Surprise—they're different!

An introductory activity to highlight differences between Frequentist and Bayesian statistics

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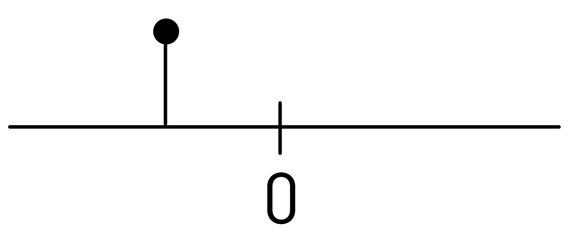
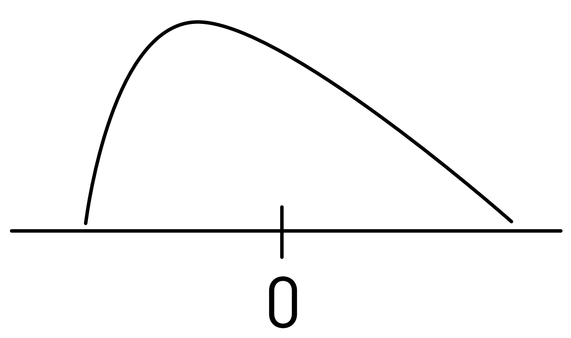
Statistics has two *paradigms*: Frequentist and Bayesian. Both are widely used, but students usually learn Frequentist only.

Frequentist:
Single true value



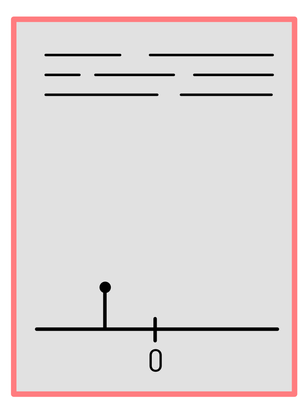
Bayesian:
Possible values

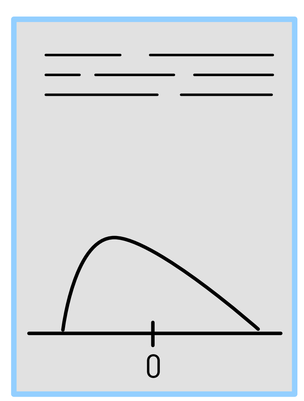


Ideally, students will choose and justify modeling assumptions, such as their choice of paradigm.

Idea: Teach students to navigate assumptions by comparing the two paradigms.

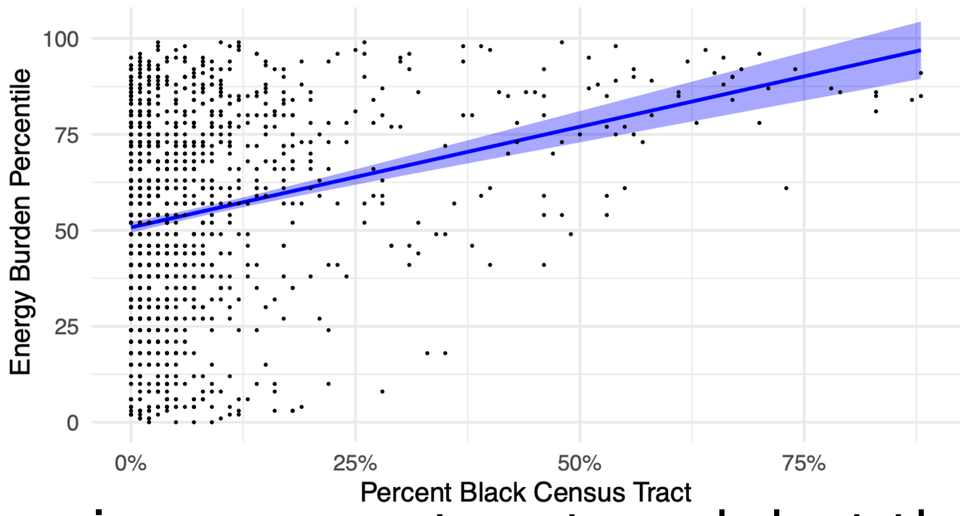
Students complete a group in-class activity





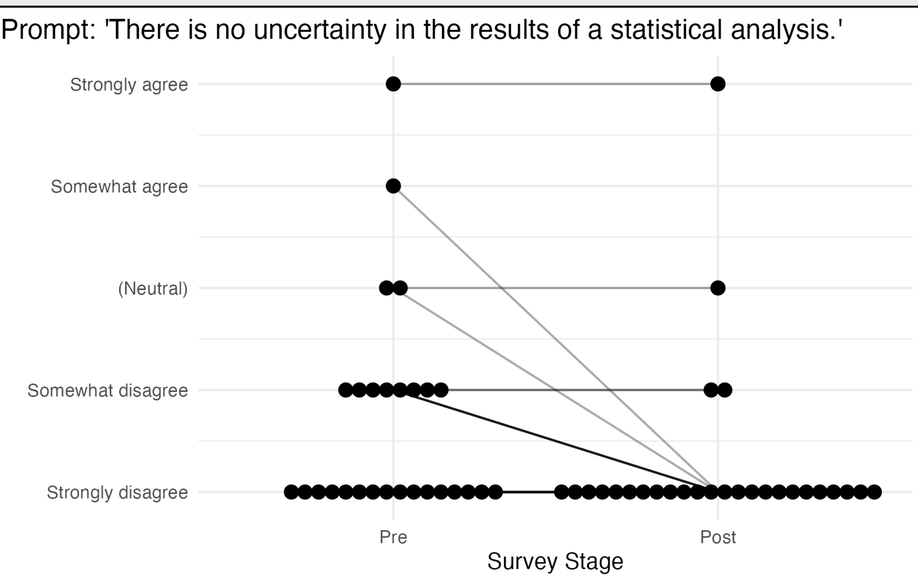
Little do students know, half of them have a Frequentist version, half have a Bayesian version!

Details: Activity uses regression results on economic and demographic data.



Regression suggests a trend, but the Frequentist and Bayesian results disagree.

Pre/post survey reveals shifts in attitudes.



Some shift in student perspectives, but a more focused learning outcome is desired.

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Activity data from Climate and Economic Justice Screening Tool

References:
Langehennig et al. "Surprise, They're Different! Comparing Frequentist and Bayesian Instructional Approaches in Political Science and Public Policy Classrooms" (2025) Political Science Educator: volume 29, issue 1

Materials Available (Scan QR Code)