

Tattoos as a window onto cross-linguistic differences in scalar implicature

Danielle Dionne & Elizabeth Coppock
Boston University

ELM, 2020

Outline

Introduction

Background

Methodology

Selected Results

Bayesian Pragmatics

Discussion

Conclusion

Introduction

Scalar Implicature: The use of a weaker form implicates the negation of a stronger alternative along the same scale.

Introduction

Scalar Implicature: The use of a weaker form implicates the negation of a stronger alternative along the same scale.

- (1) She ate some of the grapes.
 \leadsto She did *not* eat *all* of the grapes.
 Alternative: She ate *all* of the grapes.

Introduction

Scalar Implicature: The use of a weaker form implicates the negation of a stronger alternative along the same scale.

- (1) She ate some of the grapes.
 \leadsto She did *not* eat *all* of the grapes.
 Alternative: She ate *all* of the grapes.

Hearer thinks: If the speaker means 'all', they would say *all*, which is just as short (Manner), and more informative (Quantity).

Outline

Introduction

Background

Methodology

Selected Results

Bayesian Pragmatics

Discussion

Conclusion

An appeal to alternatives

Regardless of differences in the pragmatic reasoning process, all frameworks appeal to the idea of alternatives. (Grice, 1975; Horn, 2000; Geurts, 2011; Chierchia et al., 2008; Frank & Goodman, 2012)

An appeal to alternatives

Regardless of differences in the pragmatic reasoning process, all frameworks appeal to the idea of alternatives. (Grice, 1975; Horn, 2000; Geurts, 2011; Chierchia et al., 2008; Frank & Goodman, 2012)

Alternatives: “Sentences the speaker might have uttered instead of the one that he did utter” (Geurts, 2011, p. 29)

An appeal to alternatives

Regardless of differences in the pragmatic reasoning process, all frameworks appeal to the idea of alternatives. (Grice, 1975; Horn, 2000; Geurts, 2011; Chierchia et al., 2008; Frank & Goodman, 2012)

Alternatives: “Sentences the speaker might have uttered instead of the one that he did utter” (Geurts, 2011, p. 29)

- (1) She ate some of the grapes.
 ~> She did not eat all of the grapes.
 Alternative: She ate *all* of the grapes.

Constraining the set of alternatives

To understand scalar implicature calculation, we need to understand what alternatives are available to listeners.

Constraining the set of alternatives

To understand scalar implicature calculation, we need to understand what alternatives are available to listeners.

Different theories have imposed different constraints on the set of alternatives:

- ▶ **Complexity-only constraints**
restrict alternatives based on word count.
 - ▶ Horn (2000)
 - ▶ Katzir (2007)

Constraining the set of alternatives

To understand scalar implicature calculation, we need to understand what alternatives are available to listeners.

Different theories have imposed different constraints on the set of alternatives:

- ▶ **Complexity-only constraints** restrict alternatives based on word count.
 - ▶ Horn (2000)
 - ▶ Katzir (2007)
- ▶ **Prevalence-based constraints** restrict alternatives based on production probability.
 - ▶ Geurts (2011)
 - ▶ Frank & Goodman (2012), Goodman & Stuhlmüller (2013)

Digits in Scalar Implicature

It has been noted in the literature that an asymmetry exists between *finger* and *toe*.

(Horn, 1984, 2000; Geurts, 2011)

(2) She has a tattoo on her finger.
 \leadsto She does not have a tattoo
 on her thumb.

(3) She has a tattoo on her toe
 $\not\leadsto$ She does not have a tattoo
 on her big toe.

Horn's conjecture

“We would predict that if the **colloquial** language replaced its *thumb* with the polymorphous *pollex* (the Latin and scientific English term for both ‘thumb’ and ‘big toe’), the asymmetry [between *finger* and *toe*] would instantly vanish.”



Geurts (2011), *Quantity Implicatures*



“It is important to note, however, that the adjective ‘colloquial’ is doing real work in this statement: it is not enough for an alternative word to be in the language; it has to be sufficiently salient, as well: if the word ‘thumb’ was rarely used, then presumably the asymmetry between would vanish too.”

The present study

Spanish: *pulgar* 'thumb' (equally as complex as *thumb*, less prevalent)

Goal: To investigate, using cross-linguistic comparison, what determines the viability of alternatives when calculating a scalar implicature

The present study

Spanish: *pulgar* 'thumb' (equally as complex as *thumb*, less prevalent)

Goal: To investigate, using cross-linguistic comparison, what determines the viability of alternatives when calculating a scalar implicature

Outline

Introduction

Background

Methodology

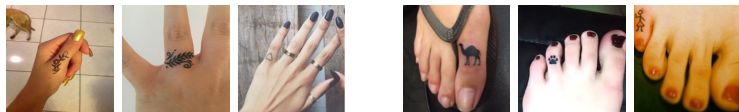
Selected Results

Bayesian Pragmatics

Discussion

Conclusion

Design/Procedure



TARGETS

FILLERS

NORMING: PRODUCTION
(fill in the blank)

6 digits

6 other body parts
(arm, leg, back)

COMPREHENSION
(forced choice)

6 digit-pairs

6 other pairs
(mix of easy/hard)

Order, left-right presentation randomized.

Outline

Introduction

Background

Methodology

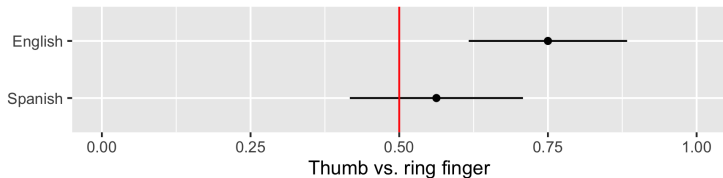
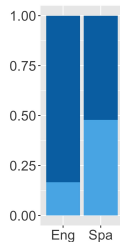
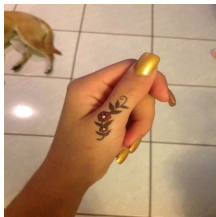
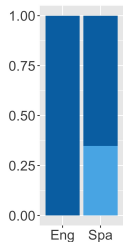
Selected Results

Bayesian Pragmatics

Discussion

Conclusion

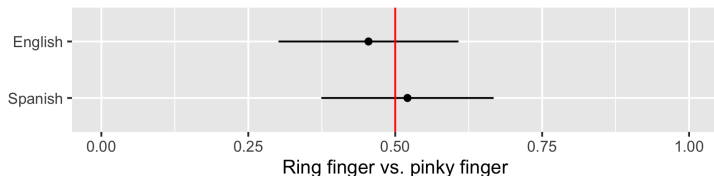
Thumb vs. ring finger (Comprehension)



“She has a tattoo on her finger.”

Observed rates plotted with 95% CI

Ring finger vs. pinky finger (Comprehension)



“She has a tattoo on her finger.”

Observed rates plotted with 95% CI

Outline

Introduction

Background

Methodology

Selected Results

Bayesian Pragmatics

Discussion

Conclusion

The RSA Framework (e.g. Frank & Goodman 2012)

The RSA framework uses probabilistic reasoning to model the recursive nature of pragmatic reasoning.

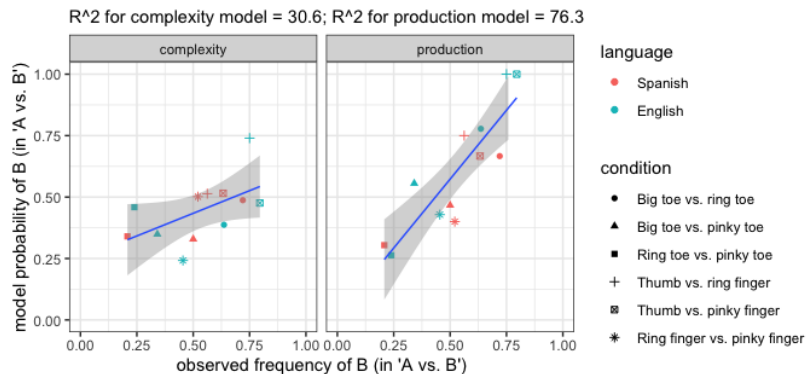
The RSA Framework (e.g. Frank & Goodman 2012)

The RSA framework uses probabilistic reasoning to model the recursive nature of pragmatic reasoning.

Let us consider two models of the speaker S :

- ▶ Complexity Model: penalizing longer utterances
- ▶ Production Model: perfect knowledge of speaker behavior (prevalence)

Model comparison



Comparison of Model Results

Outline

Introduction

Background

Methodology

Selected Results

Bayesian Pragmatics

Discussion

Conclusion

Discussion

Geurts was right: It matters how prevalent an alternative is.

Discussion

Geurts was right: It matters how prevalent an alternative is.

In Spanish, *pulgar* is not as widespread, so it does not block *dedo* the way *thumb* blocks *finger*.

Discussion

Geurts was right: It matters how prevalent an alternative is.

In Spanish, *pulgar* is not as widespread, so it does not block *dedo* the way *thumb* blocks *finger*.

Support: *pinky* doesn't act like *thumb* (in Spanish or English).

-Single-word alternatives available to speakers, but less prevalent.

Discussion

Geurts was right: It matters how prevalent an alternative is.

In Spanish, *pulgar* is not as widespread, so it does not block *dedo* the way *thumb* blocks *finger*.

Support: *pinky* doesn't act like *thumb* (in Spanish or English).

-Single-word alternatives available to speakers, but less prevalent.

Troublesome for complexity-based accounts (Horn, 1984, 2000; Katzir, 2007)

Outline

Introduction

Background

Methodology

Selected Results

Bayesian Pragmatics

Discussion

Conclusion

Conclusions

1. Viability of alternatives depends on **how prevalent the alternatives are.**
 - ▶ Languages differ in which alternatives are considered viable based on the prevalence of translational equivalents

Conclusions

1. Viability of alternatives depends on how prevalent the alternatives are.
 - ▶ Languages differ in which alternatives are considered viable based on the prevalence of translational equivalents
2. Viability is tied to prevalence (production probability), and complexity is not all there is to it. Interlocutors are **recursively probabilistic** when communicating.

Conclusions

1. Viability of alternatives depends on how prevalent the alternatives are.
 - ▶ Languages differ in which alternatives are considered viable based on the prevalence of translational equivalents
2. Viability is tied to prevalence (production probability), and complexity is not all there is to it. Interlocutors are recursively probabilistic when communicating.

Our findings provide evidence **against a structural approach** to calculating alternatives (Horn, 2000; Katzir, 2007), favoring theories that determine alternatives based on **production probability** (Geurts, 2011; Goodman & Stuhlmüller, 2013).

Thank you!

Gracias!

References I

- Aronoff, Mark. 1976. *Word formation in generative grammar*. Cambridge, MA: MIT Press.
- Atlas, Jay & Stephen Levinson. 1981. It-clefts, informativeness, and logical form: radical pragmatics (revised standard version). In Peter Cole (ed.), *Radical pragmatics*, 1–61. New York: Academic Press.
- Bergen, Leon, Noah D. Goodman & Roger Levy. 2012. That's what she (could have) said: How alternative utterances affect language use. In *Proceedings of the thirty-fourth annual conference of the cognitive science society*, 120–125. Cognitive Science Society.
- Bergen, Leon, Roger Levy & Noah Goodman. 2016. Pragmatic reasoning through semantic inference. *Semantics & Pragmatics* 9(20). 1–83.
- Blutner, R. 2000. Some aspects of optimality in natural language interpretation. *Journal of Semantics* 17(3). 189.
- Blutner, Reinhard. 1998. Lexical pragmatics. *Journal of Semantics* 15(2). 115–162.

References II

- Chierchia, Gennaro, Danny Fox & Benjamin Spector. 2008. The grammatical view of scalar implicatures and the relationship between semantics and pragmatics. In Claudia Maienborn, Klaus von Stechow & Paul Portner (eds.), *Semantics: An international handbook of natural language meaning*, Berlin: Mouton de Gruyter.
- Frank, Michael C. & Noah D. Goodman. 2012. Predicting pragmatic reasoning in language games. *Science* 336(6084). 998.
- Geurts, Bart. 2011. *Quantity implicatures*. Cambridge: Cambridge University Press.
- Goodman, Noah D. & Andreas Stuhlmüller. 2013. Knowledge and implicature: Modeling language understanding as social cognition. *Topics in Cognitive Science* 5(1). 173–184.
- Grice, Paul. 1975. Logic and conversation. In Peter Cole & Jerry Morgan (eds.), *Syntax and semantics*, vol. 3, 41–58. New York: Academic Press.
- Horn, Laurence. 1984. Toward a new taxonomy for pragmatic inference: Q-based and R-based implicature. In Deborah Schiffrin (ed.), *Meaning, form, and use in context: Linguistic applications*, 11–42. Washington, DC: Georgetown University Press.

References III

- Horn, Laurence. 1991. Duplex negatio affirmat... the economy of double negation. *Chicago Linguistics Society* 27. 80–106.
- Horn, Laurence R. 1972. On the semantic properties of logical operators in English. Doctoral dissertation, University of California, Los Angeles.
- Horn, Lawrence R. 2000. From *if* to *iff*. Conditional perfection as pragmatic strengthening. *Journal of Pragmatics* 32(3). 289–326.
- Jäger, Gerhard. 2000. Some notes on the formal properties of bidirectional optimality theory. *ZAS Papers in Linguistics* .
- Jäger, Gerhard. 2012. Game theory in semantics and pragmatics. *in Maeinborn et al. (2012)* 2487–2425.
- Katzir, Roni. 2007. Structurally-defined alternatives. *Linguistics and Philosophy* 30(6). 669–690.
- Kiparsky, Paul. 1982. Word formation and the lexicon. In F. Ingemann (ed.), *Proceedings of the 1982 Mid-America Linguistic Conference*, 3–32. University of Kansas, Lawrence, KS.

References IV

- Krifka, Manfred. 1989. Nominal reference, temporal constitution and quantification in event semantics. In Renate Bartsch, Johan van Benthem & Peter van Emde Boas (eds.), *Semantics and contextual expression*, 75–115. Dordrecht, Netherlands: Foris.
- Matsumoto, Yo. 1995. The conversational condition on horn scales. *Linguistics and philosophy* 18(1). 21–60.
- McCawley, J.D. 1978. Conversational implicature and the lexicon. In Peter Cole (ed.), *Syntax and semantics, volume 9: Pragmatics*, 245–259. Academic Press.
- Swanson, Eric. 2010. Structurally defined alternatives and lexicalizations of xor. *Linguistics and Philosophy* 33(1). 31–36.
- Teodorescu, Viorica Alexandra. 2009. *Modification in the noun phrase: the syntax, semantics, and pragmatics of adjectives and superlatives*. University of Texas at Austin dissertation.
- van Rooij, Robert. 2003. Negative polarity items in questions: strength as relevance. *Journal of Semantics* 20. 239–73.