The added informativity of ambiguous utterances

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a feature, not a bug

Traditionally, linguists have treated **ambiguity** as **a bug in the communication system**, something to be avoided or explained away (Grice, 1975; Chomsky, 2002).

More recent research has begun to take notice of the **efficiency** ambiguity affords to us: by relying on context to fill in missing information, we can **reuse lightweight bits of language** rather than fully specifying the intended message (Levinson, 2000; Piantadosi et al., 2012; Wasow, 2015).

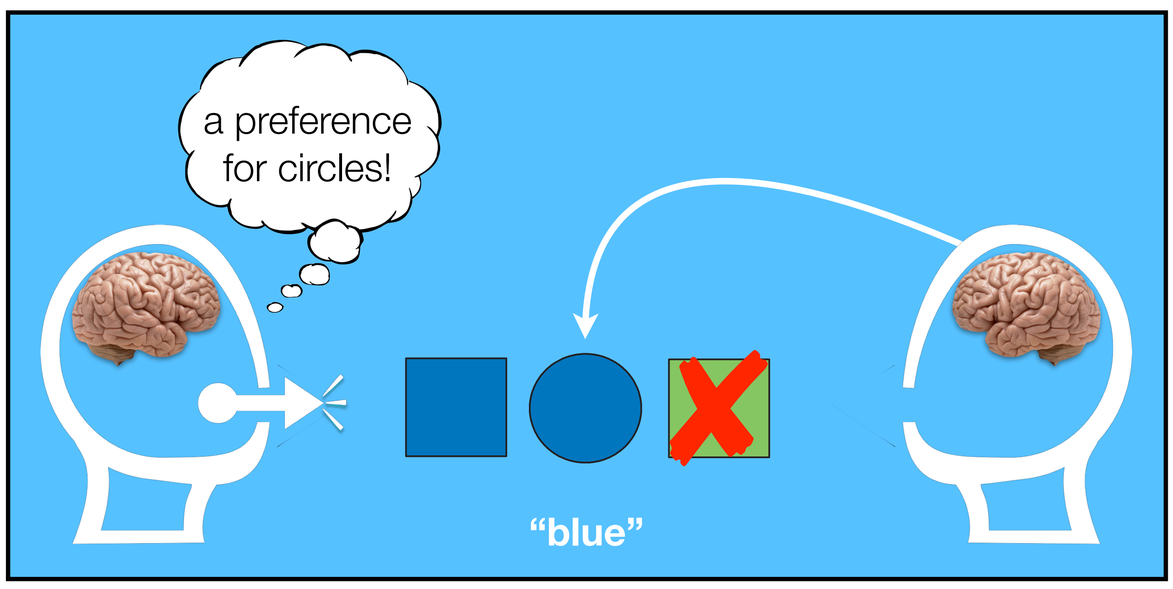
Viewed in this way, ambiguity serves as a feature, not a bug, of an **efficient communication system**.

The current work identifies **an additional benefit** in using ambiguous language: the **extra information** we gain from observing how our listeners resolve ambiguity.

We propose that **language users learn about each other's private knowledge by observing how they resolve ambiguity**.

simple reference games

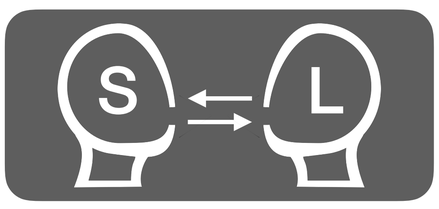
If language does not do the job of specifying the information necessary for full interpretation, then listeners are left to draw on their opinions, beliefs, and preferences to fill in the gaps; **by observing how listeners fill those gaps, speakers learn about the opinions, beliefs, and preferences of listeners**.



a computational model

Rational **S**peech **A**ct

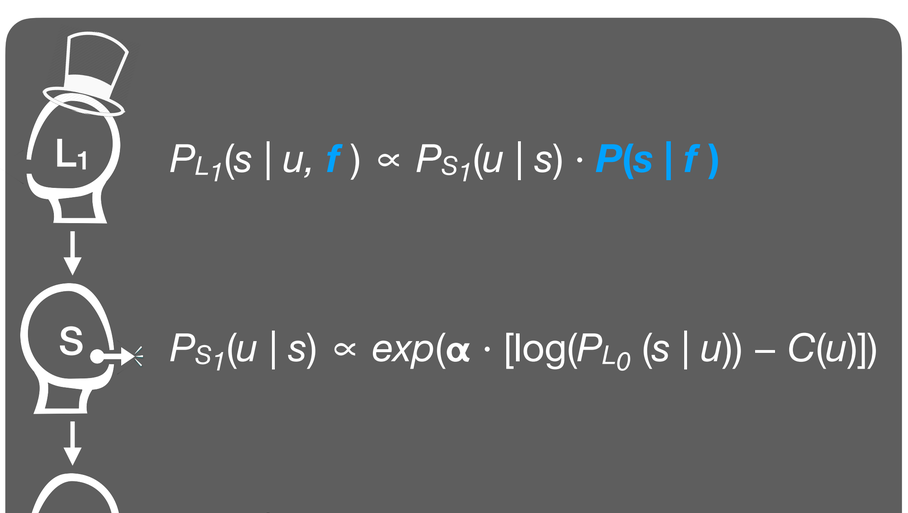
speaker observes state, chooses utterance
listener hears utterance, infers state

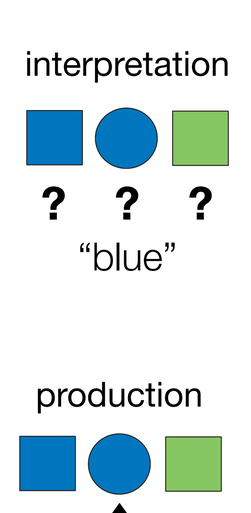


speaker and listener coordinate:
utterance + interpretation that maximizes the probability of correctly resolving the **Q**uestion-**U**nder-**D**iscussion

(Frank & Goodman, 2012; Goodman & Frank, 2016)

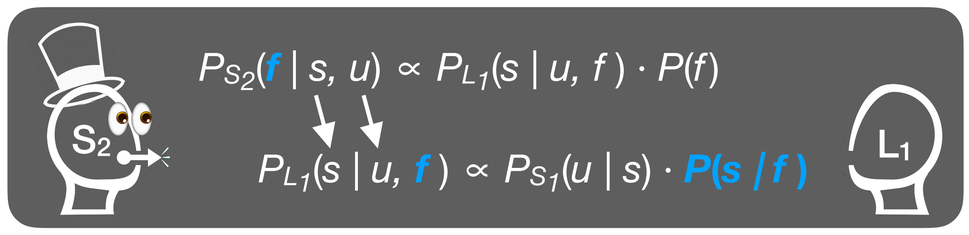
introducing preferences



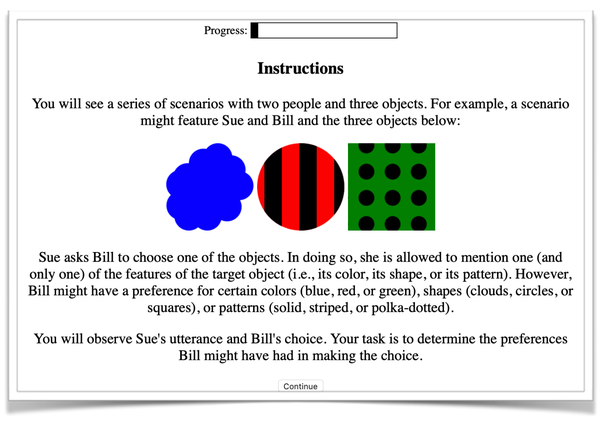


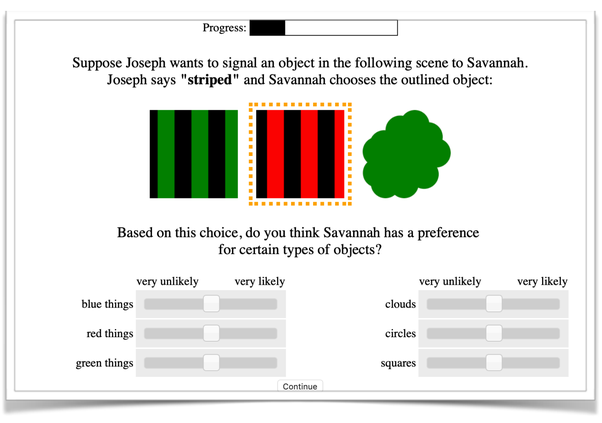
inferring preferences

Speaker **observes** listener's **object choice; infers preferences** that led to choice.



experiment 1

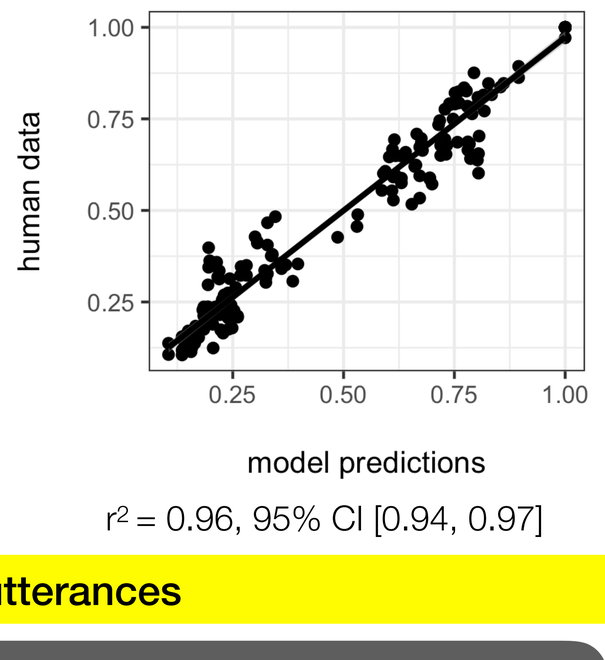




Some text explaining the experiment

More text….

Preference strength (P(s|f)) fit to participant data

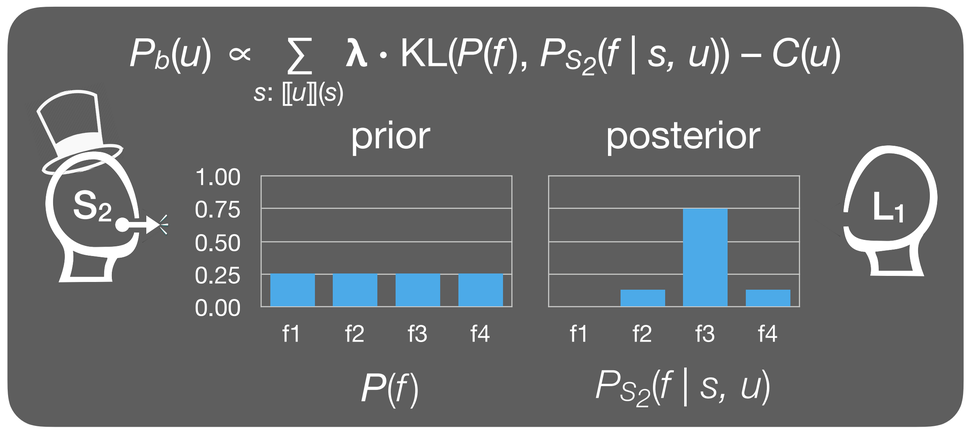


$r^2 = 0.96$, 95% CI [0.94, 0.97]

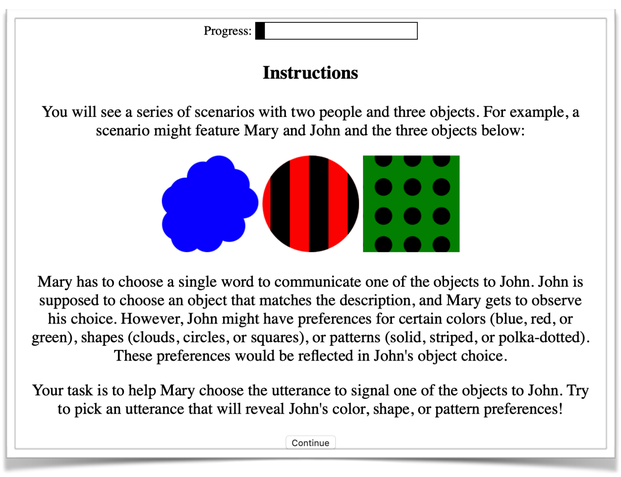
choosing utterances

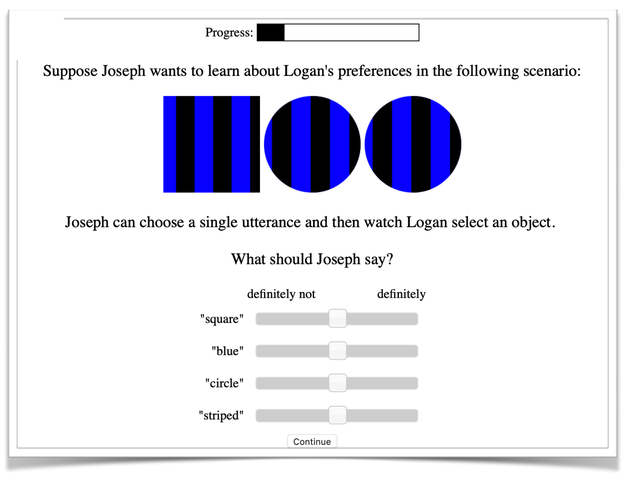
Useful utterances **maximize information gain.**

They maximize the **difference between** the **prior** and the **posterior**.



experiment 2

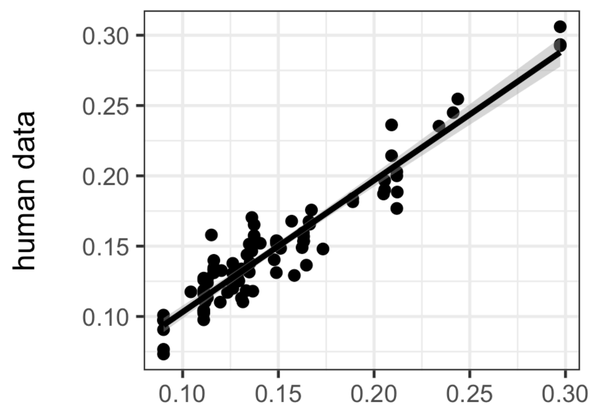




Some text explaining the experiment

More text….

Lambda fit to participant data



$r^2 = 0.91$, 95% CI [0.84, 0.95]

References: