

Same Statement, Different Meaning: Interpreting Generics by Comparison

Xiuyuan Flora Zhang & Daniel Yurovsky
The Department of Psychology, University of Chicago



Background

Utterances like ‘birds lay eggs’ and ‘mosquitoes carry West Nile’ are examples of generic statements. Generic statements can be seen as composed of:

a category + a given feature

Whether one accepts a generic statement is not based on a fixed threshold of the feature’s prevalence rate within a category, e.g. there is less than 50% of birds that lay eggs and less than 10% of mosquitoes that carry West Nile. Following Tessler and Goodman’s work on generalization using generic statements (Tessler & Goodman, 2018), we look at the effect different comparison sets has on participants’ prevalence rate estimation for a novel category and a given feature.

Hypothesis

Using Bayesian inference to estimate the prevalence rate of a feature given a category,

$$\begin{aligned} P(\text{Feature } f_i | \text{Category } y_j) &\gg P(\text{Feature } f_i) \\ &\gtrapprox \sum_{x_i \in X} P(\text{Feature } f_i | X = x_i) P(X = x_i) \\ &\gtrapprox \sum_{y_j \in Y} P(\text{Feature } f_i | Y = y_j) P(Y = y_j) \end{aligned}$$

where $Y \subset X$.

We hypothesize that the prevalence rate of a feature given a novel category is greater than the prevalence rate of the same feature given a comparison set,

$$\begin{aligned} P(\text{Feature } f_i | \text{Novel Category}) &\gg P(\text{Feature } f_i) \\ &\gtrapprox P(\text{Feature } f_i | Y = y_j) P(Y = y_j) \end{aligned}$$

Methods

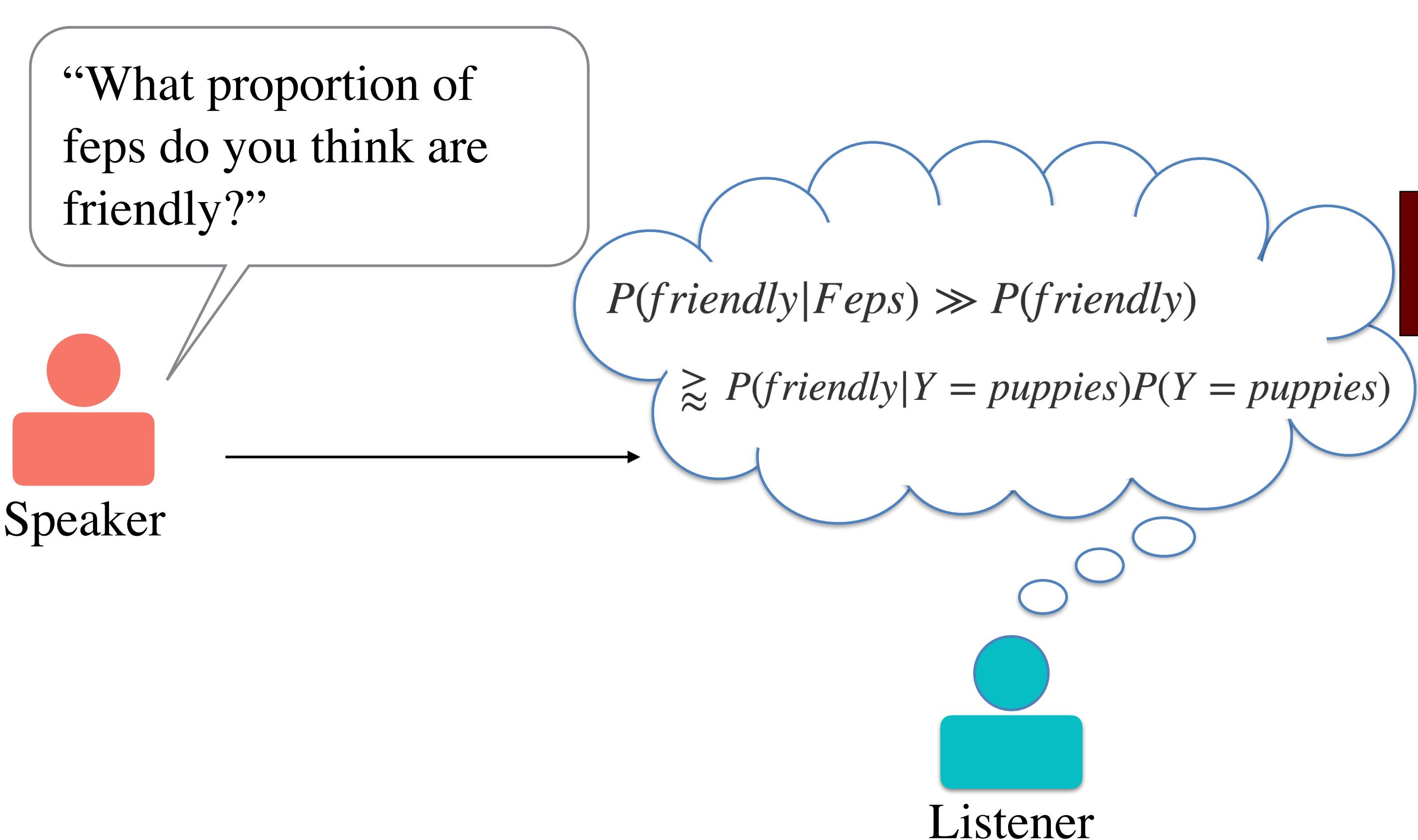
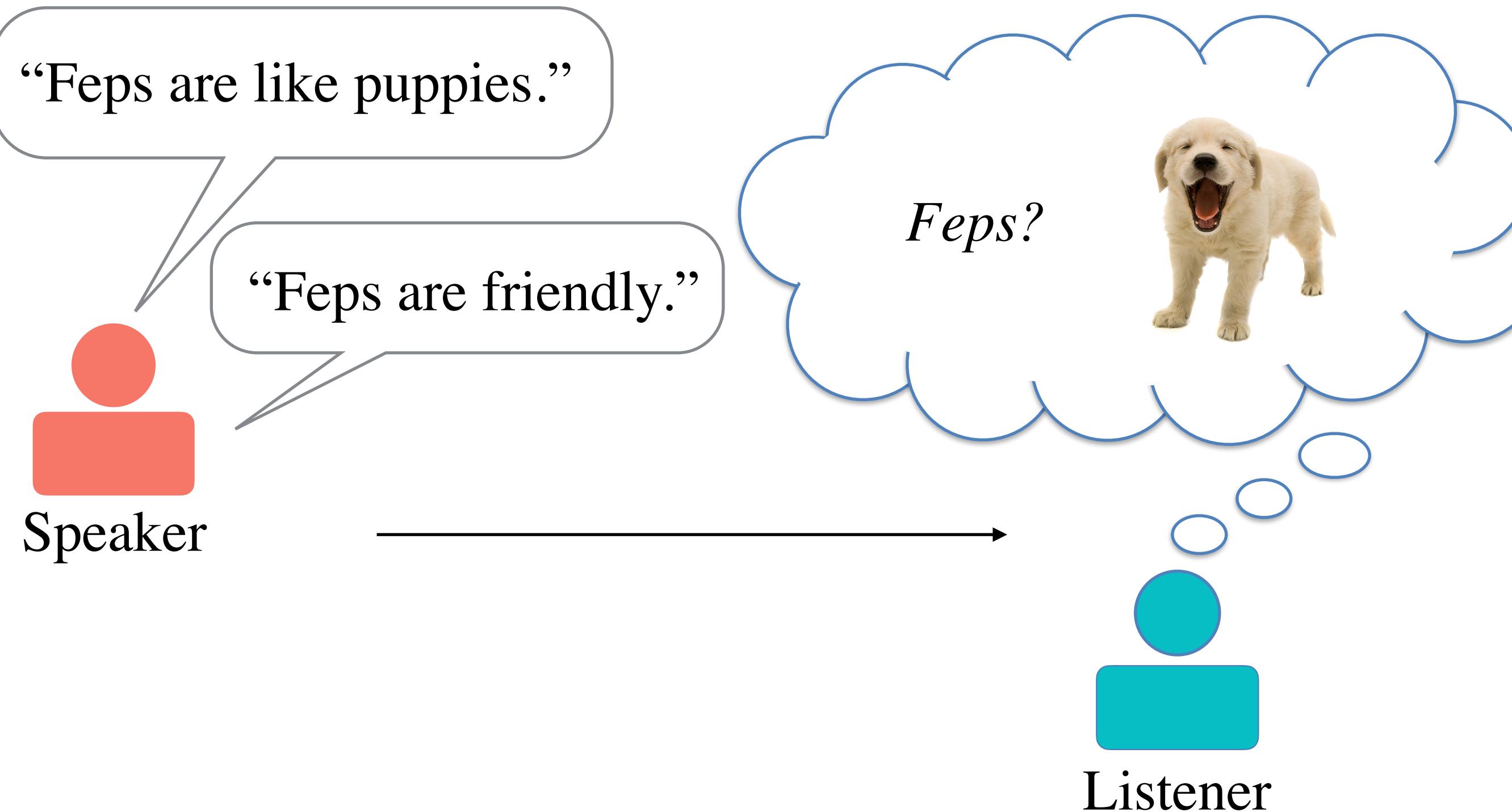
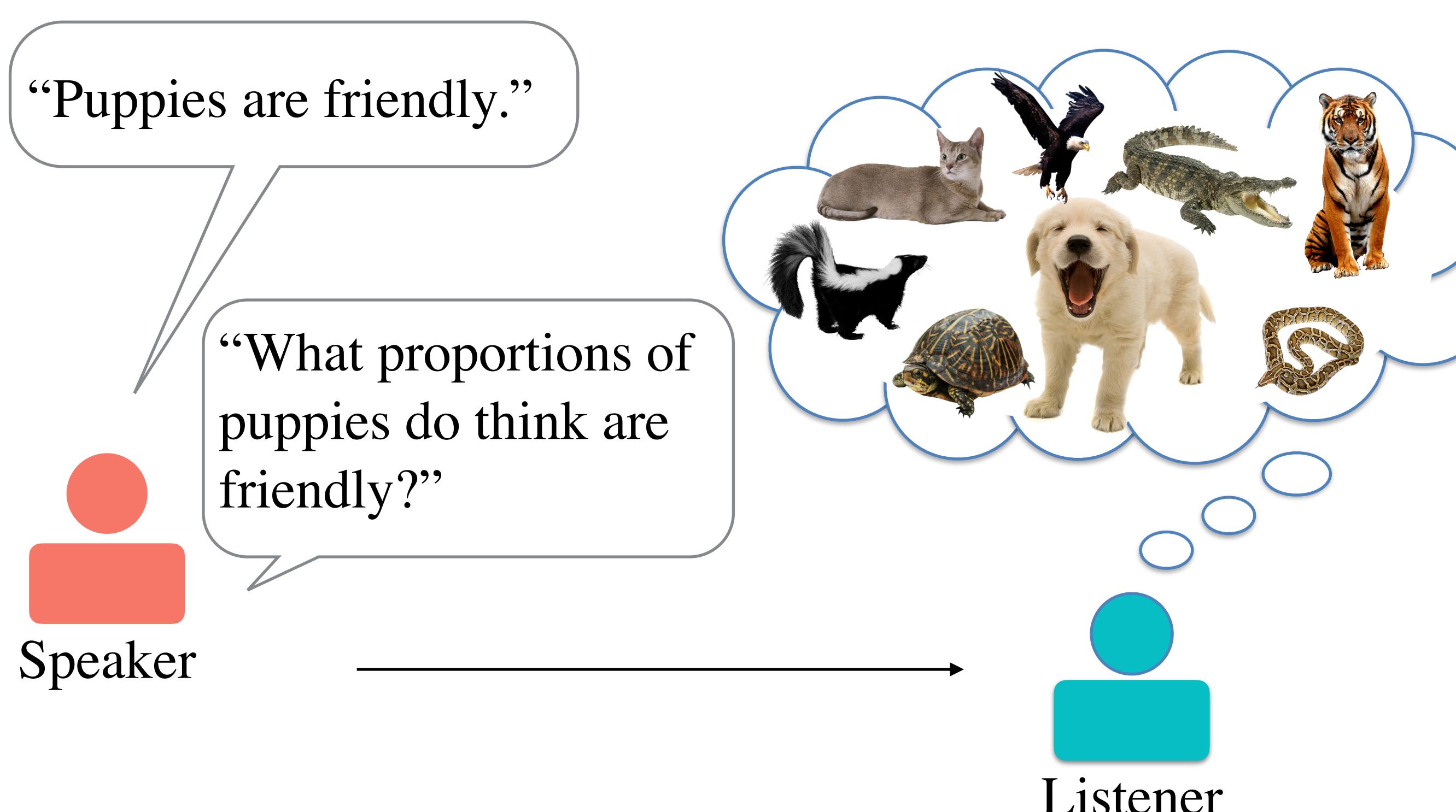
Study 1. Participants ($n = 150$) were recruited from Amazon Mechanical Turk and asked to (1) evaluate the truth condition of generic statements about a set of familiar categories and features listed in the table below and (2) provide a prevalence rate estimation (e.g., what proportions of puppies are friendly?).

Study 2. Another 150 participants were recruited. They were first given a novel category and its paired comparison category, and then asked to provide a prevalence rate estimation on novel categories.

Feature	Alternative Comparison Categories	Novel Category
friendly	Puppies (H), Goats (M), Squirrels (L)	Feps
tasty	Pizzas (H), Fruits (M), Vegetables (L)	Kobas
heavy	Trucks (H), Stones (M), Bikes (L)	Dands

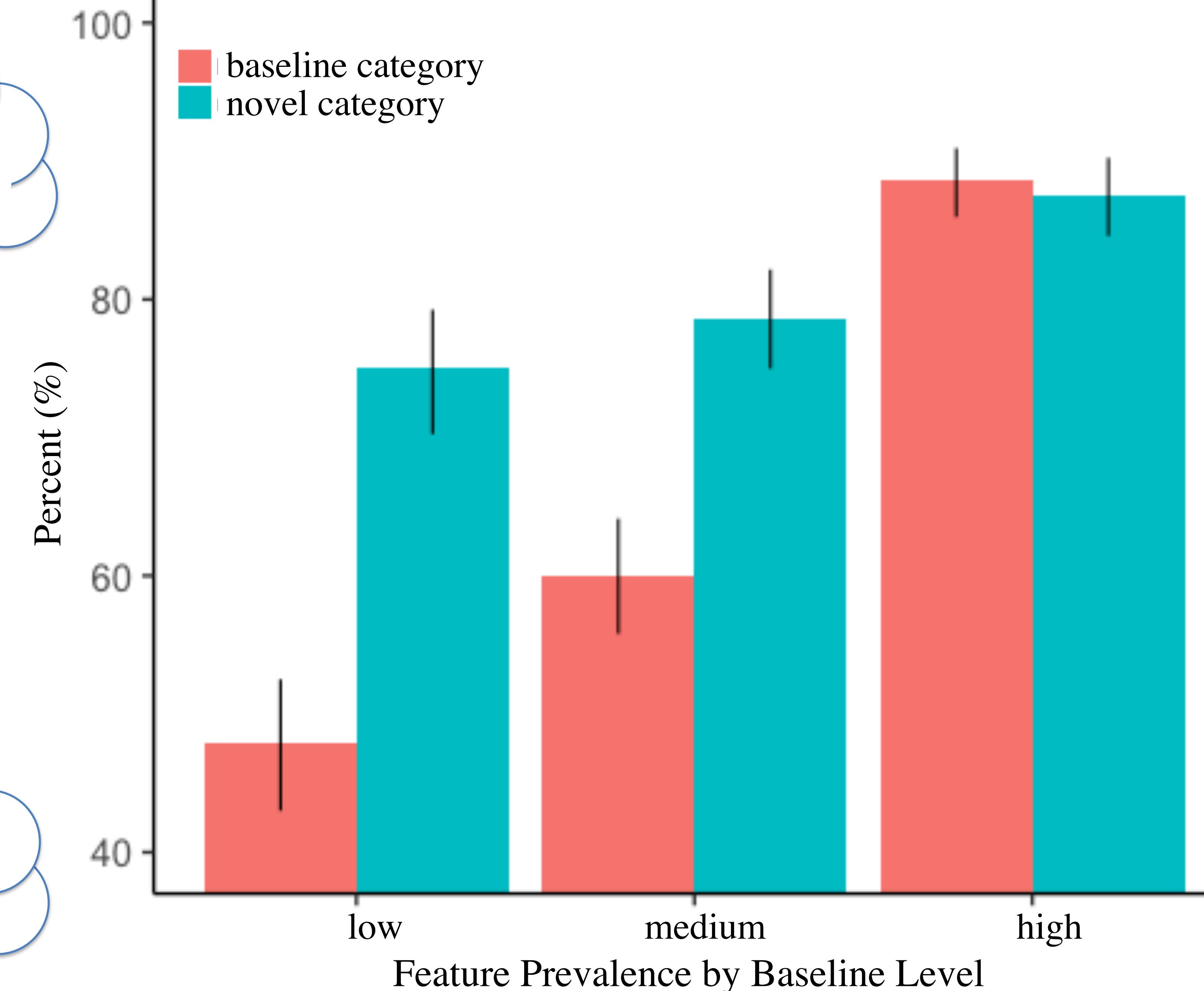
(H = high prevalence, M = medium prevalence, L = low prevalence)

Task



Results

Mean Feature Prevalence Estimation



Conclusion

- Different comparison sets lead participants to draw different inferences about the same novel category.
- People use background knowledge to draw inferences when they learn about new categories.
- Speakers may be unlikely to specify the comparison set as they did here. If speakers and listeners rely on different implicit comparison sets, it may lead to asymmetric beliefs about a novel category.

Future Direction

- How might demographic backgrounds, e.g. gender, age, and geography, license different implicit comparison set and affect inferences of a novel generic?
- Working to develop a kid-friendly version of this task to evaluate the effect of comparison sets and kids’ inference about generics.