Sorites Data Summary

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Wording used in sorites experiments

Table 1: Sorites variations

id	date	inductive phrasing	N
00	2013 August 27 7am	relative	30
01	2013 August 28 12pm	relative	50
07a	2014 January 31 7am	both*	10
07b	2014 February 5 5am	both*	60
07c	2014 February 6 5am	both	50
10	2014 April 23 4am	conditional	30
11	2015 June 5 2pm	relative	30

Possible phrasings of inductive premise:

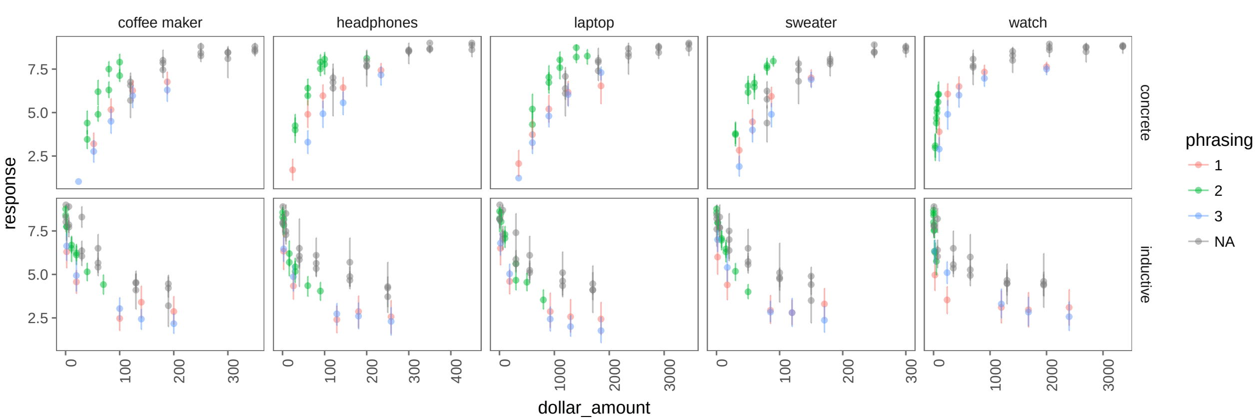
- relative: "An ITEM that costs $EPS less than an expensive ITEM is also expensive."
- conditional: "If an ITEM is expensive, then another ITEM that costs $EPS less is also expensive."

Consistent across all experiments:

- Concrete premise: "An ITEM that costs $VAL is expensive."
- Prompt: "Please indicate how much you agree with the above statement."
- Left (lower) label of likert scale: "Completely disagree""
- Right (higher) label of likert scale: "Completely agree""

*In experiments 7a and 7b, phrasing was randomized between participants (either relative or conditional), but I did not record which phrasing was used for which participant

Results of sorites experiments



Priors experiments

Give a number

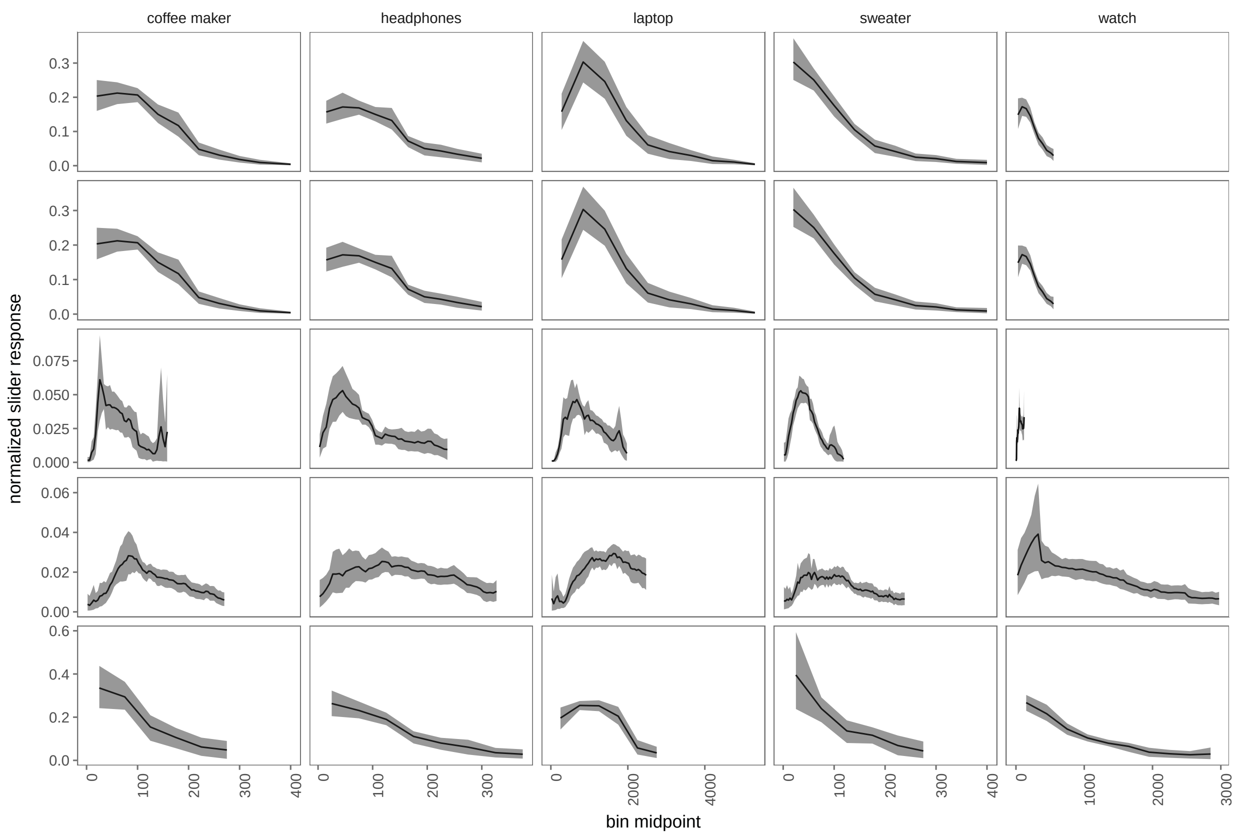
I don't know Justine's exact phrasing for this, but participants were asked, for each item, a possible price for that item.

Bins

Here are the instructions participants got in all of the prior experiments:

> In each scenario, someone has just bought an item. Please give your best estimate of the price of the item. You will do this by rating how likely you think it is that the actual price is within each of NBINS different ranges.
>
> NAME bought a new *ITEM*.
>
> Please rate how likely it is that the cost of the *ITEM* is within each of the following ranges.

There was a "split" condition (10 participants), where participants saw one bin at a time. In all other versions, the sliders for each item were shown together. We did not collect enough data in the split condition to normalize responses.

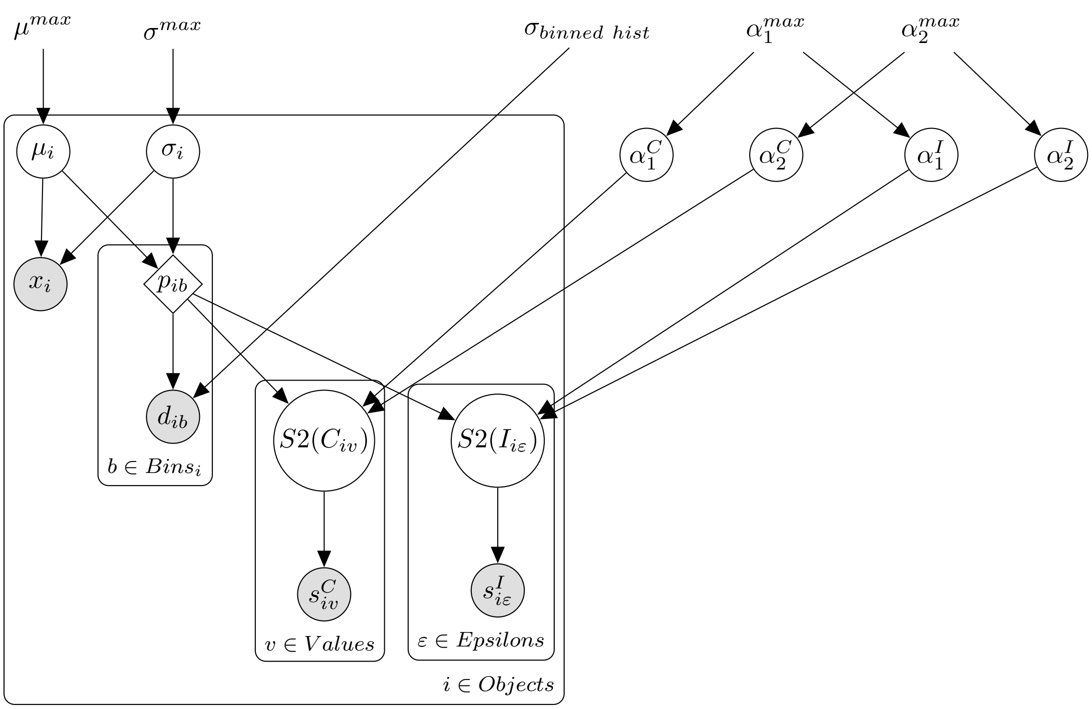


Model

Definitions

- w_i := width of histogram bins for item i
- x_i := sample in give a number trial
- p_{ib} := true probability of bin b for item i
- d_{ib} := slider rating for bin b for item i
- $S2(I_{i\varepsilon})$:= RSA S2(L1(expensive) + ε) for item i
- $S2(C_{iv})$:= RSA S2(expensive) for item i
- $s^I_{i\varepsilon}$:= binarization of likert rating for inductive premise for item i and epsilon ε
- s^C_{iv} := binarization of likert rating for concrete premise for item i and value v
- α^I_2 := speaker rationality for S1 for inductive premise

Diagram



Distributions/Functions/Values:

Experiment design parameters:

- $Objects$
- $Bins$
- $Epsilons$
- $Values$

Assumed model parameters:

- $\mu^{max} = ??$
- $\sigma^{max} = ??$

- $\sigma_{binned\ hist} = ??$
- $\alpha_1^{max} = 20$
- $\alpha_2^{max} = 5$

Inferred Latent variables:

- $\mu_i \sim \mathcal{U}\{0, \mu^{max}\}$
- $\sigma_i \sim \mathcal{U}\{0, \sigma^{max}\}$
- $\alpha_1^I \sim \mathcal{U}\{0, \alpha_1^{max}\}$
- $\alpha_2^I \sim \mathcal{U}\{0, \alpha_2^{max}\}$
- $\alpha_1^C \sim \mathcal{U}\{0, \alpha_1^{max}\}$
- $\alpha_2^C \sim \mathcal{U}\{0, \alpha_2^{max}\}$
- $logit(p_{ib}) = \int_{LB_{ib}}^{UB_{ib}} \varphi(ln(t)|\mu_i, \sigma_i)dt$

Observations from experimental data:

- $logit(d_{ib}) \sim \mathcal{N}(logit(p_{ib}), \sigma_{binned\ hist})$