Modeling GRB (and other) populations:
Some lessons from multilevel modeling

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Goal: Infer properties of a population from measurements of observables with measurement error and selection effects

Multilevel models:

- Upper level: Draw observables from (adjusted) pop'n dist'n
- Lower level: Draw measurements from independent data distributions
- Bayes: Account for measurement error via marginalization → marginal likelihood, averages over uncertainties

Ignoring uncertainties corrupts inferences: