conditionals.
(or at least processed differently)
b) May reflect
i) Forced calculation of implicature.
ii) Revision due to unlikely continuation.
(c) Delsing et al., 2011; Federmen et al., 2007)

results (extended)
Non-parametric bootstrapped cluster analysis (Maris & Oostenveld, 2007)
1. Linear regression at each electrode/time point.
2. Find clusters of points in time and space where t-value exceeds threshold (±1.96)
3. Randomly permute condition codes, repeat steps 1-2.
4. Repeat step 3 100 times.
5. For clusters in step 2: p-value = percent. clusters in step 4 larger than cluster in question,
at "some of"

Exp. 1

Each cluster = sig. or non-sig. depicted in diff. color.

at "the rest"

no sig. clusters

one sig. cluster (orange)

references