Semantics and Linguistic Theory 34

Embedded scalar diversity

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Embedded SI

(1) Mary read some of the books.
Scalar implicature (SI): Mary read some, but not all, of the books.

(2) Every child read some of the books.
a. Global SI (**weak inference**): Not every child read all of the books.
b. Embedded SI (**strong inference**): No child read all of the books.

Existence of embedded SI key piece of evidence for adjudicating among SI theories – subject of experimental work

Scalar diversity

Lexical scales differ in how likely they are to lead to SI, e.g., (1) more likely than (3), i.a., van Tiel et al. (2016):

(3) The soup is warm.

⟶ The soup is warm, but not hot.

Sun et al. (2018) naturalness ratings on:
(4) The soup is hot so not warm.

Variation found in naturalness = embedded SI
Correlated w/ global scalar diversity (r=0.44), but not predicted by same factors (cf. Bleotu & Benz, in press)
I argue: (4) unnatural unless *The soup is warm* previously asserted ⟶ low ratings, null result

Research question

Do embedded and global SIs give rise to the **same scalar diversity**?

Do the **same properties of alternatives** predict both kinds of variation?

Adjudicate among competing theoretical accounts of embedded SI

Experiment

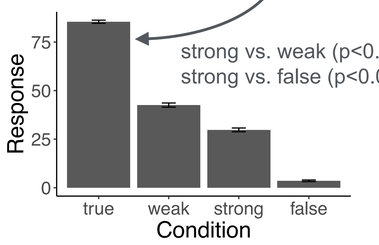
items from van Tiel et al. (2016) × task/conditions from Gotzner & Romoli (2018)

participant N=118
item N=42

Task: Judge to what extent the first sentence suggests the second (0%-100% sliding scale)

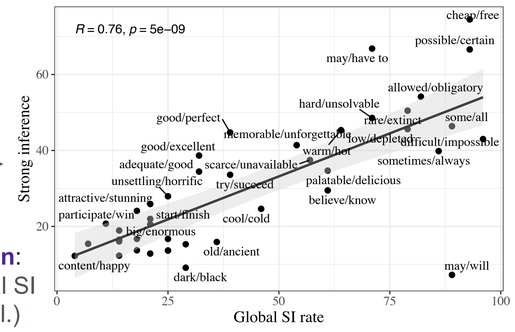
(5) Every soup was warm.
a. At least one soup was warm. (T control)
b. Not every soup was hot. (weak inf.)
c. No soup was hot. (strong inf.)
d. Not every soup was warm. (F control)

Same pattern as Gotzner & Romoli
evidence for embedded SI



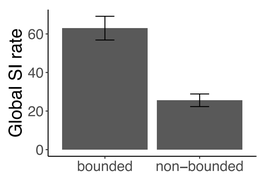
strong vs. weak (p<0.001)
strong vs. false (p<0.001)

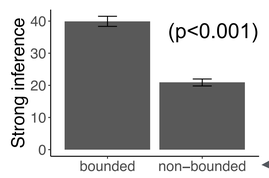
Strong correlation: strong inf. ~ global SI (from van Tiel et al.)



Predictors of diversity

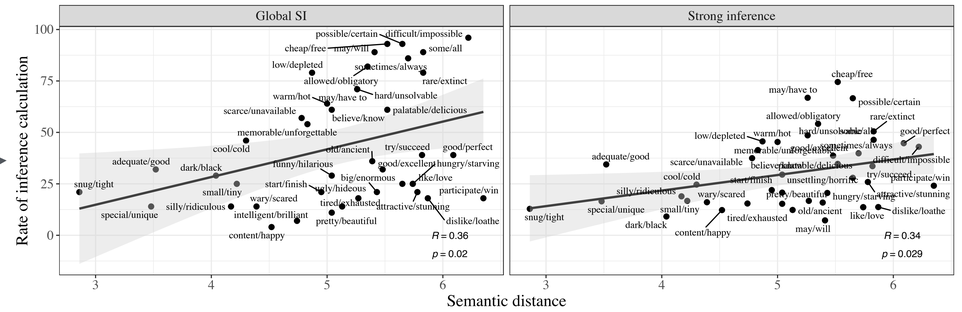
global SI data from van Tiel et al.





Semantic distance:
measured via 7-point Likert scale (vTetal)

Boundedness:
stronger alternative denotes a fixed point



Same properties of alternatives predict global and embedded diversity

Theoretical accounts

Support accounts of embedded SI that build on alternatives:

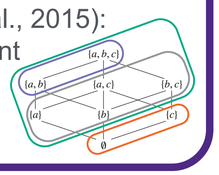
Grammatical theory (i.a., Chierchia, 2004; Chierchia et al., 2012):
(6) Every soup x: O(x was warm).
Exhaustification operator excludes alternatives under the quantifier

Modified neo-Gricean account (i.a., Sauerland, 2004):
(7) Every soup was hot.
(8) Some soup was hot.
Takes (8), instead of the "standard" Gricean (7), to be the alternative that is reasoned about and negated

RSA-Lexical Uncertainty: Neo-Gricean model (Potts et al., 2015):
Lexical scales built into model by constraining refinement space
$\mathcal{R}_c$(*some N*)= {⟦*some N*⟧, ⟦*some N and not all Ns*⟧}

Incompatible with **alternative-free accounts**:

'Vanilla' RSA-Lexical Uncertainty (Bergen et al., 2016),
RSA-LU: Unconstrained uncertainty model (Potts et al., 2015):
Embedded SI derived via unconstrained lexical refinement
⟦*some N*⟧ = {{a, b, c}, {a}}; ⟦*some N*⟧ = {{a, b, c}}, etc.
(every nonempty subset of ⟦*some N*⟧)



Problem of baseline

Gotzner & Romoli's Exp. 1 defines existence of strong inference as higher % than F control

Concern about F control: Incompatible with first sentence

Exp. 2: "Some soup was hot" (compatible control, but not a valid inference)

But this is also problematic, since it's the negation of the strong inference

My solution: Experiment with inference task: "Would you conclude from this that, according to Mary, no soup was hot?" ⟶ Yes/No

Yes = **Inference calculation** for that trial/participant

All results replicate other than semantic distance

Conclusion

- Embedded scalar diversity **mirrors global scalar diversity**
- **Boundedness** and **semantic distance** predict both (see Bleotu & Benz for converging evidence from *some*/*possible* embedding)
- **Incompatible** with 'unconstrained uncertainty' RSA-LU
- Evidence for **shared mechanism** underlying embedded and global SI

Next step – non-monotone:
(9) Exactly one door is ajar.
Strong inference: Exactly one door is ajar but not open. The others are either not ajar or open. (Chemla & Spector, 2011)