

Scales and scalarity: Processing scalar inferences

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Scales, degrees and implicature

Introduction

An utterance of (1) has at least two interpretations.

(1) The movie was good.

a. One-sided: >80

b. Two-sided: 80–90

The one-sided interpretation is theoretically prior to the two-sided interpretation. (Horn, 1972)

Is the theoretical priority of the one-sided interpretation reflected in cognitive processing? (Recanati, 1995)

Proposals

Which interpretation is cognitively prior?

- Literal-first: >80 (Huang & Snedeker, 2009)
- Defaultism: $80-90$ (Levinson, 2000)
- It depends (e.g., van Tiel & Schaeken, 2017)

Sentence verification

Bott and Noveck (2004) asked participants to give their truth judgements to sentences with 'some' and 'all'.

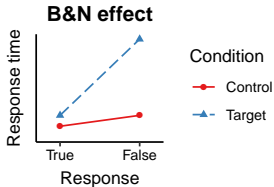
Control

Some mammals are dogs. (True)

Some dogs are insects. (False)

Target

Some dogs are mammals. (True/False)



Against defaultism, 'false' answers were slower than 'true' answers in the target but not control condition.

Research question

Processing data from sentence verification appear to substantiate the literal-first hypothesis.

However, most research has focused on 'some' (and 'or') even though not all lexical scales are alike. (van Tiel et al., 2016)

Does the B&N effect generalise to other scalar words?

First foray

Van Tiel, Pankratz, and Sun (2019) carried out a sentence-picture verification task with 7 scalar words.

- > Three types of images for each scalar word:
 - > Ctrl-True: the sentence is unambiguously true.
 - > Ctrl-False: the sentence is unambiguously false.
 - > Target: the sentence is true only on its one-sided interpretation.
- > The sentence is presented first, followed by the image.
- > Participants give truth value judgements.
- > Response times were measured (Exp. 1).

The battery is low



Ctrl-True

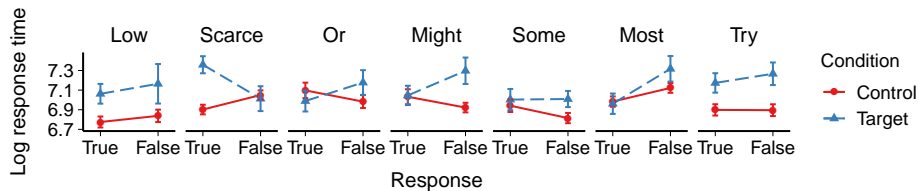
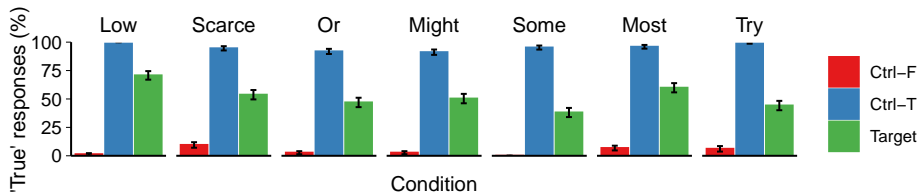


Ctrl-False



Target

Results



Results

- > B&N effects for all scalar words except for 'low' and 'scarce'.
What makes these two scalar words special?
- > 'Low' and 'scarce' are **inherently negative**, i.e., they denote an upper bound on their dimension. (Horn, 1989)
- > Polarity hypothesis: only the processing of scalar inferences of positive scalar words is cognitively costly.

Polarity hypothesis

Sentence verification times depend on polarity; the sentences in (2) take increasingly longer to verify. (Clark & Chase, 1972)

- (2) a. The star is above the cross. (Positive)
- b. The cross is below the star. (Inherently negative)
- c. The cross is not above the star. (Explicitly negative)

Polarity hypothesis

The explanation relies on two critical assumptions:

- > The one-sided reading and the SI are verified in parallel.
- > The scalar inferences of negative scalar words are cognitively represented as positive propositions.

Verification times depend on the polarity of the scalar word.

<i>Scalar word</i>	<i>Literal reading</i>	<i>Scalar inference</i>	<i>B&N effect</i>
positive (e.g., 'some')	positive	expl. negative	present
inh. negative (e.g., 'scarce')	inh. negative	positive	absent
expl. negative (e.g., 'not all')	expl. negative	positive	reversed

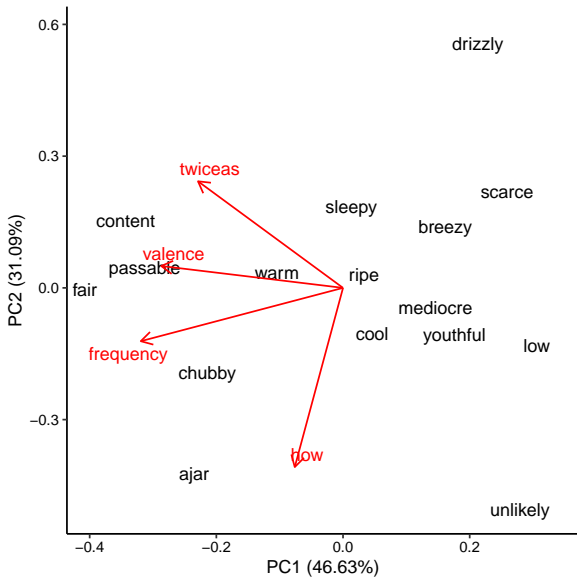
*This also explains why **indirect** SIs lack a processing cost. (Cremers & Chemla, 2014; Romoli & Schwarz, 2015)

The critical test

Van Tiel and Pankratz (2021) comprehensively tested the polarity hypothesis using 16 adjectival scalar words.

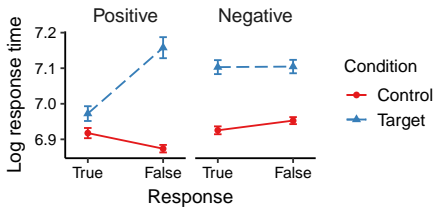
Polarity was measured by combining the results of four measures of polarity, relativised to the antonym. (Schäfer, 2015)

- > The frequency in the 'twice as' construction. (Sassoon, 2010)
- > The frequency in 'how' questions. (Rett, 2008)
- > The overall frequency. (Boucher & Osgood, 1969)
- > The perceived valence. (Mohammad, 2018)



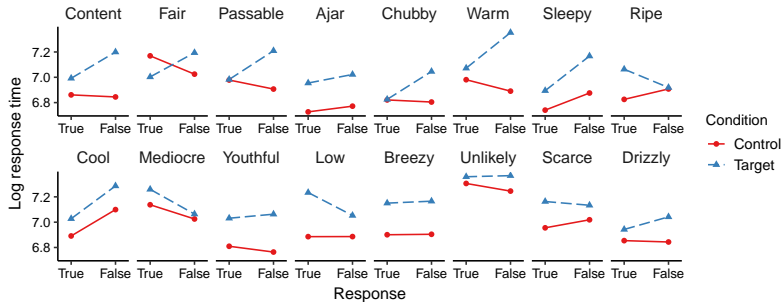
Van Tiel and Pankratz (2021)

- > Three types of images for each scalar word:
 - > Ctrl-True: the sentence is unambiguously true.
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 - > Target: the sentence is true only on its one-sided interpretation.
- > The sentence is presented first, followed by the image.
- > Participants give truth value judgements.
- > Response times were measured.



> Interaction between condition, response, and polarity in the expected direction.

> All adjectives showed the expected pattern except 'youthful'.

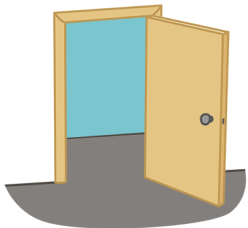


Conclusion

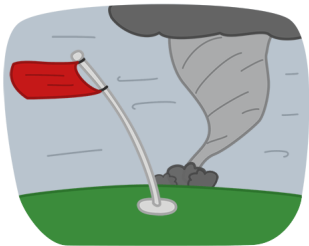
- > Only the SIs of positive scales are associated with a processing cost. (Gotzner et al., 2018)
- > The computation of SIs per se is not cognitively costly.
- > Do other findings about SI processing generalise better? (Breheny et al., 2006; Huang & Snedeker, 2009)
- > Looking beyond 'some' brings us new theoretical and methodological insights (and raises fruitful new questions).

Thank you for your attention!

The door is **ajar**



It is **breezy** outside



He is **chubby**



She is **content**



The water is **cool**



The weather is **drizzly**



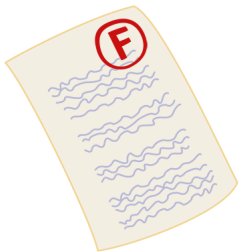
Her accuracy is **fair**



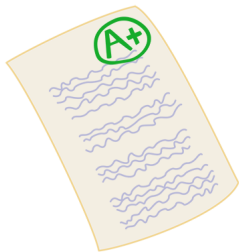
The water in the bath is **low**



Her grade is **mediocre**



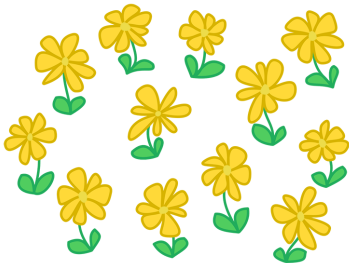
Her grade is **passable**



The banana is **ripe**



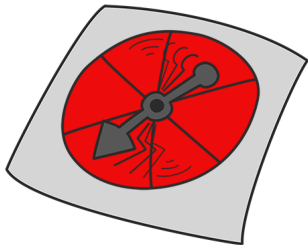
Red flowers are **scarce**



She is **sleepy**



The arrow is **unlikely** to land on blue



The water is **warm**



She looks **youthful**



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