



JMP Instructional data set 013

Voting Rates in U.S. Presidential Elections

JMP platforms and statistical methods

Graph Builder: Line graph; simple linear regression

Problem statement

High voter participation rates in elections are a sign of a healthy democracy as it's an indication of the engagement the citizenry has in the political process. It also increases the likelihood that election results will align with what the majority of a population wants. Political scientists examine these participation rates not just in aggregate but also across various demographics (e.g., age, education, race, gender, etc.).



Data has been gathered on voting rates in U.S. presidential elections from 1964-2024. The analyses will focus on using graphical methods and simple linear regression to explore historic data on voting rates in U.S. presidential elections across age, ethnic, and education demographics to make comparisons and identify potential trends.

Data

IDS_013.jmp

Year	Presidential Election years from 1964 to 2020
Overall	Percentage of the total voting-age population that voted
Male	Percentage of the male voting-age population that voted
Female	Percentage of the female voting-age population that voted
Age_18-24	Percentage of the voting-age population between the ages of 18 to 24 that voted
Age_25-44	Percentage of the voting-age population between the ages of 25 to 44 that voted
Age_45-64	Percentage of the voting-age population between the ages of 45 to 64 that voted
Age_65+	Percentage of the voting-age population age 65 or older that voted
White	Percentage of the voting-age White population that voted
African American	Percentage of the voting-age African American population that voted
Asian	Percentage of the voting-age Asian population that voted
Hispanic	Percentage of the voting-age Hispanic population that voted
Ed_No High School	Percentage of the voting-age population that has not attended high school that voted
Ed_9th-12th Grade	Percentage of the voting-age population that has attended but not completed high school that voted
Ed_No High School	Percentage of the voting-age population that has completed high school that voted
Ed_Some College or Associates Degree	Percentage of the voting-age population that has completed some college or attained an associates degree that voted
Ed_Bachelors Degree or More	Percentage of the voting-age population that has attained a bachelors degree or more that voted

Exercises

1. Create a line graph of the voting rates (overall and for each group) over time. Describe any trends or features. To determine if there is enough statistical evidence to support any trends you have identified, fit a linear regression equation to each and examine R-Squared and p-values.

Instructions:

Graph > Graph Builder. Place 'Overall' on the Y axis, and 'Year' on the X. Instead of creating 16 different line graphs, it would be best to utilize the Column Switcher tool so all the variables can be viewed from the one by selecting the variable to display on the Y Axis. To do so, choose Redo > Column Switcher under the red triangle. Select that current variable used for the Y as the Column to Switch ('Overall'), and choose that along with all the others to use as the Replacement Columns.

Choose to display the points , line graph,  and fitted line  by selecting each from the graph palette while holding down the shift key.

Under the red triangle next to the Graph Builder title, choose to Lock Scales.
Under the red triangle next to the Column Switcher, choose to Retain Axis Settings.

2. Create a line graph showing the voting rates over time for males and females overlayed. Describe any trends or features.

Instructions:

Graph > Graph Builder. Place 'Male' on the Y axis, and 'Year' on the X. Choose Redo > Column Switcher under the red triangle. Select 'Male' as the Column to Switch, and choose that along with 'Female' to use as the Replacement Columns.

3. Create a line graph showing the voting rates over time for the four different age groups overlayed. Describe any trends or features.

Instructions:

Follow similar process as in Exercises 2 using the four age variables.

4. Create a line graph showing the voting rates over time for the four different ethnic groups overlayed. Describe any trends or features.

Instructions:

Follow similar process as in Exercises 2 and 3 using the four ethnic variables.

5. Create a line graph showing the voting rates over time for the five different education groups overlaid. Describe any trends or features.

Instructions:

Follow similar process as in Exercises 2-4, using the five education variables.

6. What other data would be helpful to have to better understand differences and trends in voting rates across the U.S. voting population?

Supporting materials

Data Source: <https://usafacts.org/data/topics/people-society/democracy-and-society/elections/presidential-voting-rate/>

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