

Sorites Prior Elicitation 2C: 3 domains

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Experiment Design

There were 3 domains (height, price, and age) corresponding to 3 adjectives (tall, expensive, old). For each domain, there were 3 items (height: building, tree, mountain; price: watch, laptop, coffee maker; age: New Yorker, college student, new parent).

For height items, there were 20 bins per item. For age items, there were 18 bins per item. For prices, the number of bins varied (we were attempting to accommodate the tails of the distributions, based on pilot prior elicitation).

The width of the bins (e.g. 1000 for “A mountain with a height between 1000 and 2000 ft”) varied according to the type of item. Ages were always in bins of width 5.

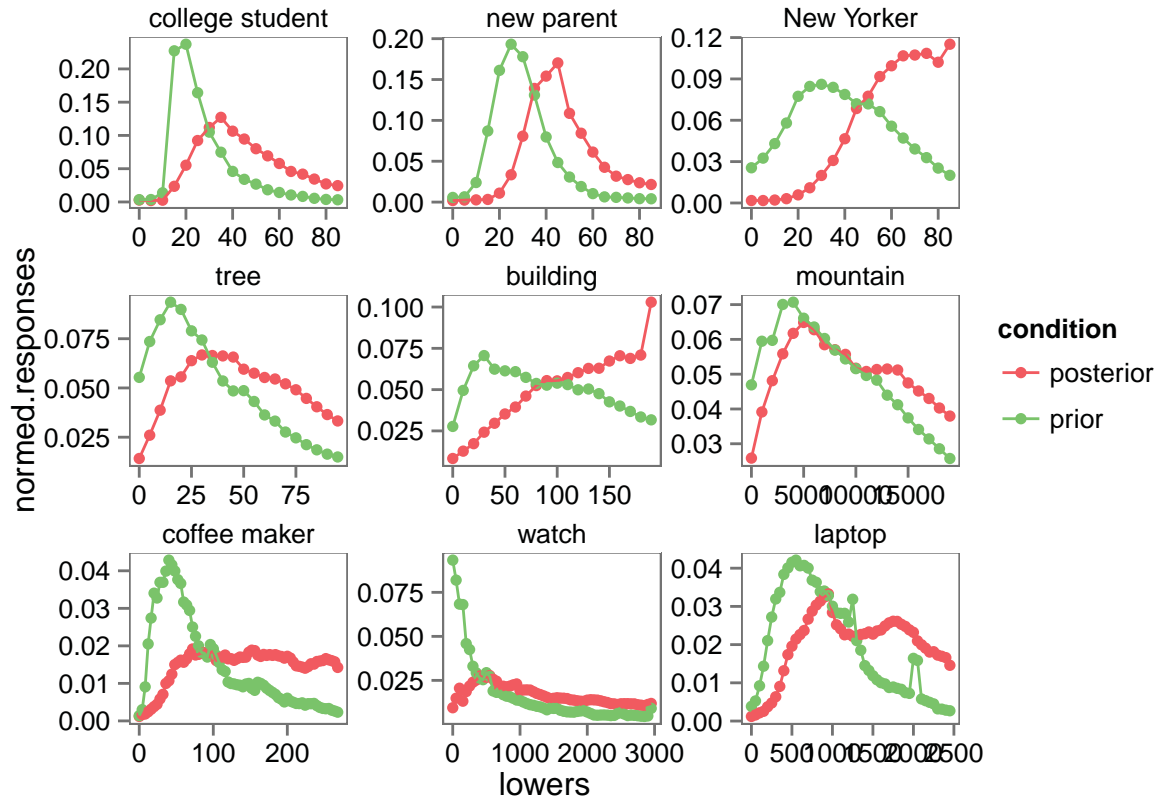
##	item	domain	bin.width	nbins
## 1	college student	age	5	18
## 2	new parent	age	5	18
## 3	New Yorker	age	5	18
## 4	tree	height	5	20
## 5	building	height	10	20
## 6	mountain	height	1000	20
## 7	coffee maker	price	4	68
## 8	watch	price	50	60
## 9	laptop	price	50	50

We had prior (no utterance) and posterior (someone says, “that [[item]] is [[adjective]]”) conditions. Prior/posterior and domain were varied between Ss. There were at least 36 participants in each condition.

##	domain	condition	N
## 1	age	posterior	58
## 2	age	prior	78
## 3	height	posterior	49
## 4	height	prior	59
## 5	price	posterior	40
## 6	price	prior	36

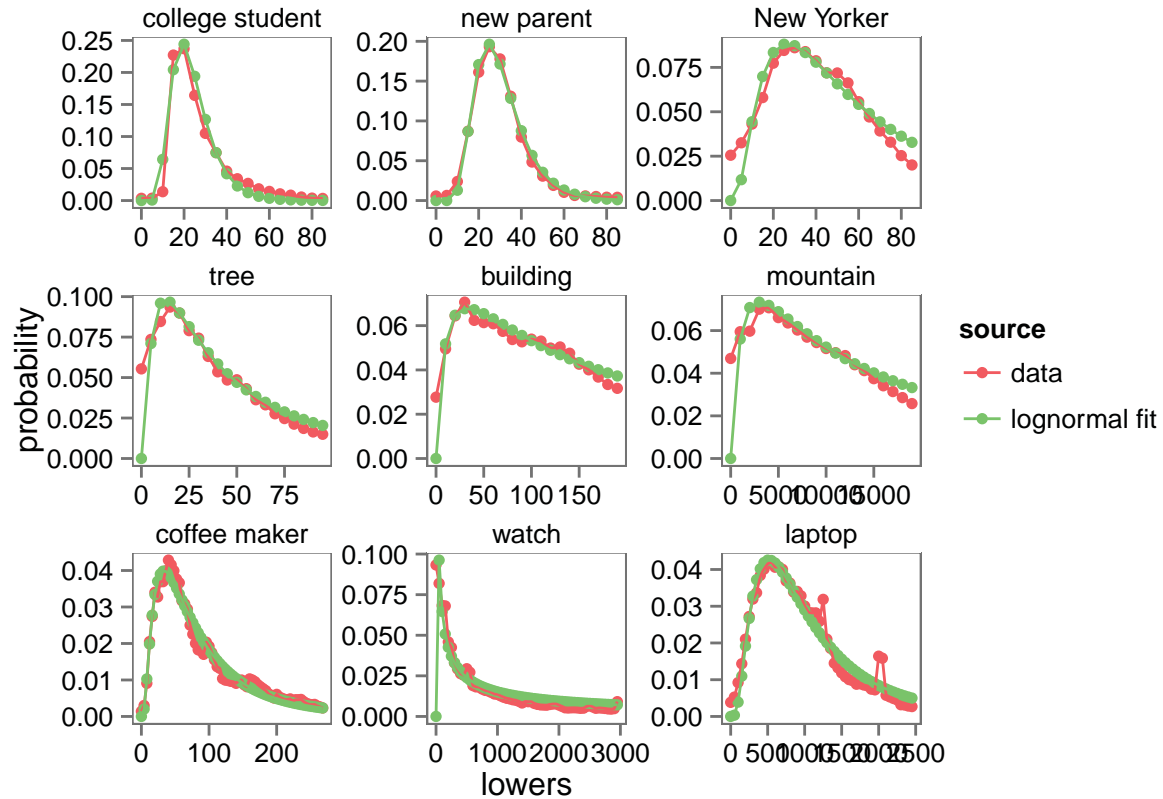
Empirical Priors and Posteriors

We normalize each participants response to each item to get an estimate of their discrete probability distribution for that item.



Fit to Log-normal curve

For each prior distribution, we fit a log-normal curve. The fit is very good, except for watches, which are too left-skewed (because of the bins we asked about in an attempt to get more of the tail).



We plug the best-fit log-normal parameters into the adjectives model as the priors for the items.

##	item	mu	sig
## 1	college student	2.95	0.394
## 2	new parent	3.20	0.385
## 3	New Yorker	3.28	0.830
## 4	tree	2.53	1.146
## 5	building	3.49	1.612
## 6	mountain	7.99	1.479
## 7	coffee maker	3.51	0.871
## 8	watch	-11.19	5.184
## 9	laptop	6.25	0.752

Adjectives Model vs. Empirical Posterior

We graph the posterior predictions of the model against the posterior data from this experiment.

We also get predictions from this model for sorites, though we have no experimental data to test this against for the age and height domains.