Learning Novel Categories through Background Knowledge Using Generic Statements

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Hypothesis

In a speaker-listner interaction scenario, where the speaker utters a true generic statement 'C(category) are F(feature),' we hypothesize that, when C is a novel category, the listner uses her own background knowledge to infer the prevalence rate of feature F in category C upon hearing the generic. In our current paradigm, we provide participants a familiar category $C_{familiar}$, $C_{familiar}$ serving as background knowledge.

Conditions

The table below includes our feature selection, its corresponding comparison categories (chosen based on our estimate of their low, medium, and high prevalence rate) and 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

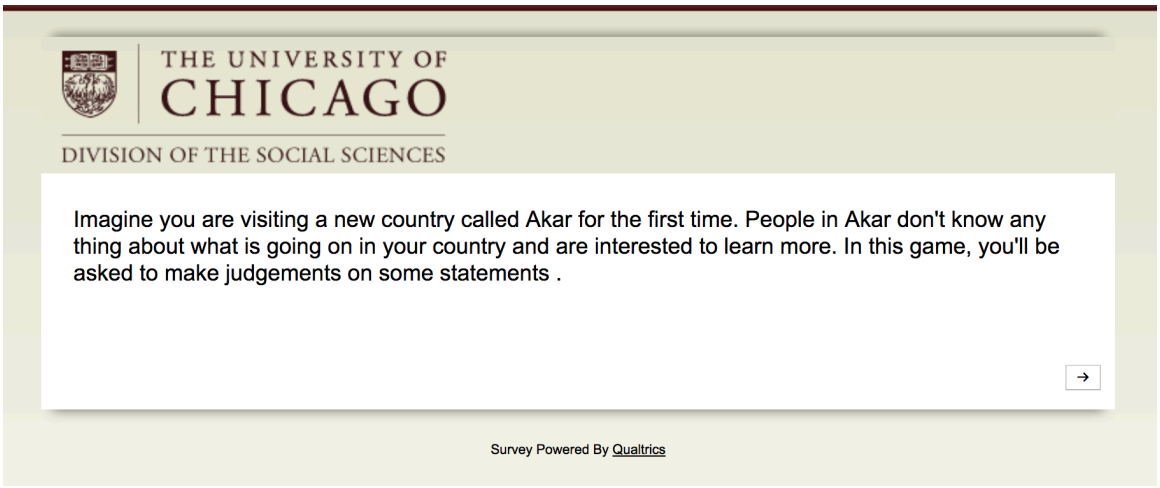
(H = high prevalence, M = medium prevalence, L = low prevalence)

Setup

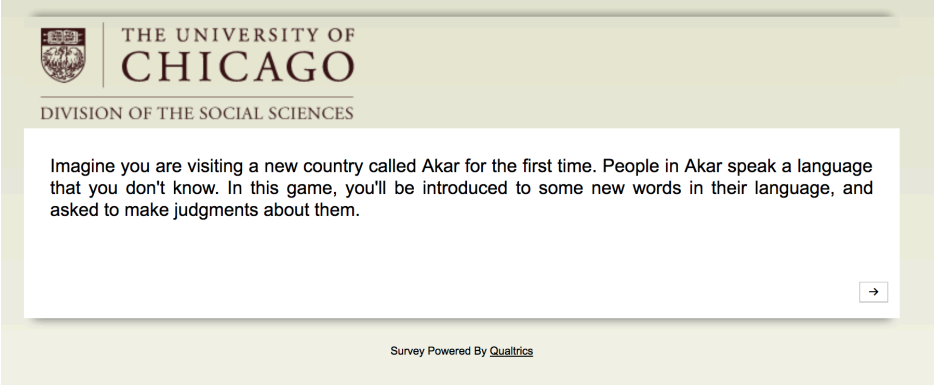
We run three separate survey studies on Amazon Mechanical Turk. All three surveys provide participants a narrative that introduces them to an imaginary country, Akar. Sample questions from all three surveys are provided in the section below. The first survey recorded participants's evaluation of a given generic statement as True or False as well as their prevalence rate estimates for all abovementioned 9 categories (3 per feature.) The second survey introduced a novel category C_{novel} along with a familiar comparison category $C_{familiar}$, then asked participants to estimate the prevalence rate of the feature F in novel category C_{novel}. The third survey is similar to the second, with the difference that we only stated 'C_{novel} are like $C_{familiar}$.' before asking participants to estimate the prevalance rate of feature F for C_{novel}. This survey serves as a sanity check, checking whether participants treat C_{novel} as equivalent to $C_{familiar}$ and provide a smiliar rather than higher estimate for C_{novel} comparing to estimates for $C_{familiar}$.

Below are two examples of the MTurk survey that we run:

1. Getting the baseline prevalence rate for familiar comparison categories.



2. Introducing a novel category with a generic statement, provding participants familiar comparison categories.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Imagine you are visiting a new country called Akar for the first time. People in Akar speak a language that you don't know. In this game, you'll be introduced to some new words in their language, and asked to make judgments about them.
Survey Powered By Qualtrics


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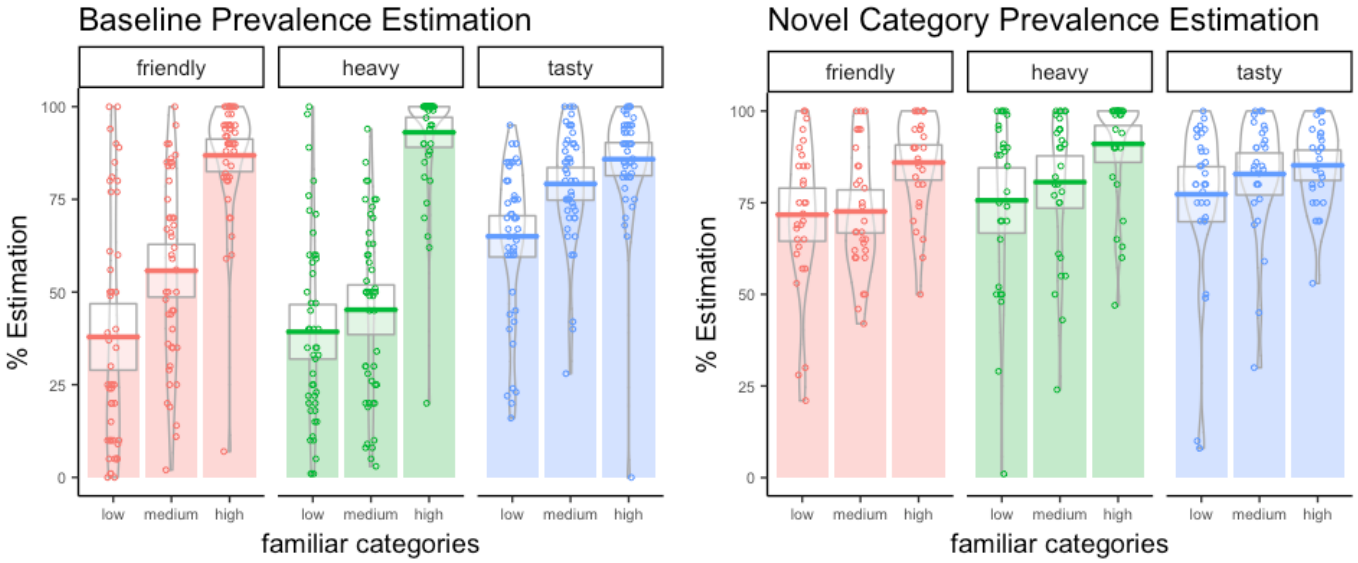
The Akarians tell you that feps are like goats.
One of the Akarians says that: "feps are friendly."
What percent of feps do you think are friendly?
You can drag the slider bar below to show your results.
0%
100%
Survey Powered By Qualtrics

Results


Baseline Prevalence Estimation
friendly
heavy
tasty
% Estimation
100
75
50
25
0
low
medium
high
familiar categories
Novel Category Prevalence Estimation
friendly
heavy
tasty
% Estimation
familiar categories