

# Supplemental Material

- 1) Sample + partial distribution technique secondary analysis
- 2) Sensitivity analysis to fitting process – sample based elicitation techniques
- 3) Distributions of residuals – Study 2, replication
- 4) Distributions of residuals – Study 3

## 1) Sample + partial distribution technique secondary analysis

In Study 2, we prompted participants to provide subjective probabilities for three intervals to understand the effect of eliciting multiple ranges and to compare the effect of the eliciting the subjective probability of the range associated the mode versus other random ranges that are not associated the most salient value for participants. In the main analysis, we used one interval that conditioned to the mode to fit a beta distribution.

**Guess the Results of a Workplace Survey**

We are interested in how you think mental health affects workers in the tech workplace. Please guess the **proportion of women in the tech industry who feel that mental health affects their work often**.

24 % **Mode**

You guessed that **24%** of women in the tech industry in the US feel that mental health interferes with their work often. To help us understand your prediction better, please answer the question below.

.....

What do you think is the chance (0% ~ 100%) that the proportion of the woman who said mental health interferes their work often fell into the range (**green bar**) between **18%** and **30%**?

0% 18% 30% 100%

85 **First interval conditioned on the mode**

.....

What do you think is the chance (0% ~ 100%) that the proportion of the woman who said mental health interferes their work often fell into the range (**purple bar**) between **40%** and **50%**?

0% 40% 50% 100%

15 % **Second interval**

.....

What do you think is the chance (0% ~ 100%) that the proportion of the woman who said mental health interferes their work often fell into the range (**pink bar**) between **50%** and **60%**?

0% 50% 60% 100%

5 % **Third interval**

.....

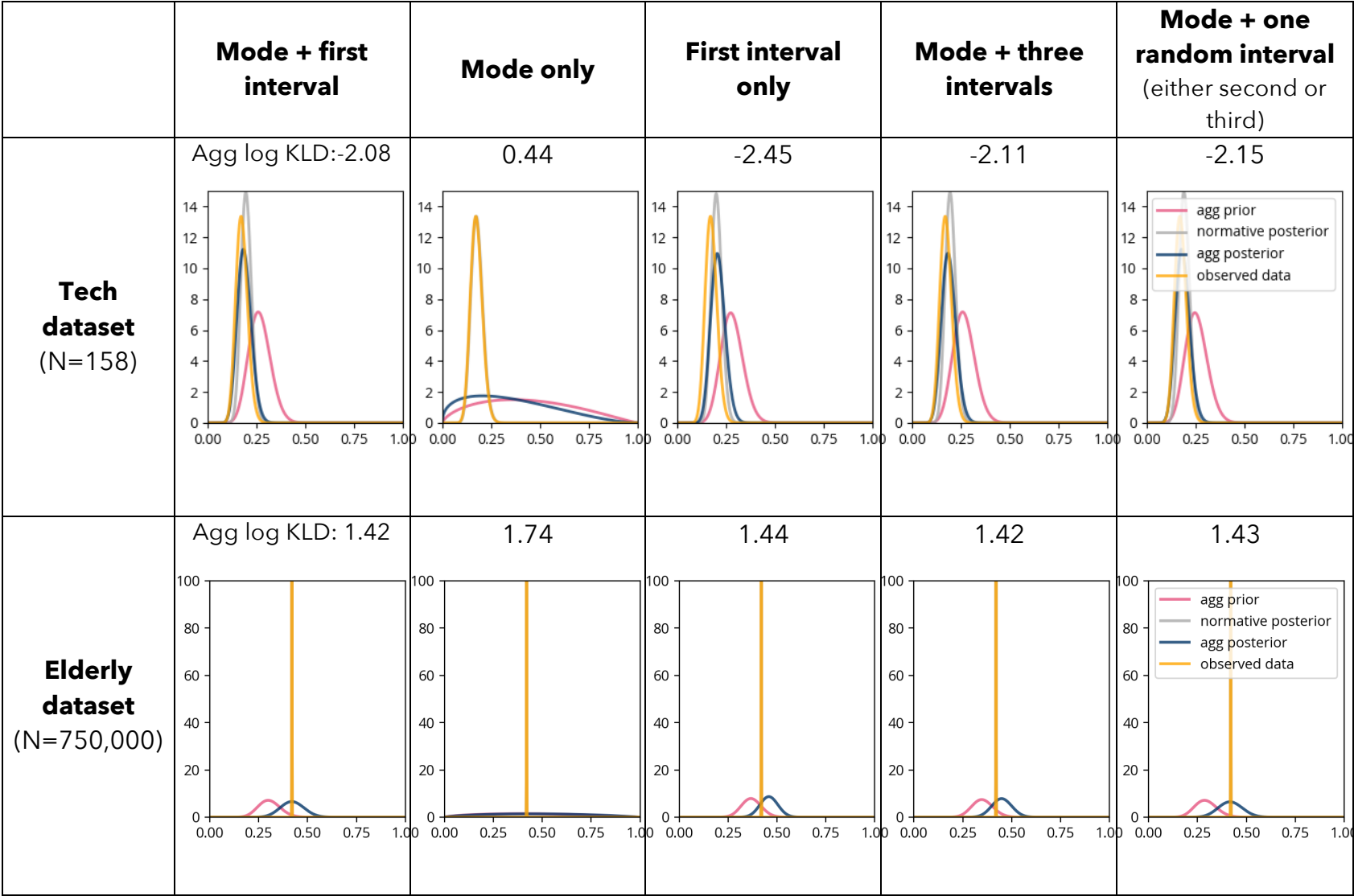
Done

1) Participants were first prompted to provide a prediction (mode).

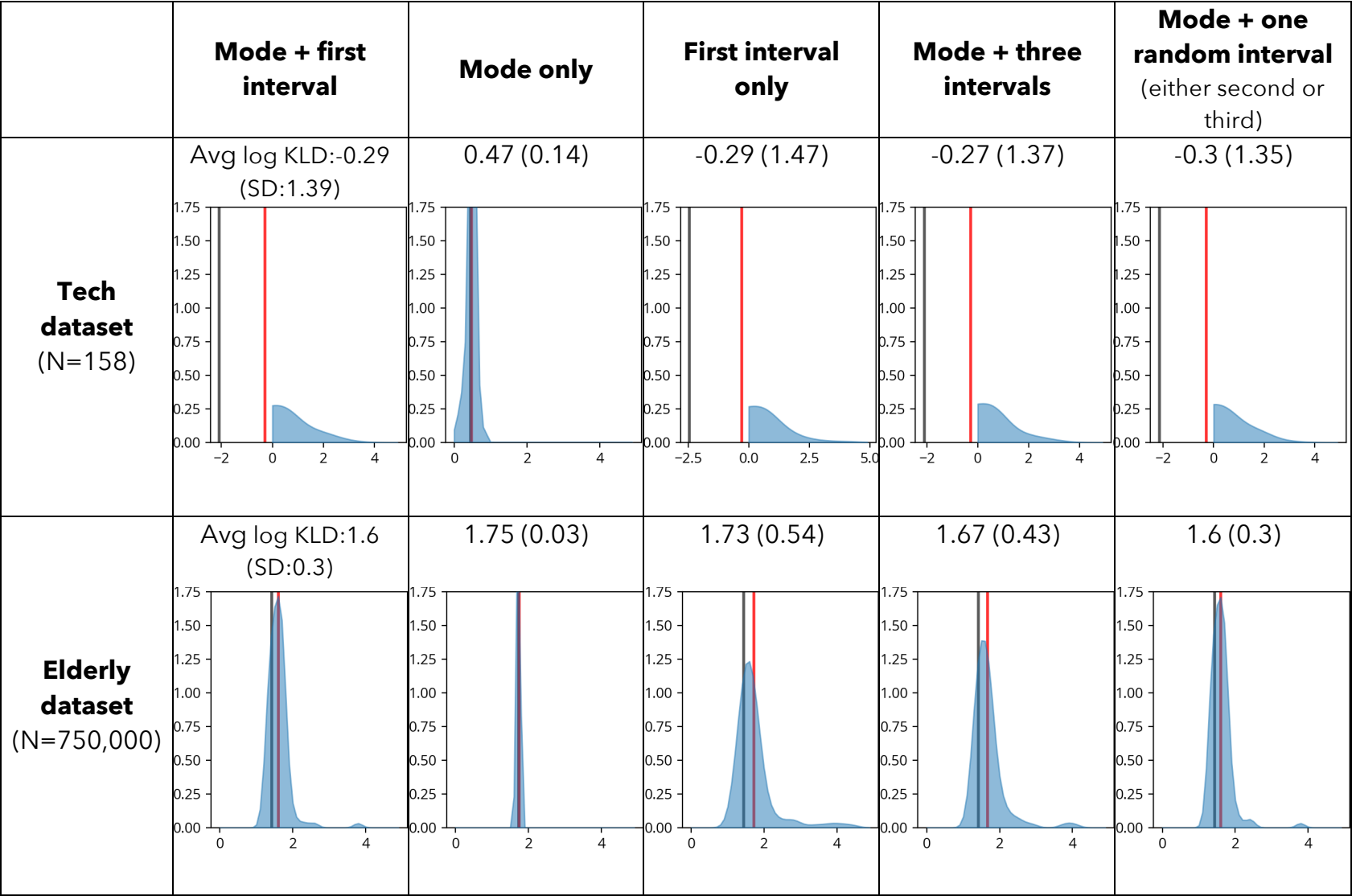
2) Participants were then asked to provide the subjective probability (\$sp\$) that the true proportion falls into the range calculated based on the mode value that they entered ( $[m - m*0.25, m + m*0.25]$ ).

3) We asked for two additional intervals. To assign two ranges for which to elicit the subjective probabilities, we created a list of ranges from 0% to 100% spaced by 10% ([0%-10%, 10%-20% ... 90%-100%]). We chose two ranges randomly among the range that did not overlap with the range associated with the mode.

Aggregate level



Individual Level

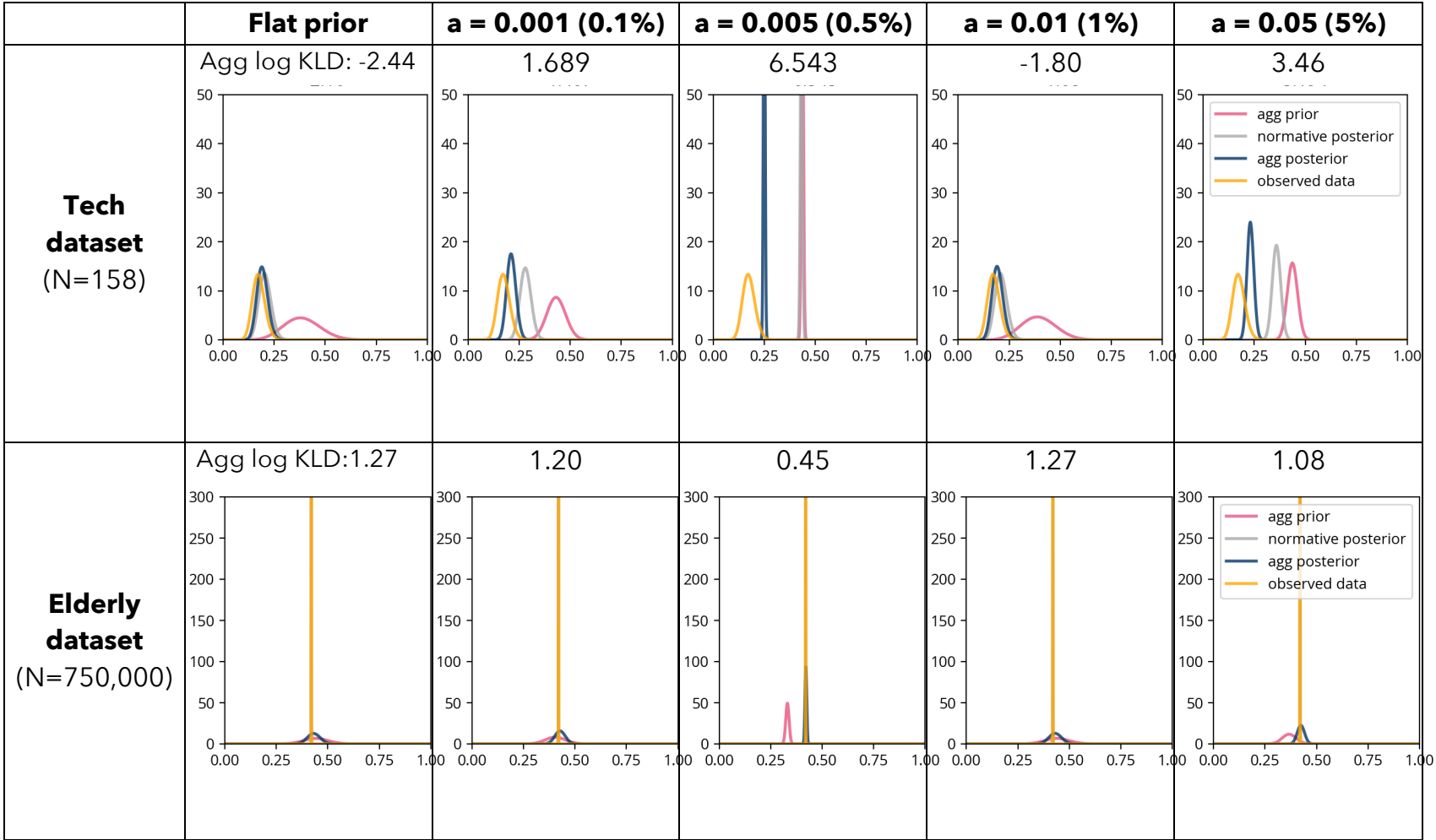


## **2)Sensitivity analysis to fitting process - sample based elicitation techniques**

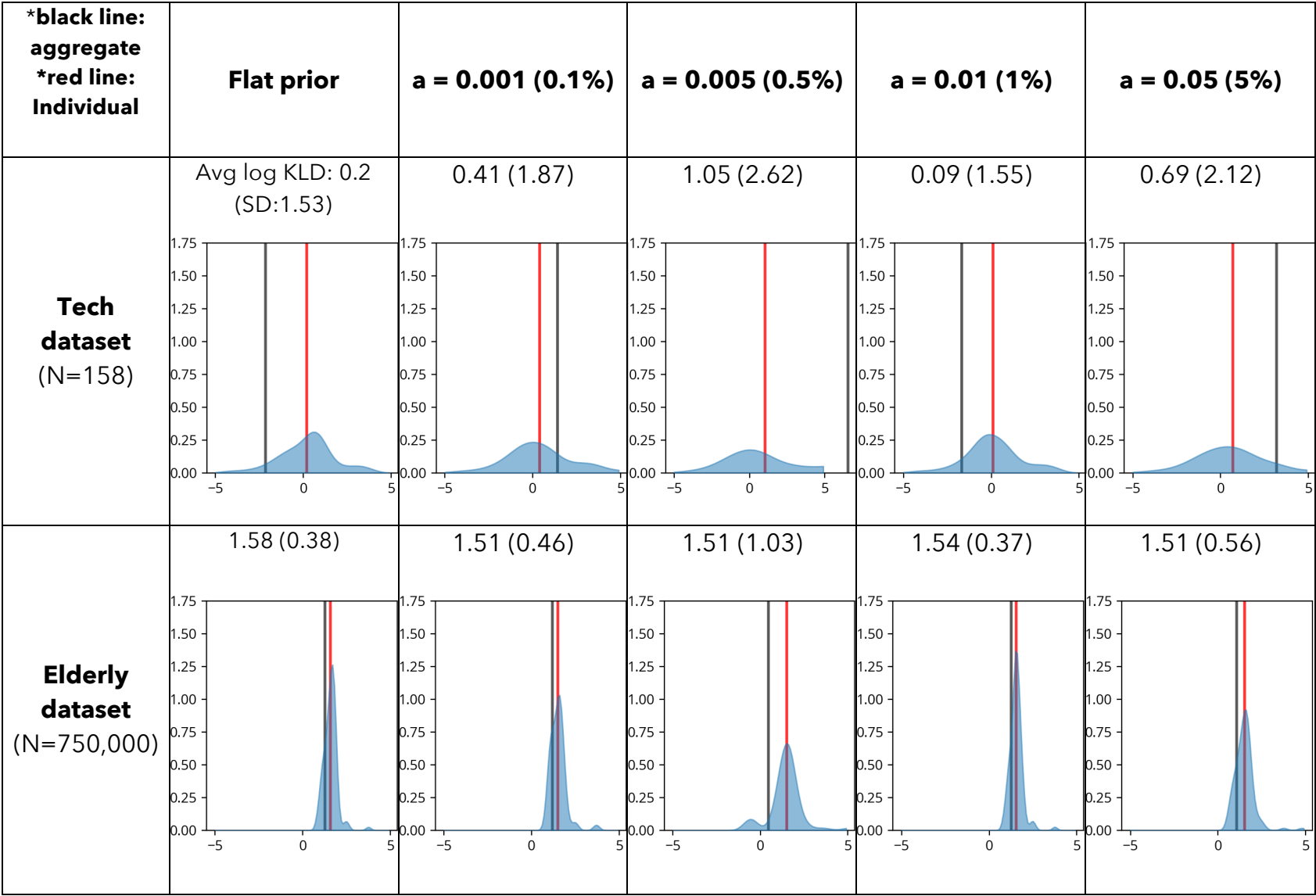
For sample-based elicitation conditions, we used the Method of Moments to estimate distribution parameters (i.e., alpha and beta) using samples provided by each participant. This method provides an estimate using the mean of the samples that participants provided and the variance of the to calculate beta parameters. However, this approach does not provide a unique solution when the participant provides the same values five times or 0 confidence for all samples. In the case of providing the same values five times, we can either treat them as if this person has no uncertainty (used in Study 2) or has a very certain distribution. To create a very certain distribution (i.e., very sharp), we could convert participants sample as a range. For example, if the participants provide "50" for five times [50,50,50,50,50], we can use the Method of Moments by altering the response to [50 - (2 \* **a**), 50 - **a**, 50, 50 + **a**, 50 + (2 \* **a**)]. In this analysis, we varied **a** to see how the result changes.

Text sample-based condition

Aggregate Level

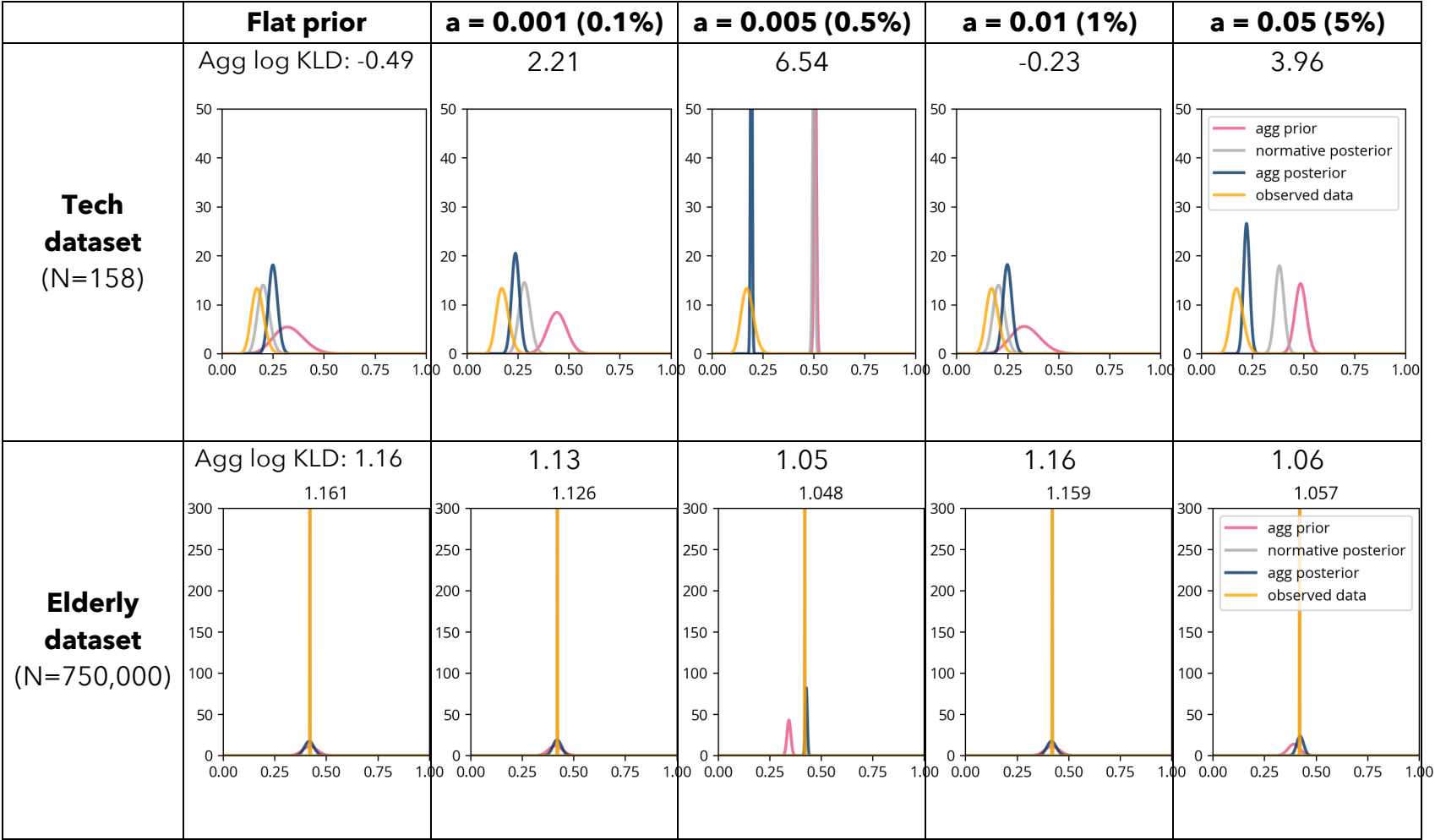


Individual Level



Graphical sample-based condition

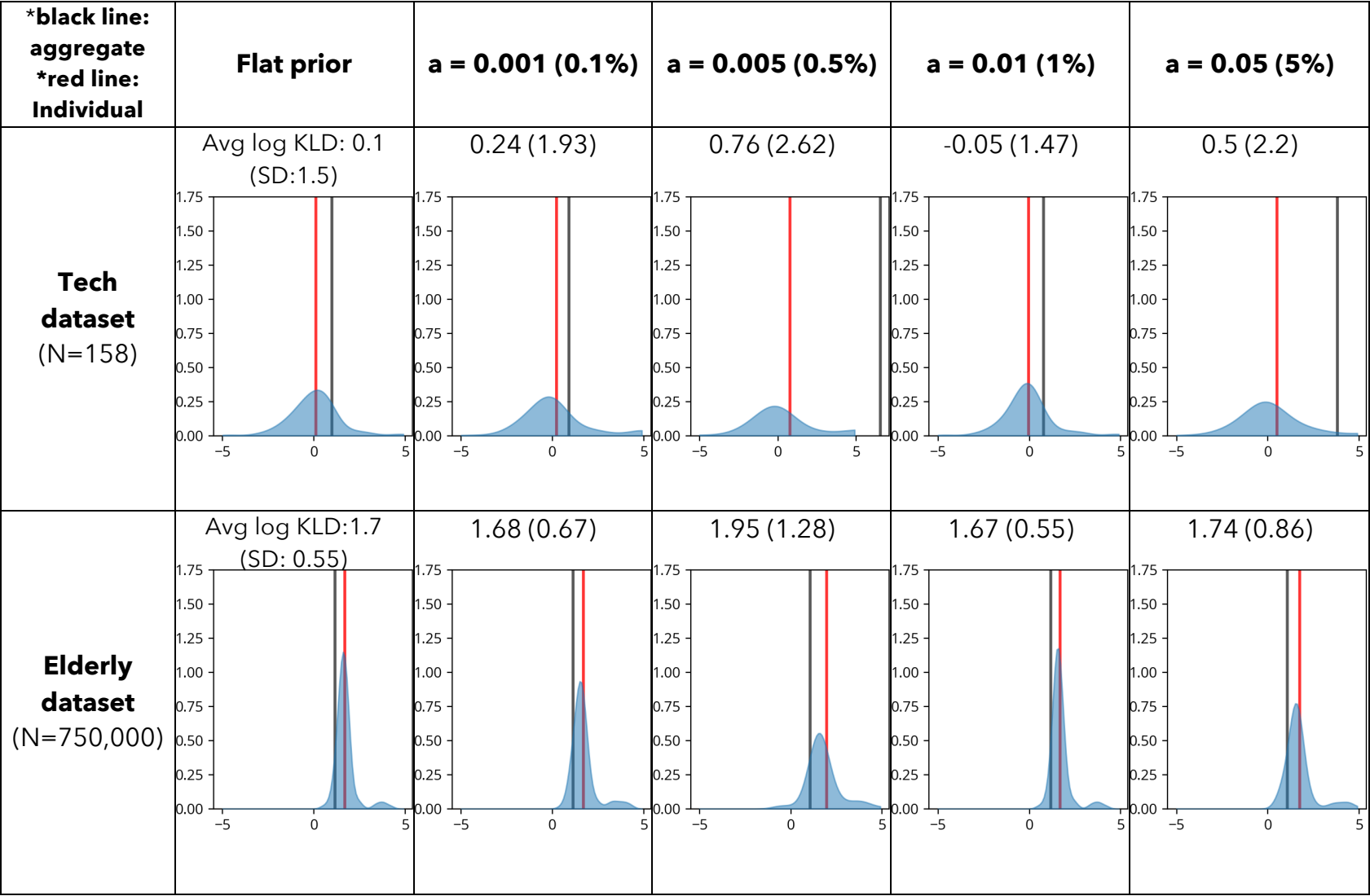
Aggregate level



Individual level

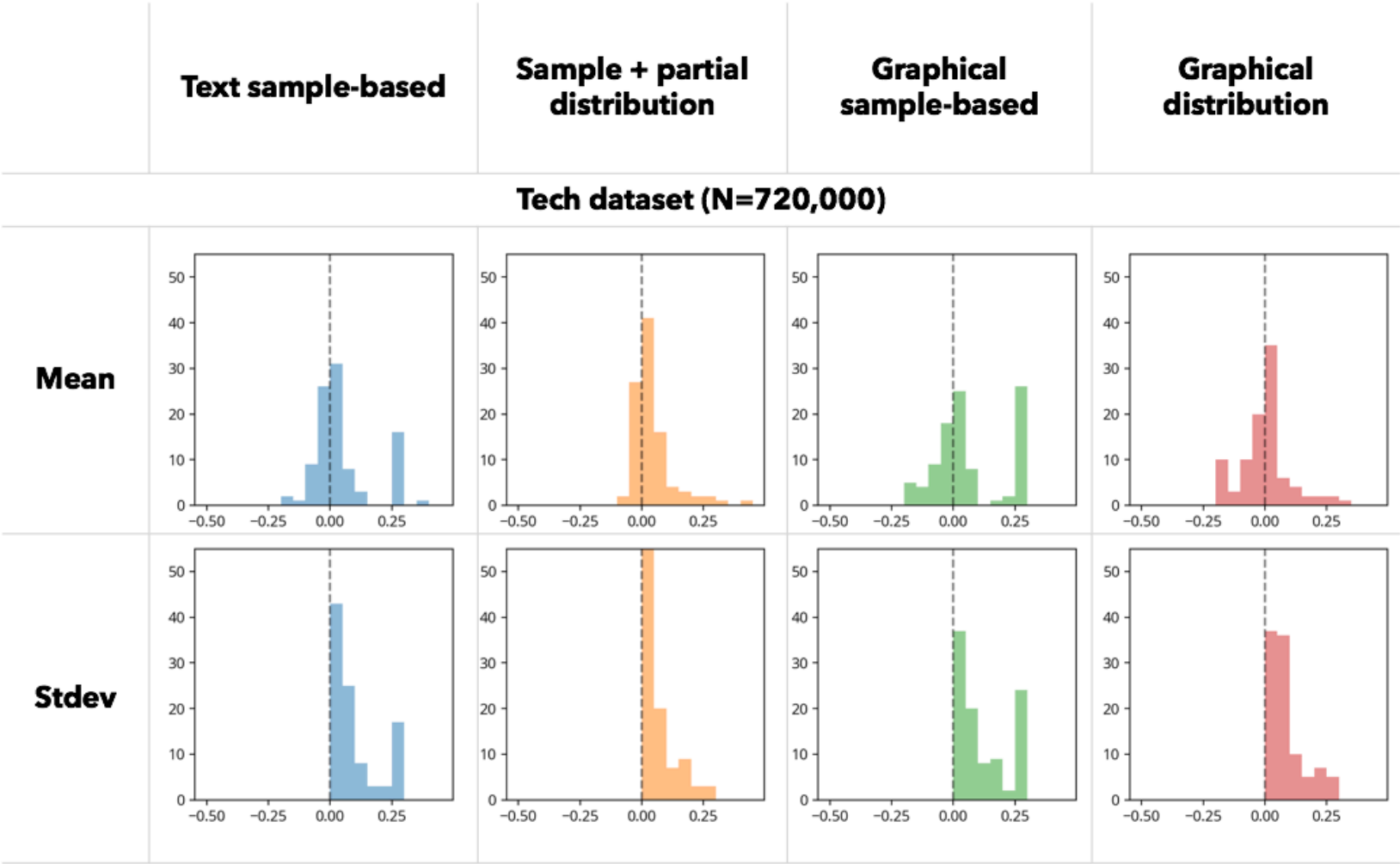


A Bayesian Model of Cognition to Evaluate Everyday Data Interpretation

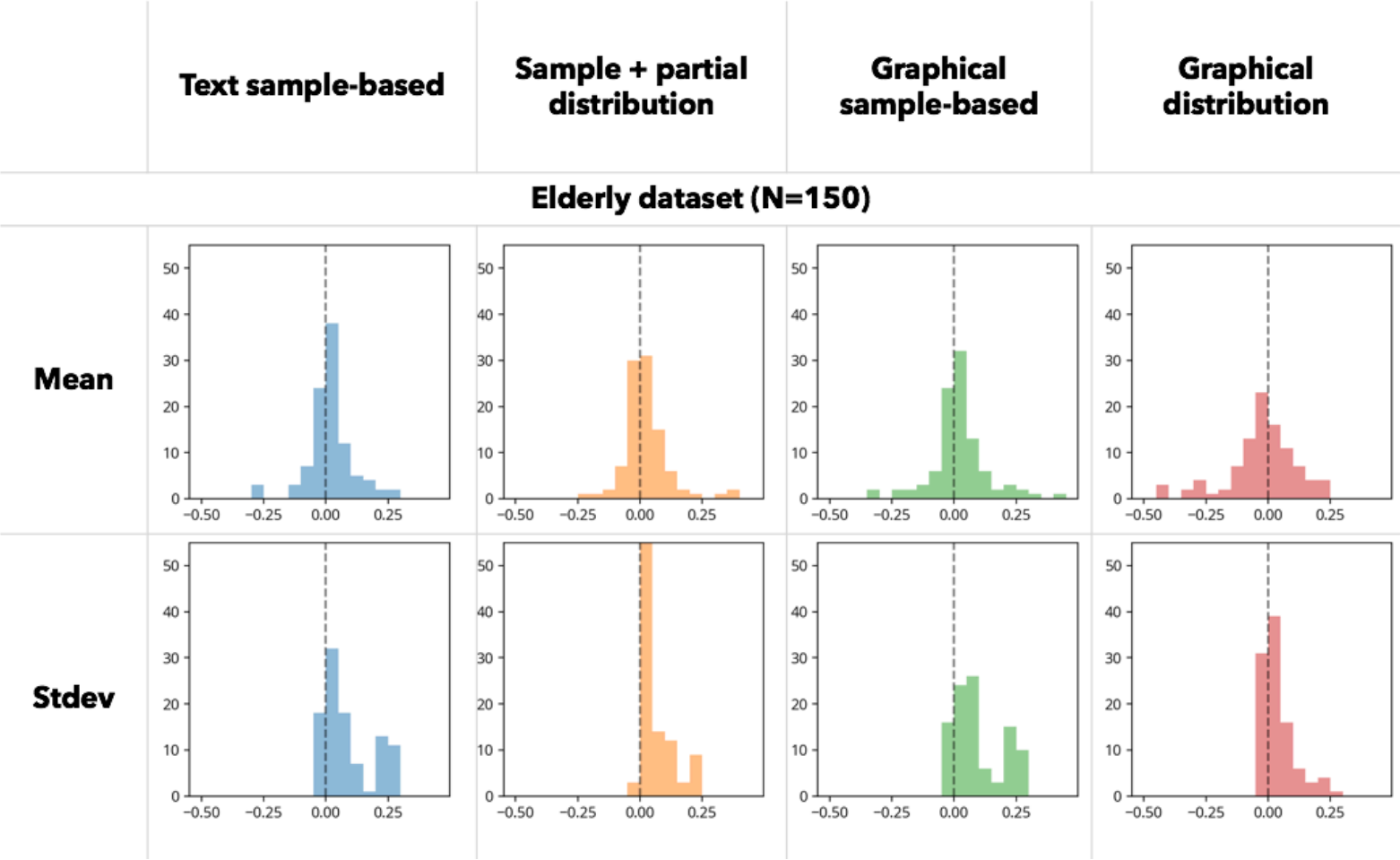


3) Distributions of residuals - Study 2, Replication

Tech dataset (N=720,000)



Elderly dataset (N=150)



4) Distributions of residuals - Study 3

Elicitation conditions

