



LUND UNIVERSITY

Processing negation in a miniature artificial language

Farshchi, Sara; Paradis, Carita; Andersson, Richard

2017

Document Version:

Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):

Farshchi, S., Paradis, C., & Andersson, R. (2017). *Processing negation in a miniature artificial language*. Abstract from Negation and Negativity in Natural Language, Bochum, Germany.

Total number of authors:

3

General rights

Unless other specific re-use rights are stated the following general rights apply:

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

Processing negation in a miniature artificial language

Sara Farshchi, Carita Paradis & Richard Andersson
Lund University

Background. Negated forms have been shown to cause a higher processing cost for language comprehension in the form of higher error rates and longer processing times (Wason, 1959; Wason & Jones, 1963; Just & Carpenter, 1971). Research on prefixal negation (e.g. *unhappy*) suggests that although prefixally-negated forms involve an explicit negator such as *un-*, they are not processed as negated forms and do not involve a processing cost (Hoosain, 1973; Sherman, 1976). This study revisits the processing cost issue. In two Artificial Language Learning (ALL) experiments, we investigate participants' responses to pictorial representations of negated and non-negated meanings. Through pictures we teach them meanings equivalent to:

1. Prefixal negation such as *unhappy* – referred to as “narrow negation”
2. Constituent negation expressed by the negator *not* as in *not happy* – referred to as “broad negation”
3. No negation

In experiment 1, the scope of broad negation (*not happy*) included the meaning of narrow negation (*unhappy*) while in experiment 2, the scope of broad negation covered the middle range of the scale between the two extremes ‘*happy* – *unhappy*’. Using artificial language learning eliminated length and frequency differences between the forms that are inherent in natural language.

Methods. Experiment 1 (37 participants) and experiment 2 (28 participants) both consisted of one learning phase and one testing phase. In the learning phase, participants learned three prefixes corresponding to the three forms described above: 1. *ka*: narrow negation, 2. *va*: broad negation, 3. *sa*: empty prefix with no negation. Next, participants learned 8 artificial adjectives that were later used in the testing phase (e.g. *reft* = ‘full’). The testing phase comprised a picture-word verification task in which participants were tested on the combination of the three prefixes and the artificial adjectives previously memorized (e.g. *kareft*, *vareft*, *sareft*).

Results. In experiment 1, increased response times and lower accuracy rates were found for narrow negation compared to non-negated form. Moreover, broad negation resulted in the highest number of errors. However, no differences were found in response times between narrow and broad negations. In experiment 2, further proof of the processing cost of narrow negation in comparison to the non-negated condition was found in the form of lower accuracy rates. No differences were found in the response times across the three forms. In experiment 2, broad negation was no longer more costly than narrow negation.

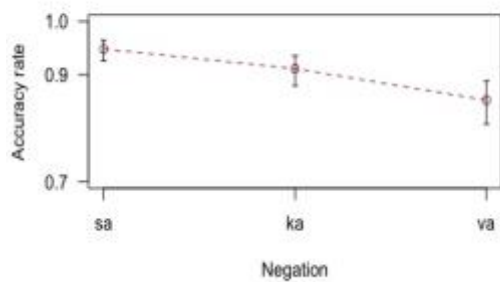
Conclusion. The experiments showed increased processing times and higher error rates for narrow negation compared to the non-negated condition. This new finding suggests that prefixally-negated meanings are in fact processed as negated meanings and involve a processing cost. Moreover, broad negation was the most costly form to process in experiment 1. However, when its scope was limited to the middle range between the outer poles, broad negation was no longer more difficult than narrow negation. This suggests that broad negation was more costly to process when there was overlap in meaning with the range for narrow negation and this large meaning span makes broad negation more vague and more difficult to process.

References

- Hoosain, R. (1973). The processing of negation. *Journal of Verbal Learning and Verbal Behavior*, 12, 618-626.
- Just, M. A., & Carpenter, P. A. (1971). Comprehension of negation with quantification. *Journal of Verbal Learning and Verbal Behavior*, 10, 244-253.
- Sherman, M. A. (1976). Adjectival negation and the comprehension of multiply negated sentences. *Journal of Verbal Learning and Verbal Behavior*, 15, 143-157.
- Wason, P. C. (1959). The processing of positive and negative information. *Quarterly Journal of Experimental Psychology*, 92-107.
- Wason, P. C., & Jones, S. (1963). Negatives: Denotation and connotation. *British Journal of Psychology*, 54(4), 299-307.

Figures:

Experiment 1



Experiment 2

