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

This paper finds cross-linguistic differences in scalar implicatures based on the availability of hyponyms in the language. Horn (1984) theorizes that *finger* narrows in opposition to its hyponym, *thumb*, based on the maxims of Quantity and Manner. Thus, when a listener hears *finger*, they are likely to conclude *not thumb*, since thumb is just as complex (Manner) and is more informative (Quantity). This theory correctly predicts that *toe* should not narrow in opposition of *big toe*, since *big toe* is more complex. Horn (2000: 122) conjectures that "if the colloquial language replaced its *thumb* with the polymorphous *pollex* (the Latin and scientific term for both 'thumb' and 'big toe') the asymmetry [between *finger* and *toe*] would instantly vanish." Geurts (2011) emphasizes that Horn's subtle caveat in "colloquial usage" is crucial; it's not enough for the more specific term to exist; it must also be "colloquial". Spanish contains a single word *pulgar* (derived from *pollex*) that can be used for 'thumb' and 'big toe', and it is perceived as less common by speakers. We can therefore test Geurts's prediction directly.

To assess the importance of being "colloquial", we conducted production and comprehension studies in English and Spanish on three fingers (thumb, ring finger, pinky) and the corresponding toes. The production studies asked participants to fill in the blank in "She has a tattoo on _____", given an image of a digit with a tattoo. The comprehension study (a forced-choice task) asked participants to choose between two images, selecting the one that a speaker is probably talking about when saying "She has a tattoo on her finger/toe".

As predicted, participants strongly preferred an image of a ring finger over a thumb for the sentence "She has a tattoo on her finger" in the English comprehension task. This finding is in line with the behavior in the production task, where participants unanimously used *thumb* rather than *finger* (Figure 1). In contrast, there was no statistically significant preference for the thumb given the Spanish equivalent of "She has a tattoo on her finger" (using *dedo* `finger/toe'). Assuming *pulgar* is a single word in Spanish, this result supports Geurts's idea that being "colloquial" matters, and complexity is not all there is to it.

Moreover, a purely complexity-based theory should also predict a *finger not pinky* implicature, since 'pinky' is a single-word alternative, just like thumb. But we find no such implicature; why? Horn argues that *thumb* is a "viable lexicalized alternative" and *pinky* is not. But what exactly makes *pinky* non-viable? The single-word *pinky* (Spanish *meñique*) was the most-used utterance in the production study. But *finger* was used as well, roughly as often as with the ring finger, so the lack of implicature tracks speaker production probabilities. Furthermore, we found an implicature from *toe* to 'not pinky toe' in both English and Spanish. This implicature is in line with speaker production probabilities (to describe the pinky toe, speakers tend to use a specific description) but mysterious from the complexity perspective.

Overall, our findings show that listeners are Bayesian, with good models of speaker production probability. To illustrate this, empirical results are plotted in Figure 3 against predictions from two Rational Speech Act models (e.g. Goodman & Stuhlmüller, 2013) – one that is complexity-based and one where the speaker is defined according to our production results. The production-based model ($R^2 = 76.3$) seriously outperforms the complexity-based model ($R^2 = 30.6$). So listeners reason based which alternatives speakers will choose. It remains somewhat mysterious what drives speaker behavior, though, if not complexity alone.

References

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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.
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Figure 1. Production results for thumb and ring finger in English and Spanish.

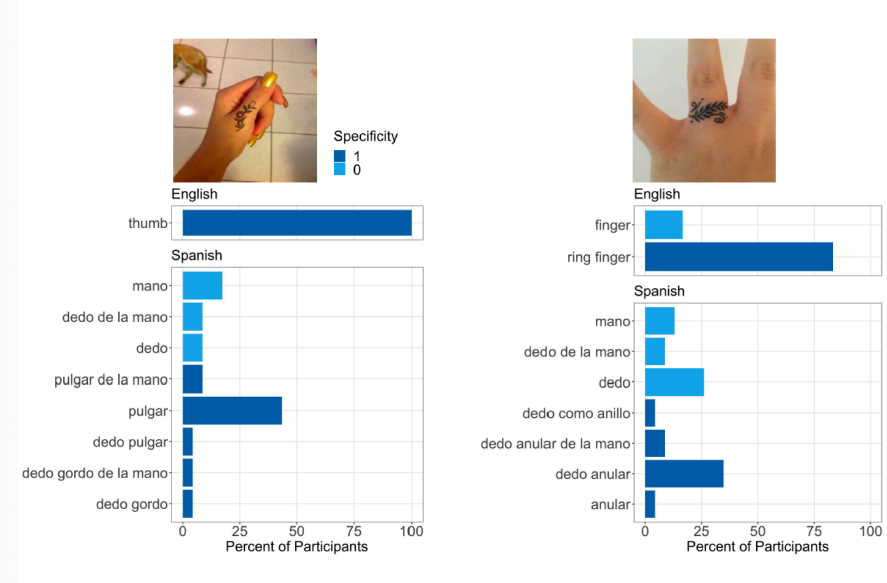
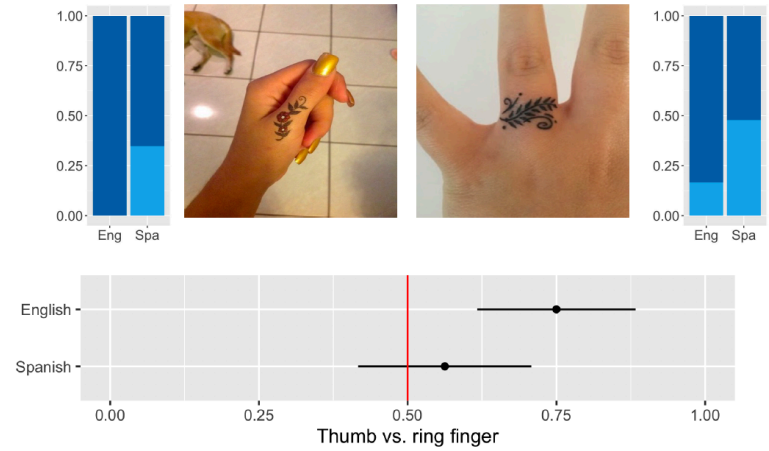


Figure 2. Comprehension results for thumb, ring finger + summarized production results.



"She has a tattoo on her finger."

Figure 3. Forced choice task results vs. model probabilities for two models.