A Statistical Abstract Analysis of the Gelman Paradox: Why correlation does not denote causation in voting outcomes based on regional average incomes

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Abstract

Over the past few years, there has been increased analysis of voting and voting patterns based on education and income. Analysis seemed to be contradictory. As a group, people with higher incomes tended to have voting patterns leaning toward the Republican Party; and, as a group, people with lower averages incomes tended to have voting patterns learning toward the Democratic Party. However, many areas of the United States of America with lower average incomes saw voting trends toward the Republic Party. This apparent paradox, referred to in this article as, "The Gelman Paradox" is discussed conceptually.

Keywords: voting patterns; income and voting; rural voting

Dr. Andrew Gelman Ph.D. a statistician and political science expert from Columbia University is the person for whom the Gelman Paradox is named. Dr. Gelman as has reputation in Academic circles as a scholar. He is also known in the mainstream press by such publications as the *New York Times, Time Magazine, NewsWeek,* and *The Washington Post.*

Gelman (2008) found voting patterns are most strongly influenced by income. Although many of those in the lower socio-economic group tend to be socially conservative, they do not tend to vote for the more socially conservative candidate; however, they do tend to vote based on economic issues (Huber & Stanig, 2009).

Over the past few years the formerly "solid south" for Democrats has shifted toward being more reliably Republican. A look at correlations, without analyzing the data, gives the incorrect view that many regions with very low incomes and many poor social conservatives tend to vote Republican; however, an analysis of the data shows those low income voters are actually voting for the Democratic Party.

What is responsible for this apparent paradox?

Gelman (2012) discovered the richer and better educated (have a college degree) in the United States tend to vote Republican while those with lower incomes and less education (do not have a college degree) tend to vote for Democrats.

However, there are exceptions. For example, Gelman discovered eighty percent of those who are wealthy because they are "trust fund kids" do vote for the Democrats. It could also be argued some billionaires tend to support the Democratic Party because their businesses are reliant on contracts with the government and government spending. However, the general trend is the better educated and the wealthier tend to vote for the Republican Party. People employed by government, and therefore paid with taxpayer dollars, may also favor the Democratic Party. Please keep this caveat in mind, there is no single cause as to why anyone does or does not vote for a political party. Additionally, the Gelman Paradox is looking at general trends rather than at specific elections. The likability or affinity a voter may have for a particular candidate, tradition, friends, family, opinions about social favorability, sources of income, career field, and many other factors are a component as to why people vote the way they vote. A great number of people vote for both parties depending on a plethora of factors. These factors depend on whether or not the election is local, statewide, or national. Other potential factors related to voting also have an influence; as well as the fact, many voters will vote a split ticket.

But what about the Southern part of the United States? The poorer areas tend to support Republicans. Is this because the voters there are poor and uneducated as was suggested by a post I saw on social media? The answer is of course 'no'.

The poor, even in the south, and even poor areas where the majority of the vote goes to the Republicans, do tend to vote overwhelmingly for the Democratic Party. The middle class and the rich tend to vote for the Republicans.

The advancement of the middle class in the South is the reason for the shift of the Southern States in the USA from the solid Democratic column to the Republican column.

But wait, if a majority of the poor do not vote for the Republican then how can a poor district find itself voting for the Republican candidate? This is because of differing voting percentages of rich, middle class, and poor; and, as a result of the Southern United States seeing economic growth and developing a larger middle class starting in the 1980s. However, income inequality is a basis for class based voting (McCarty, Poole, and Rosenthal, 2006).

What about religious values?

Regardless of religious values the wealthier tend to vote Republican while the poor tend to vote for the Democrat; the difference is voter turn-out as Republicans enjoy a greater turnout of voters than the Democrats (Gelman, Kenworthy, & Su, 2010). In other words, there was no statistically significant difference in voting patterns related to religions values.

Statistical Abstract

Suppose there is a small voting precinct having 200 registered voters. These numbers roughly correspond with accepted polling data but are not exact. The point of the model is to demonstrate how the paradox operates not to show exact numbers. Therefore, this model is a statistical abstract to demonstrate why a paradox occurs.

Of people at the poverty line ($15,000 per year) only about 45% vote. Suppose 100 or half of the people in this precinct are below the poverty line and they all vote for the Democratic candidate. This provides 45 votes for the democratic candidate.

The next group are the low middle class ($30,000 a year). There are 55 people meeting this criterion in this precinct. This group votes equally for the democratic candidate and the Republican candidate. About 60 percent of the people in this group vote. This provides 17 Democratic votes and 16 Republican votes. Of course in actuality this would be 16.5 votes to the Democratic candidate and to the Republican candidate. Because we cannot have half of a voter we will say the Democratic candidate gets the extra voter.

There are 45 people in the middle middle class making about $50,000 per year and they vote at a rate of about seventy-five percent and they vote Republican. This gives 33.75 votes to the Republican candidate. Because we can't have 75% of a voter we will call this 33 votes.

The average income for this precinct is about $27,000 per voter, and is below "lower middle class". If you figure in the per capita based on size of household, then the average income per capita is even lower and could be below our poverty line of 15,000. For example, say there is one child per one voter. Now we have a per capita income of 13,500 per year. This is a very poor precinct.

Population and Income	Number of People	Incomes	Total Income
Low Income	100	15,000	1,500,000
Low Middle	55	30,000	1,650,000
Middle Middle	45	50,000	2,250,000
Total	200		5,400,000

Per Capita Income

Voters	200	27,000	Per Capita Income Per Voter
Total Citizens	400	13,500	Per Capita Income Per Total Population

The election results are now 56% from the Democratic candidate and 44% for the Republican candidate.

Before the rise of the middle class in the South

Number of Voters	Number of Voters	Percentage Voting	Democratic Votes	Republican Votes	Total Votes
Low Income	100	45%	45		45
Low Middle	55	60%	17	16	33
Middle Middle	45	75%		33	33
Totals	200	56%	62	49	111
Percentage of the vote			56%	44%	100%

Now we see the middle class start to grow. There are now still 90 voters at the poverty line, 50 voters in the lower middle class and 60 voters middle-middle class (this could also be interpreted as increasing income inequality).

Population and New Income Levels	Number of People	Incomes	Total Income
Low Income	90	15,000	1,350,000
Low Middle	50	30,000	1,500,000
Middle Middle	60	50,000	3,000,000
Total	200		5,850,000

New Per Capita Income

Voters	200	29250	Per Capita Income Per Voter
Total Citizens	400	14625	Per Capita Income Per Total Population

After the rise of the Middle Class in the South

Number of Voters	Number of Voters	Percentage Voting	Democratic Votes	Republican Votes	Total Votes
Low Income	90	45%	41		41
Low Middle	50	60%	15	15	30
Middle Middle	60	75%		45	45
Totals	200	58%	56	60	116
Percentage of the vote			48%	52%	100%

The increase in total income has gone from 5,400,000 dollars to 5,850,000 dollars representing an increase of 450,000 dollars. The new result would calculate as an increase of 1,125 dollar per capita or 2,250 dollar per voter in income. In other words, after a 1,125 dollar increase in per capita income per year we still have the per capita income of $14,625. So, the average income per capita is below our $15,000 poverty line and has not increased very much at all. But now let us look at the election results. Now we have 48% voting for the Democratic Party and 52% voting for the Republican Party (90 at 45%, 50 at 60% and 60 at 75%). Although this precinct is still below the poverty line it has gone from being a solid safe precinct for the Democratic Party to being a solid by 4% of the vote for the Republican Party. This would be reported as the precinct below the poverty line having a 14% change in voter preference toward the Republicans after only a 1,125 dollar per year per capita increase in income. This amounts to 93.75 dollars a month increase of income per capita. When looking at a standard 2000 hour work year the change represents an average pay raise of 1.13 dollars an hour.

	per voter	per capita
Increase per Year	2,250	1,125
Increase per Month	187.5	93.75
Increase per Week	43.27	21.63
Increase per Day	6.16	3.08
Increase per hour with a 2000 hour work year	1.13	0.56

This is why you cannot merely look at income levels and how a precinct votes and assume this means people of a particular socio-economic status are voting a certain way. This is true even if you have your data on income and voting from the census bureau and overlay them with maps of income. In politics as well as economics, correlation does not necessarily mean causation.

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