Online sellers revisited

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Revisiting Online Sellers

- We now have five online sellers, each with different numbers of positive ratings from different numbers of total evaluations

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One	10	10	100%
Two	48	50	96%
Three	186	200	93%
Four	75	100	75%
Five	1	2	50%

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  - the additional sellers have 75 out of 100, and 1 out of 2 positive ratings

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- The more general research question now is to model the rates with which the sellers generate positive reviews

Independent Rate Model

- The original rate model assumed that the k_i of positive ratings out of n_i total evaluations for the ith seller are generated by an underlying probability θ_i, so that

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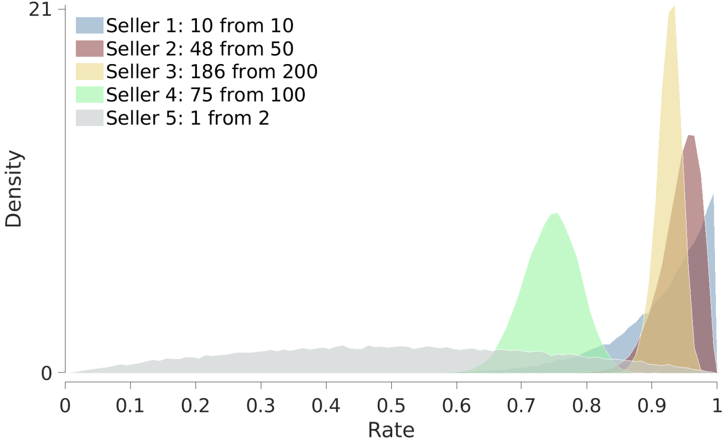
- The underlying rates are independent of each other, and given the uniform prior $\theta_i \sim \text{uniform}(0, 1)$

Independent Rate Model Inferences



Same Rate Model

- If we were willing to assume all the sellers had the same underlying rate, there would just be a single $\theta \sim \mathrm{uniform}(0, 1)$, and the individual data would be generated as

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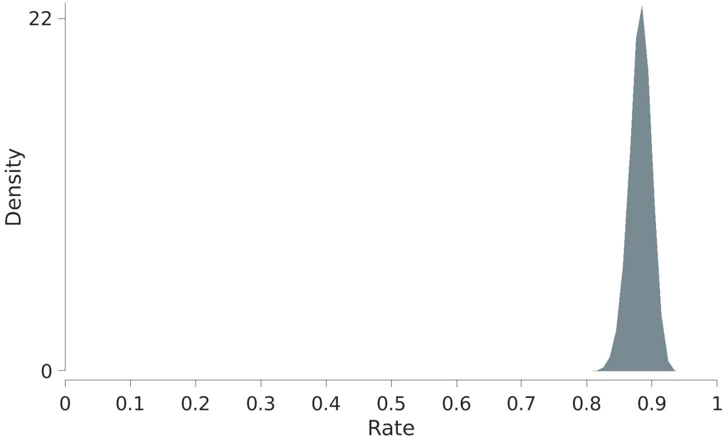

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- In general, cognitive variables will have some mixture of sameness and difference, because both invariants and variation are involved in most cognitive phenomena

Hierarchical Rate Model

- Hierarchical models allow both sameness and difference to be modeled, by assuming individual-level parameters that are connected by all being drawn from an over-arching group distribution

$$\theta_i \sim \text{Gaussian}(\mu, \sigma^2)\text{T}(0, 1)$$

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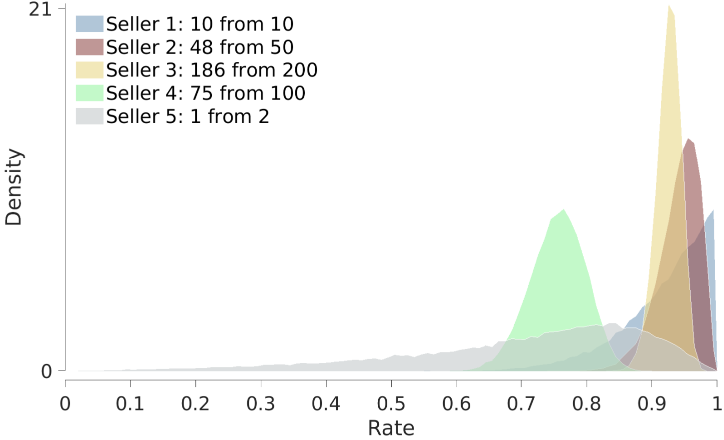

Exercise

Implement the hierarchical sellers model. Who is better?

$$\theta_i \sim \mathrm{Gaussian}(\mu, \sigma^2)\mathrm{T}(0,1)$$

$$k_i \sim \mathsf{Binomial}(\theta_i, n_i)$$

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