Rich state, poor state, red state, blue state: 
What’s the matter with Connecticut? 
A demonstration of multilevel modeling

Andrew Gelman 
Department of Statistics and Department of Political Science 
Columbia University 

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Themes

- Income and voting: understanding aggregate and individual patterns
- Multilevel modeling and graphical display
- Some politics and some psychology
- Collaborators
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Democrats and Republicans, rich and poor

- I never said all Democrats are saloon-keepers. What I said is that all saloon-keepers are Democrats. — Horace Greeley, 1860

- Pat doesn’t have a mink coat. But she does have a respectable Republican cloth coat. — Richard Nixon, 1952

- Like upscale areas everywhere, from Silicon Valley to Chicago’s North Shore to suburban Connecticut, Montgomery County supported the Democratic ticket in last year’s presidential election, by a margin of 63 percent to 34 percent. — David Brooks, 2001

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That map
Rich states go for the Democrats, but rich voters go for the Republicans. How do we understand this?

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Richer states now support the Democrats

- In each Presidential election year, run linear regression:
  - $y =$ state vote share for the Republican
  - $x =$ average income in the state
- Display time series of estimates ± standard errors (the “secret weapon”)
- Quantitative version of looking at a series of red/blue maps
- Also do separate analyses for South, non-South
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- Recent trends explain why it's recent news
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- “Fat-cat” Republicans and “working-class” Democrats
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Richer counties support the Republicans in some states and the Democrats in others.

- Within each state, estimate regression on county data:
  - $y =$ county vote share for the Republican
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- Varying-intercept, varying-slope model:

- Fit separate model for each election year ("secret weapon")
- For each state, display time series of estimated $\beta_s$
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- Varying-intercept, varying-slope model:
  - $y_{c} = \alpha_{s[c]} + \beta_{s[c]} x_{c} + \text{error}_{c}$
  - $s[c] = \text{state containing county } c$
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Coef of county-level income on county-level vote: South

- Oklahoma
- Texas
- Mississippi
- South Carolina
- Kentucky
- Alabama
- North Carolina
- Georgia
- Virginia
- Louisiana
- West Virginia
- Arkansas
- Tennessee
- Florida
Coef of county-level income on county-level vote: West

Utah

Wyoming

Idaho

Montana

Colorado

Arizona

Nevada

New Mexico

Oregon

Washington

California

Hawaii
Coef of county-level income on county-level vote: Midwest

**States**
- Nebraska
- North Dakota
- South Dakota
- Kansas
- Indiana
- Ohio
- Missouri
- Wisconsin
- Iowa
- Minnesota
- Michigan
- Illinois

**Year**
- 1968
- 1980
- 1992

**Coef**
- -0.3
- 0.1
Coef of county-level income on county-level vote: Northeast
Richer counties support the Republicans in some states and the Democrats in others

- In “deep-red” Southern states such as Oklahoma, Texas, Mississippi, etc., richer counties strongly support the Republicans.
- In “media-center” states of New York, California, Maryland, and Virginia, richer counties slightly support the Democrats.
- Journalists noticed a pattern (richer counties supporting the Democrats) that is concentrated in the states where the journalists live!
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Richer voters continue to support the Republicans within states

- Within each state, estimate logistic regression on individuals:
  - $y =$ vote preference (1=Rep, 0=Dem)
  - $x =$ individual income (on a five-point scale)
- Varying-intercept model:
  - $\Pr(y_i = 1) = \logit^{-1}(\alpha_s[i] + \beta x_i)$
  - $s[i] =$ state containing county $i$
- State-level regression of $\alpha_s$ on state income
- Use 2000 Annenberg Election Survey (over 100,000 respondents)
- Plot estimated $\Pr(R$ vote) vs. income for three representative states
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Varying-intercept model, 2000

Connecticut
Ohio
Mississippi

Andrew Gelman
Rich State, Poor State, ...
How do income/voting patterns vary by state

- Varying-intercept, varying-slope model:
  - \[
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  - \(s[i]\) = state containing county \(i\)
  - State-level regression of \(\alpha_s\) and \(\beta_s\) on state income
  - Income is coded as \(-2, -1, 0, 1, 2\), so we can interpret both intercepts and slopes
  - Plot estimated \(\Pr(R \text{ vote})\) vs. income for 3 representative states
  - Plot estimated slopes vs. state incomes
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  - $s[i] = \text{state containing county } i$
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- Income is coded as $-2, -1, 0, 1, 2$, so we can interpret both intercepts and slopes

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Estimates using National Election Studies
Income and vote preference from exit polls

Mississippi

Ohio

Connecticut

Virginia

Andrew Gelman  Rich State, Poor State, ...
Understanding the differences between states

- Richer states support the Democrats—even though, within any given state, richer voters tend to support the Republicans.
- The slope within a state is strongest in poor, rural, Republican-leaning “red” states and weakest in rich, urban, Democrat-leaning “blue” states.
- These patterns have largely arisen in the past ten or fifteen years.
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- Positive slopes within states are no surprise.
- Between states: state income as product of long-term trends (large cities 50 or 100 years ago, more trade, immigration, ethnic diversity).
- Economic issues are perhaps more salient in poor states, less salient in rich states (that could be “what’s wrong with Connecticut”).
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  - Overstates “polarization”
  - Focus on large land-area states
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- I come from Huntington, a small farming community in Indiana. I had an upbringing like many in my generation—a life built around family, public school, Little League, basketball and church on Sunday. My brother and I shared a room in our two-bedroom house. — Dan Quayle, 1992


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- Both sides want to claim the “average American”

- 50% of voters support each party, so no easy answers for either side!
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- What does a “typical” Democrat or a “typical” Republican look like?
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- It evidently irritates many liberals to point out that their party gets heavy support from superaffluent “people of fashion” and does not run very well among “the common people.” — Michael Barone, 2005

- First-order availability bias (“false consensus effect“): most people I know are Democrats, therefore most people are Democrats

- This is the error attributed to Kael, but nobody would actually make this mistake for a Presidential election!
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- Journalists are mostly Democrats and mostly richer than average
- Second-order availability bias: I am a Democrat and richer than average, therefore the Republicans are likely to be poorer than average
- Richer journalists are more likely to be Democrats
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- National journalists in New York, California, Maryland, and Virginia live in states where:
  - Rich counties support the Democrats, poor counties support the Republicans
  - There is only a weak relation between income and vote preference
  - In contrast, in the deep-red Southern states:
    - Rich counties support the Republicans, poor counties support the Democrats
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- The red/blue map is misleading. Actually, Republicans are richer than Democrats, on average—in the U.S., and within states.
- But, there are real differences between red and blue states. Income is more important in red states.
- There are statistical, political, and psychological reasons for journalists (and others) to get confused on this.
- Key statistical tools: Multilevel modeling, interactions (varying slopes), the secret weapon, the superplot.
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