

EDUCATION'S EFFECT ON VOTER TURNOUT:
THE EFFECTS OF EDUCATIONAL VARIABLES ON
COUNTIES AND STATES' VOTER TURNOUT
DIFFERENCE FROM THE 2016 AND
2020 PRESIDENTIAL ELECTIONS.

by

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Abstract

This study furthers the investigation of how educational factors affect voter turnout. Prior studies have proven educational factors such as gender to be an important factor in determining civic participation and, thus, voter turnout. However, the exact causal relationship between education level and voter turnout remains elusive. This study investigates these previously proven education factors in addition to systematic factors that affect educational attainment. By studying factors that affect education itself, the causal link between how education affects voter turnout is deconstructed at a deeper level than in previous studies. The results of the study found there to be causal links between socioeconomic factors and levels of graduation rates in determining voter turnout. These findings are crucial to understanding how structural issues such as unemployment and poverty levels affect education, an essential determinant of voter turnout.

Introduction

This paper examines how education levels affect voter turnout rates in the 2016 and 2020 presidential elections. I investigate the effects of education levels within selected counties on voter turnout. In the United States, education is the responsibility of state governments, and each state has a different idea of what system works best. Because of these differences, education may have a varying effect on civic duties such as voting. This study builds upon a previous study where the education variable, individuals with a bachelor's degree or higher, was found statistically significant in the voter turnout in the 2016 and 2020 presidential elections. Moreover, this research project takes the next step of answering how voter turnout affected the 2016 and 2020 presidential elections and how this varied by county and state. Using a breakdown of education levels within selected counties, the study analyzes variance in voter turnout by studying socioeconomic disparities, education levels, and partisanship. These findings increase understanding of how education affects voter turnout within counties and connect how voter turnout fluctuates with the voting population's education levels.

This project answers the question of whether voter turnout depends on varying levels of education and, if there is a relationship, between which level of education most affects voter participation. This project takes a unique approach from other studies by analyzing the interaction effects of proven factors that impact voter turnout in addition to systematic factors. This information is useful in understanding how education levels can dictate the voter turnout of an area which, depending on the result, could potentially predict how represented and informed the voting population is at the time of the election.

Literature Review

When looking at education's effect on voter turnout, there are already multiple proven pathways of impact. These factors include the increased pressure education systems put on voters¹, educational disparities², level of education³, and civic literacy⁴. If there is increased pressure by education systems, there is a positive correlation on voting; conversely, the more disparities and lower education levels, the more likely voter turnout will decrease. Due to the range of studies, which have found different factors affecting voting, there has not been a study to explore how these proven variables work together; this study takes a step forward in understanding the causal link between education and voting.

As stated, this study builds off another study focused on voter turnout in rural and urban areas in the 2016 and 2020 presidential elections. Within this 2021 study⁵, all of Wyoming's counties were used as a special case due to its primarily rural populations, and then fifteen other states were randomly selected out of their respective left, right, and purple⁶ categories within the 2016 and 2020 elections. In total, ninety counties were selected and population, population density, population 65+, percentage of ethnic groups, median income, and education level were recorded. After running an OLS regression of voter turnout on these factors, education (the percentage of college graduates with a bachelor's degree or higher) was the only significant predictor. As a result of these findings, the importance of education for voter turnout suggests that more investigation is warranted.

¹ Gerber, 2008

² Hansen and Tyner, 2019

³ Pew Research, 2016

⁴ Pattie and Johnston, 2003

⁵ Runnells, "Rural and Urban Voting Patterns"

⁶ Left-leaning states describe states that had a majority vote for the Democratic-elect presidential candidate for the 2016 and 2020 presidential elections and right-leaning states had majority vote for the Republican-elect presidential candidate for both elections. Purple states are states that flipped parties in the majority vote for a presidential elect.

The first factor to consider in education's relation to voting is the pressures put on voters; furthermore, the question of whether or not educated voters face more pressure to vote. In a 2008 study, social pressure was studied to determine what kinds of pressure must be put on voters to push them to vote. The study of the 2016 presidential election found the highest percentage of voter turnout, 37.85%, occurred within the treatment group shown its own and its neighbor's voting records⁷. Moreover, when people's lack of civic duty is exposed to others, they are likelier to perform more civic duties. Evidence would suggest those who received high levels of education value civic duty because they are arguably more aware of its importance.

This raises the question of whether there would be a difference in a county with a higher concentration of higher-educated people than a county with a less educated population. Gerber concludes voting is arguably one of the easiest civic duties to perform and gives a person a better sense of duty to one's country and, when a person is exposed to their lack of political participation, will be more likely to act in the interests of the social norm⁸. In contrast, a 1995 study argues resources of time, money, and skills are predictors of political participation and therefore voter turnout⁹. The three principles, time, money, and skills are interconnecting forces that drive a person's motives regarding whether they vote. These three principles could play a role in a higher-educated individual's motive to vote. Moreover, a highly educated individual could have skills gained from a bachelor's degree, such as finance, in addition to fulfilling core curriculum requirements. The individual would be more likely to understand the importance of a budget plan in a presidential campaign; in other words, being more educated helps voters understand the large policy differences between the two parties, which creates an additional incentive to vote. The two

⁷ Gerber, 2008, pg. 38

⁸ Gerber, 2008, pg. 40

⁹ Brady, 1995, pg. 285

other factors in voter turnout also depend on the individual; an individual's education usually affects how much time and money they have due to their occupations. First off, it is important to explain why education is a predictor of money and skills as those with higher educational attainment typically earn more and can take time off to vote. And secondly, because of the individual's occupation, what skills they will use (or not use) in civic duties reflect their access to education. In conclusion, it is difficult to gauge how all the factors will influence every eligible voter in the United States; however, there must be a consideration for the role of time, money, and skills in voter turnout due to an individual's education.

The subsequent topic in continuing to explore social norms is the influence of education disparities on the social norm of voting. Gerber's article does not consider educational disparities but are a critical aspect of explaining the voter turnout of a county. Furthermore, a 2019 article finds "the idea that differences in [voting] norms can help explain long-standing educational disparities in voting behavior. Because educational attainment in the US is a strong marker of social class, our findings have notable implications for research on socioeconomic inequality in political participation¹⁰." The study found a connection between educational disparities and voting, which opens the door to break down how there is an exact relationship between socioeconomic status, education attainment, and voting behavior. Additionally, the social groups of higher educated populations have the potential to pressure individuals within the group to take civic action. This social pressure could stem from the education and social understanding gained from earning a bachelor's degree (as explained earlier). Therefore, it can be concluded education disparities should be considered whenever analyzing voter turnout behavior even though there are

¹⁰ Hansen and Tyner, 2019

additional influences, such as time, socioeconomic status, social norms, and skills, in an individual's decision to vote.

With these factors in mind, the first hypothesis is formed. It is widely known that individuals with low socioeconomic status are limited in their opportunities to grow outside of the community. Lower-income people have more obstacles to face when attempting to gain more economic, educational, and social opportunities with the limited options available due to financial constraints. Furthermore, it is more difficult for individuals with low economic status to take off work, commute, and/or hire childcare to vote because they are limited in time and money. With this idea in mind, Hansen and Tyner constructed a study to understand if and why low socioeconomic communities had low voter turnout and found there is a link. The study determined that education is highly correlated with voter turnout due to low-socioeconomic populations being less likely to attend a university due to cost and, therefore, the population is likely to not vote. Hansen and Tyner state, "as steadily rising costs threaten to put postsecondary education financially out of reach for large segments of the American population, the political inequalities associated with educational attainment are likely to remain entrenched well into the future¹¹." The article then states it is necessary to understand why education is a large factor in voting behavior. This link will be further tested in relation to other variable outcomes in the study.

Hypothesis 1: As the percentage of lower-income residents in a county grows, voter turnout decreases.

¹¹ Hansen and Tyner, 2019, pg. 25

Education has other implications on a person's political involvement too. In other words, how far an individual has gone with their education is likely to be linked to their political involvement. According to Pew Research, education is a factor in party identification; long-term studies found there to be trends between a person's education level and their identifying party. These trends have shown an increasing number of highly educated adults¹² obtaining and maintaining liberal attitudes¹³. Furthermore, college-educated voters have become more Democratic in recent years. Another important finding was the growing divide among the less educated in terms of political affiliation; those who are less educated¹⁴ are tending to have an affiliation to the Republican party. Because there seems to be a link between education and partisanship, as found by Pew Research, a county's level of education matters in how political parties interact with the county, whether it be on a county, state, or federal level.

Additionally, a 2016 article by John Hansen discusses the effects of increased mobilization and voting. While not directly linked to voter turnout, Hansen suggests that as parties become unified, there is an increase in participation and, thus, voter turnout. For example, Hansen references Norman Ornstein's statistical analysis on Congress¹⁵, stating "both chambers of the Congress have witnessed an increase in the number of 'party unity' votes—a majority of Democrats against a majority of Republicans—and increased party cohesion on party unity votes¹⁶." Knowing there is a relationship between party cohesion and party votes, there could be a possible effect on partisanship and education. Furthermore, there is a proven relationship between

¹² College degree or higher

¹³ Pew Research, 2016

¹⁴ No college degree

¹⁵ Ornstein et al., 2013, Tables 8-3 and 8-4

¹⁶ Hansen, 2016, pg. 152

education and political affiliation while there is a relationship between political affiliation¹⁷ and voter turnout.

Hypothesis 2: Education will have more impact in blue and red states than in purple states.

Next, a 2011 article challenges the long-standing belief there is a connection between education and political participation. This study uses data extracted from the number of men who had been in the Vietnam draft and the resulting increase in education levels. Focusing on the long-term effects of the Military Selective Services Act of 1967, “[the] results suggest that much of the OLS effect arises, not because education is causal, but because it proxies for other factors, that is, the kinds of people who get educated are the kinds of people who tend to participate in politics anyway¹⁸.” However, this study fails to factor in the educational disparities present in the United States during the long-term analysis and does not address any implications socioeconomic and education levels might have on voter turnout. Berninsky and Lenz are arguing education’s apparent effect on voter turnout is due to the selection effect. This means there is bias due to the sample’s targeted selection in the study. In other words, by studying only an educated population, they are studying a population that already has a higher voter turnout compared to the entire population. Because there is limited scope on education’s effect on voter turnout, there is a reason to further pursue the interaction between the two variables.

In another long-term study, the findings contrast those of Berninsky and Lenz as it is found there is an effect of education on voter turnout. The 2010 study found there to be a connection after following students throughout their time in grade and high school. From there, researchers

¹⁷ Affiliation in parties that are increasing in party cohesion and, thus, party unity votes as proven by Hansen.

¹⁸ Berninsky and Lenz, 2011, 267

studied their voting participation. The study has an aim “to set in motion a line of research that begins by using experiments to identify the effects of education and then employs even more refined experimental designs in order to answer questions about causal pathways¹⁹.” Sondheimer and Green are continuing the trend of acknowledging a link between education and voting but cannot pinpoint where the exact correlation lies. Other factors are found to impact voting and education, such as an effect between those in college and an increase in voting; however, the amount of time spent in college does not significantly impact the results²⁰. This finding suggests college’s social culture affects voter turnout, which would mean the level of education a student receives does not matter in terms of voting. This finding suggests attending college and experiencing the social culture is more important than the actual degree obtained. Taking this study a step further, it would be interesting to see how this relationship between enrollment in college and voter turnout is affected whenever there is a 4-year university located in the county. Another link between the influence of education level is the role of gender.

Hypothesis three stems from the multiple studies proving there is a connection between education and voter turnout; even more so, there is a relationship between individual voting increasing with their higher-education level. According to Tenn’s study, the amount of college education does not influence an individual’s decision to vote but, a college-level student is more likely to vote than an individual with just a high-school education. This finding challenges *Civic Education Theory*²¹, the belief civic skills and knowledge which facilitate political engagement are developed by education. This means that, in the states requiring civic education, the state’s education system has more of an impact on voter turnout. Even if the state requires civic education,

¹⁹ Sondheimer and Green, 2010, pg. 186

²⁰ Tenn, 2007, pg. 457

²¹ Verba, Schlozman, and Brady, 1995

dropouts will still be missing civic education which likely causes a decrease in voter turnout. However, Tenn discusses how his findings could be challenged because he recognizes the potential error that there is not an estimate on the “effect of education for a representative sample of the general population. [As] the data set only contains individuals who are quite young, and the effect of education is identified from those individuals who are in the ‘institutionalized’ state of being in school²².

Hypothesis 3: As a state’s dropout rates increase, there will be a decrease in voter turnout.

A 2021 study investigated a charter school's effects on a person’s voting habits. The study has interesting results as there is a link between civic participation and charter schools; however, it is only significant for women²³. Cohodes and Feigenbaum believe the significance is due to women’s naturally stronger non-cognitive skills²⁴ which “are necessary to navigate the voting process when the voting process is intentionally made difficult²⁵.” Another layer to this finding is the possibility “[that] increased educational attainment expands one’s social network and thus the likelihood of participating in community and political endeavors²⁶.” Therefore, it could be hypothesized that social interactions in a college setting could facilitate more politically active women as they are more likely to be politically mobilized than college men are. As a result, gender may be an additional factor to consider when studying the factors that link together education and voting. Hypothesis four is generated from this idea.

²² Tenn, 2007, pg. 457

²³ Cohodes and Feigenbaum, 2021, pg. 42

²⁴ Described as “socio-emotional or ‘soft’ skills include[ing] self-regulation, persistence, and grit” (Cohodes and Feigenbaum, 2021, pg. 8).

²⁵ Cohodes and Feigenbaum, 2021, pg. 9

²⁶ Cohodes and Feignbaum, pg. 186

As found by Cohodes and Feigenbaum, there is a significant increase in voter turnout of women compared to men in charter schools within the city limits of Boston. After the study, it was found that noncognitive skills strongly influenced voting among women. The researchers concluded strong socialization skills, such as attendance at events, influence a women's noncognitive skills while cognitive skills, found more frequently among men, do not have as strong an influence on voter turnout²⁷. Another study performed found there to be higher levels of high school completion and voter turnout in women²⁸. In analyzing the results, it was concluded "[that] each successive generation of women has been more politically mobilized than her predecessors, with educational attainment playing an important role²⁹." In conclusion, these three studies demonstrate the strong relationship between gender and education attainment; this relationship then has a potential impact on voter turnout.

Hypothesis 4: Gender and education have an interaction effect on voter turnout, such as the percentage of college-educated women in a population increases, and so does voter turnout.

A factor that has the potential to impact voter turnout is a person's level of civic literacy. As some states require civic classes in high school, there is a possibility that students who have taken these courses will have more interest in civic participation. However, this relationship has not been tested well in previous studies. On the other hand, a 2003 study investigated the effects of newspaper reading, a measure of civic literacy, on voter turnout in the United Kingdom³⁰. The results found there is not a correlation because the study found civic classes lacked incentive for

²⁷ Cohodes and Feignbaum, 2021

²⁸ Casico and Shenhav, 2020, pg. 45

²⁹ Cascio and Shehav, 2020, pg. 45

³⁰ Important to note the study was performed almost a decade ago and in a different country. As a result, U.S. civic literacy will have different markers than the one's described in the study.

an individual to participate. It is stated that “those who were unlikely to vote were hardly any more likely to do so if their civic literacy improved radically³¹.” Looking at the findings of this article, this study will be looking at the requirements of the specific civic education program and if it requires certain tasks such as registering to vote. Therefore, the final hypothesis will take Pattie and Johnston’s study a step further as there will be variables used to describe if civic classes are required and if students are required to register to vote.

Hypothesis 5: If a state requires high school civic literacy classes to graduate, voter turnout will increase.

Analytical Framework

As stated, previous studies on the effect of education and voting have been extensive but failed to give a conclusive answer to understanding the causal relationship between education and voting. For these reasons, it is necessary to combine the proven relationships to present a cohesive and affirmative answer to how education affects voting habits. Furthermore, by combining the knowledge collected about education and voting, this study will try to answer how all the factors previously studied (socioeconomic, dropout rates, education levels, gender ratio, and partisanship) interact with one another to cause there to be a statistically significant relationship between education and voter turnout in the previous study performed.

In focusing on the education level’s relationship with voter turnout, there needs to be an in-depth focus on the causal relationship between the variables. For this reason, a large-N analysis is used to understand how education affects voter turnout. The independent variables are measured

³¹ Pattie and Johnston, 2003, pg. 597

at the state and county levels with slight variation. First, at the state level, high school completion rates, 9th-grade dropout rate, socioeconomic disparities³², gender ratio, civic education requirements, and partisanship³³ are analyzed. Then, at the county level, the following variables are recorded: socioeconomic disparities, gender ratio, high school completion rates, 9th-grade dropout rate, the presence of a 4-year university, and partisanship. Variables will be analyzed to see the possible direct and interaction effects that may occur when combined. Furthermore, this study will be taking an in-depth look into how proven factors in education's influence on voter turnout interact with each other.

The counties will have population, geographical, and turnout differences. These differences will account for the changes in voter turnout in the 2016 and 2020 presidential elections. By including these differences and comparing counties, the effect education systems may have on voter turnout can be adequately analyzed in an in-depth manner. The end goal of this study is to understand the effects of education on voter turnout, and education's interaction with other relevant variables.

Research Design

In this research project, I conducted a large-N scale statistical analysis by looking at county and state-level voter turnout in randomly selected states and counties in the United States. All the data collected was sourced from the US census, David Leip's "Detailed Voter Registration and Turnout Data," and Michael P. McDonald's "United States Elections Project." The voting-eligible

³² Percentage of the population that is unemployed, under the poverty line, and level of education received (percent with a high school degree, some college, associate's degree, bachelor's degree, and/or graduate/professional degree).

³³ Measuring partisanship separately for the 2016 and 2020 presidential elections.

population (VEP) data³⁴ was calculated using the United States' 2010 census data and additional sources³⁵ used population estimates from the 2010 census data³⁶. I randomly selected counties to differentiate if there is a difference among education levels increasing or decreasing voter turnout. Next, I investigate a state's total counties to determine if there is a pattern of voter turnout. My dependent variable, the change in registered voter percent turnout from 2016 to 2020, is a measure using the percent of the registered voting-eligible population (VEP) turned out to vote for both presidential elections. Rather than looking at the entirety of the United States population, the VEP is the size of the potential electorate; furthermore, the measure of registered voter turnout used is out of the VEP.

Due to the continuous measurement of the dependent variable, voter turnout, I used OLS regression in R Studio. Prior to running the OLS regression, I found the bivariate correlation of each explanatory variable to insure the prediction of state-level factors of both state and county variables. I then tested for the interaction effects of selected independent variables at the county and state levels on voter turnout depicted at the county and state levels. The fifteen states are chosen using random selection out of three groups: red-swinging, blue-swinging, and purple states from the 2016 and 2020 elections. Each state within the group was given a number and then selected using a random number generator³⁷. Once the five states within each group are chosen, each state's counties are ranked by population, and then six counties are selected by a random number generator.

³⁴ Liep, "Detailed Voter Registration and Turnout Data"

³⁵ U.S. Census and McDonald, "United States Election Project"

³⁶ 2020 Census Data not released at the time of the data collection.

³⁷ There are exactly five purple states from the 2016 and 2020 elections.

As for the independent variables, there are both state and county-level with slight variations. In the state-level data, the independent variables that may affect voter turnout are socioeconomic disparities³⁸, gender ratio, high school completion rates, percent of 9th-grade dropouts, the average level of education, the requirement of civic literacy classes, and partisanship. For county-level data, the independent variables are socioeconomic variables, gender ratio, presence of a 4-year university, an average level of education, and partisanship. The independent variables, partisanship, presence of a 4-year university, the requirement of civic literacy classes³⁹, and education levels, use a dummy variable to describe the corresponding information. Partisanship's dummy variable describes the state or county as red, blue, or purple-leaning. The presence of a 4-year university is described as existing or non-existing. Finally, education levels will be described in five sections: some high school, high school graduates, some college, bachelor's degrees, and graduate degrees.

Lastly, two interaction variables test for possible interaction effects by multiplying two independent variables together. The first one is the percent of females and percent of individuals with a high school education level within the state and the second interaction variable is the percent of individuals with a college education and the percent of females within the county and state.

Analysis

State and County Regression:

³⁸ As previously stated, the percentage of the population that is unemployed, under the poverty line, and level of education received.

³⁹ The State requires a civic exam to graduate.

Table 1

```

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -106.61552 2937.84495  -0.036 0.971162
Data$Sper_Female      6.78461  59.06796   0.115 0.908909
Data$S_MinorsPop     -1.84999   0.54510  -3.394 0.001178 **
Data$SCompletion_Rates -4.57874   2.15712  -2.123 0.037600 *
Data$SHighSchool_Grad 12.53312  32.51087   0.386 0.701122
Data$SPar_2016       -6.24075   2.10793  -2.961 0.004282 **
Data$SPar_2020       -3.13444   1.66692  -1.880 0.064538 .
Data$SUni_Grad       -0.85714   0.24353  -3.520 0.000795 ***
Data$SPer_PovertyLine -3.72780   0.79847  -4.669 1.57e-05 ***
Data$SPer_Unemployed -2.11135   1.46142  -1.445 0.153340
Data$Cper_Female     0.59127   0.47695   1.240 0.219552
Data$C_MinorPop      0.22260   0.17163   1.297 0.199233
Data$CPer_Unemployed 0.06453   0.24256   0.266 0.791042
Data$CPer_PovertyLine -0.12112   0.15859  -0.764 0.447811
Data$X4_Uni          0.62504   1.14148   0.548 0.585860
Data$Ccompletion_Rates 0.56946   0.45221   1.259 0.212436
Data$X9_Cdropouts   -0.22187   0.36726  -0.604 0.547867
Data$CHighSchool_Grad -0.72501   0.37031  -1.958 0.054544 .
Data$CUni_Grad       1.23885   1.26313   0.981 0.330337
Data$CPar_2016      0.44512   2.69265   0.165 0.869215
Data$CPar_2020      -0.32656   2.61627  -0.125 0.901051
Data$Sper_Female:Data$SHighSchool_Grad -0.18345   0.65162  -0.282 0.779200
Data$Cper_Female:Data$CUni_Grad      -0.02266   0.02493  -0.909 0.366599
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Table 2

```

              Df Sum Sq Mean Sq F value Pr(>F)
Data$Sper_Female      1 1332.2  1332.2 195.958 <2e-16 ***
Data$SHighSchool_Grad  1    5.9    5.9   0.875  0.352
Data$Sper_Female:Data$SHighSchool_Grad  1    4.9    4.9   0.724  0.397
Residuals             84  571.1    6.8
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> |

```

Table 3

```

              Df Sum Sq Mean Sq F value  Pr(>F)
Data$Sper_Female      1 1332.2  1332.2 224.278 < 2e-16 ***
Data$SUni_Grad         1    2.9    2.9   0.481 0.489787
Data$Sper_Female:Data$SUni_Grad  1  80.1  80.1 13.489 0.000421 ***
Residuals             84  499.0    5.9
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
< |

```

Statistically Significant OLS Regressions:

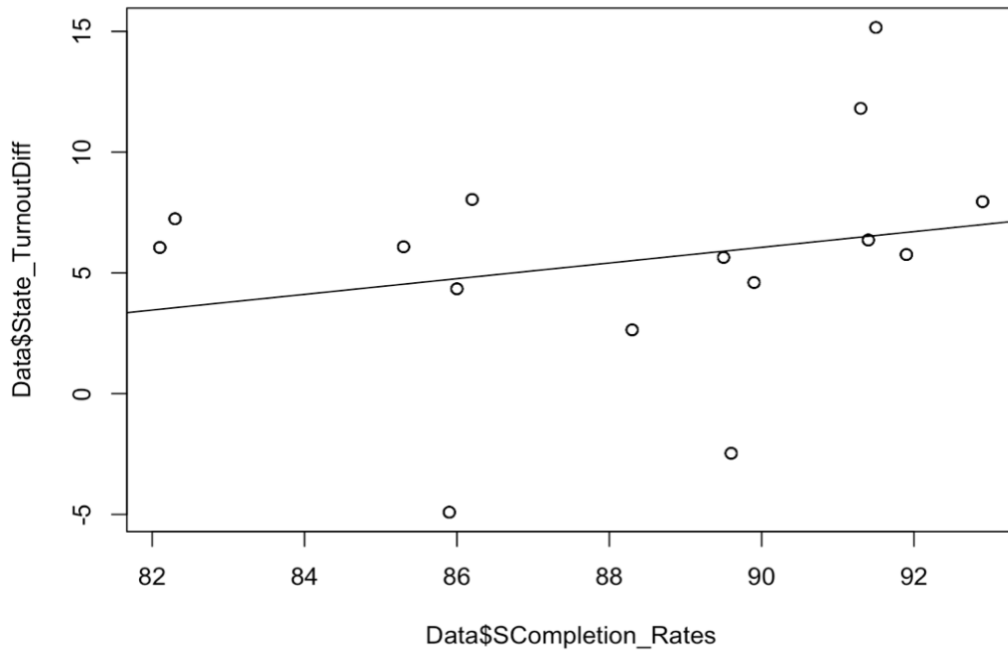


Figure 1

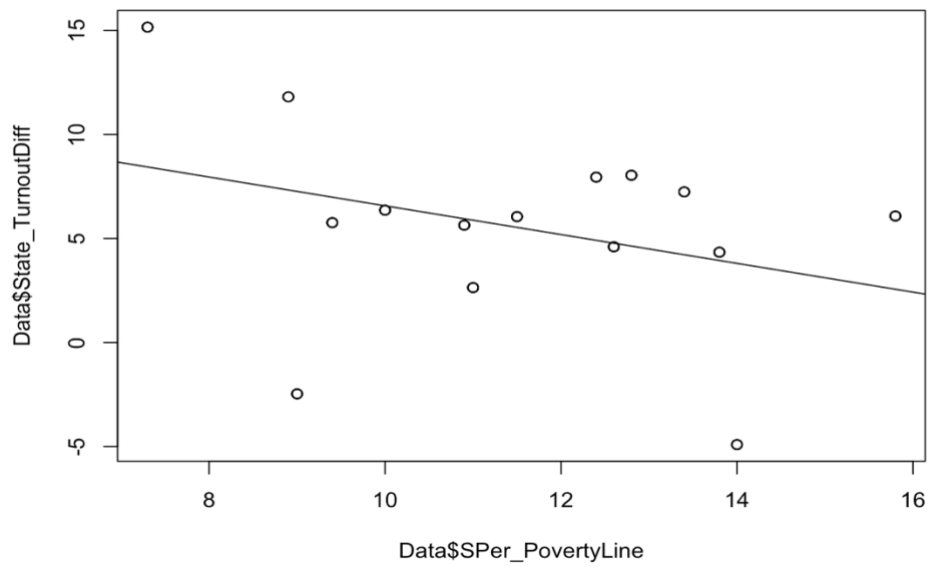


Figure 2

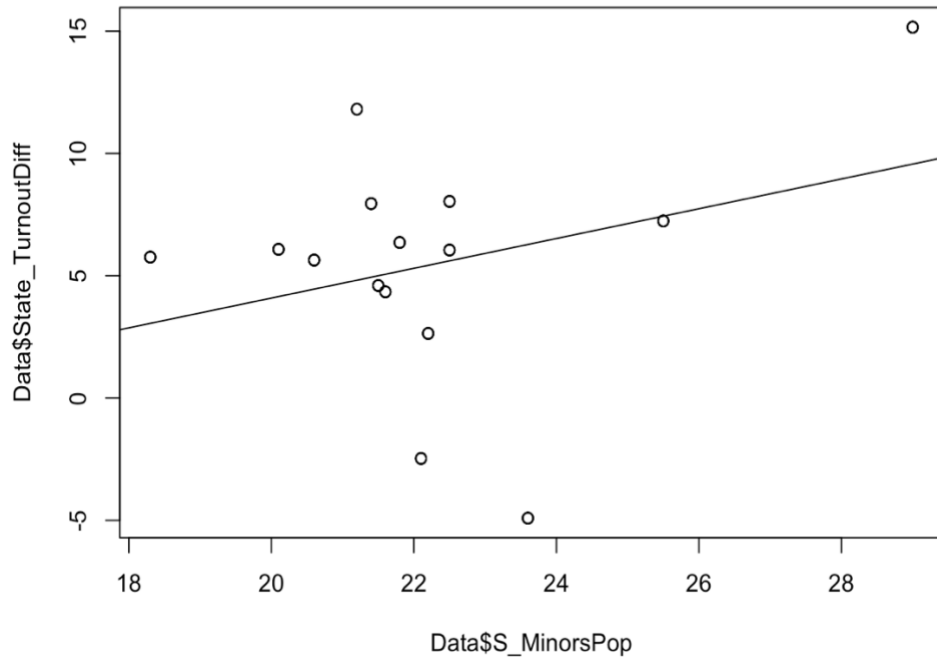


Figure 3

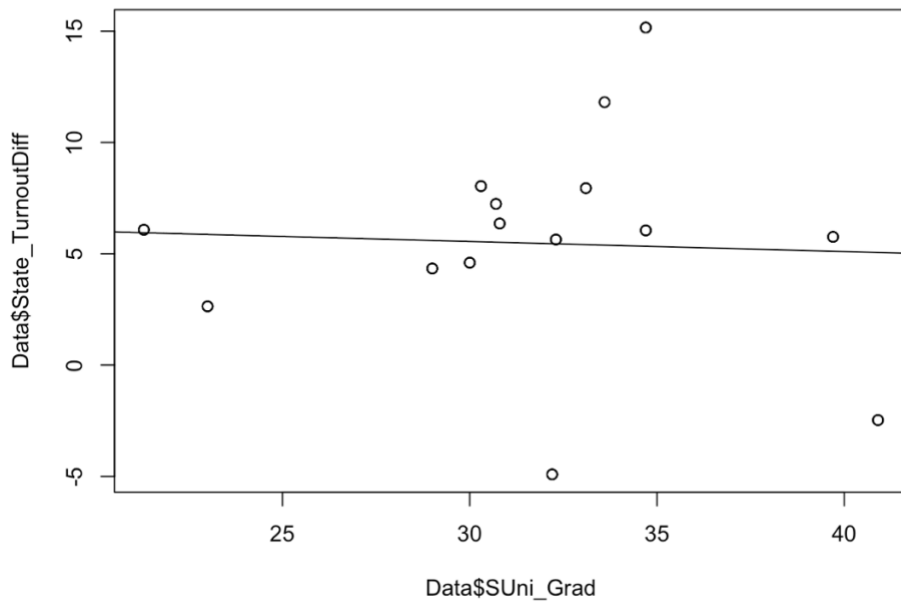


Figure 4

Data Analysis

In the State and County Regression (*Table 1*), there were five statistically significant variables: percent of individuals below the poverty line (county), percent of unemployed individuals (state), percent of individuals who dropped out of 9th grade (state), percent of individuals with a graduate-level education (state), and state partisanship in 2016. The first variable, the percent of individuals below the poverty line at a county level has a p-value of 0.036 which demonstrates voter turnout will be affected by the socioeconomic status of the county. Next, the percentage of unemployed at the state level had a p-value of 0.00248 which provides further evidence the socioeconomic state of a given area is important to gauge the percentage of voter turnout. The linear graph produced has a negative correlation displaying that, as the percentage of unemployed increases, the voter turnout differences from the 2016 and 2020 presidential elections decrease (*Figure 1*). And, though the variables are measured from different groups as one is at the county and the other at the state level, it is necessary to investigate the poverty and unemployment of the voter population. The third and fourth significant variable, the percentage of 9th-grade dropouts⁴⁰ and individuals with a bachelor's degree⁴¹, is significant and, thus, this finding demonstrates the level of a population's education will have an impact on voter turnout⁴². *Figure 2* illustrates the slight negative correlation between the percentage of the state's university graduate population and the voter turnout differences from the 2016 and 2020 presidential elections. Finally,

⁴⁰ P-value = 0.03592

⁴¹ P-value = 0.00511

⁴² *Figure 2*

state partisanship in 2016 was the last significant variable in regression⁴³. The bar graph in *Figure 3* displays the average percent difference between the 2016 and 2020 presidential elections at the state level. As shown by *Figure 3*, the Democratic party had the largest average percent difference at 6.0% while the Republican Party was about 4.0%.

The regression's findings are vital to further understanding how factors surrounding education affect voter turnout. Hypothesis 1 states "As the percentage of lower-income residents in a county grows, voter turnout decreases." Since the p-values of individuals below the poverty line and the percent of unemployed are significant, this hypothesis is supported. Looking closer, unemployment is a better predictor of the relationship of the voter turnout for lower-income Americans¹ Assuming unemployment causes there to be a larger percent of lower-income individuals. Next, Hypothesis 2 states "Education will have more impact in blue and red states than in purple states." This hypothesis is difficult to prove as influential as state partisanship is only significant in the 2016 Presidential election. To be completely proven as influential, it would have to be significant in both the 2016 and 2020 Presidential elections. Hypothesis 3 states, "As a state's dropout rates increase, there will be a decrease in voter turnout." The variables 9th-grade dropouts were found to be significant which supports this hypothesis; however, the state's high school completion rates were not. This presents the same dilemma as Hypothesis 2 and, therefore, cannot be proven as influential.

The interaction effects, presented by Hypothesis 4, states "Gender and education have an interaction effect on voter turnout, such as the percentage of college-educated women in a population increases, and so does voter turnout" is found to be significant but only at the state

⁴³ *Figure 3*

level. Interaction Model of Gender and High School Education Level (*Table 2*) had statistical significance. Furthermore, the F-test determined the interaction model to be significant which supports the hypothesis that the percentage of females with a high-school level education will influence voter turnout. On the other hand, the Interaction Model of Gender and College Education Level at the state (*Table 3*) level had differences. The interaction model (*Table 3*) found significance in the interaction model between gender and the college-education rate at the state level. From this finding, an investigation of why education levels affect females at a state level but not at the county level is warranted.

Conclusion

This study's findings helped expand knowledge on the effects of education on voter turnout. This study took a unique approach as the variables not only investigated educational factors on voter turnout but also factors that affect how an individual will have access to education; for example, the two variables that measured the percentage of unemployed individuals and the percentage of the population under the poverty line did not directly connect to voting behavior but did affect the population's education attainment. By examining these two variables, there was knowledge gained on how voter turnout is affected by both educational and socioeconomic factors.

These findings can be used to support the need for educational policy areas to improve due to its causal link to voter turnout at the state level. By demonstrating there is a link between education and voter turnout, there is incentive for representatives to advocate for better educational programs that support high school completion of youth. There is also evidence populations under the poverty line and unemployed are also linked to low voter turnout. As poverty and

unemployment effect education attainment and voter turnout, these structural issues need to be further addressed through policy programs that support youth within these socioeconomic factors.

Upon the results of the study, there are multiple ways to continue the investigation of the causal links between education and voter turnout. For instance, there could be a deeper investigation of why 2016 partisanship was significant while 2020 was not and if this was affected by variation in education among the populations at the given period. As for the difference of 9th-grade dropout rates being significant while high school completion rates are not, the question is whether this phenomenon is the result of high school's social culture surrounding politics or lack of higher education could be explored further. Lastly, one could research the causal links between socioeconomic factors, education, and voter turnout rates due to societal structures within the voting bloc. This topic, while complicated, is proven to have a resounding effect on this study's results without being defined by the results of the regression.

In conclusion, this study's findings open the door to understanding the interconnection of education and socioeconomic status in voter turnout. While the results were able to answer critical questions presented at the beginning, there are more questions to be investigated upon the completion of the study. Moving forward, the structural factors in determining how an individual attains education should be further analyzed while educational policy expands to support youth with poor socioeconomic backgrounds.

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R Code

```
#working directory
setwd("~/Desktop/")
Data<-read.csv("TurnoutDataF.csv", row.names = NULL, header = TRUE)
Data
rm(list=ls())

#downloads
install.packages("vctrs")
library("vctrs")
install.packages("tidyverse")
library("tidyverse")
install.packages("foreign")
library("foreign")
install.packages("scatterplot3d")
library("scatterplot3d")
install.packages("lme4")
install.packages("Matrix")
library("Matrix")
install.packages("diptest")
library("diptest")
install.packages("MSBVAR")
library("MSBVAR")
library("lattice")
library("MASS")
install.packages("effects")
library("effects")
library("splines")
library("nnet")
install.packages("pscl")
library("pscl")
install.packages("spatcounts")
library("spatcounts")
library("survival")
library("coda")
library("stats")
install.packages("sandwich")
library("sandwich")

#uploading CSV
setwd("~/Desktop/R Studio")
labels("TurnoutDataR3")
Data <- read.csv("TurnoutDataR3.csv", row.names = NULL)
str(Data)
head(Data)
summary(Data)
data<- read.csv("TurnoutDataR3.csv", row.names = NULL, header = TRUE)

#county OLS regression
lm(formula = X2016RV_Turnout ~ CUni_Grad, data=Data)
```

```

rows <- length(Data[,1])
columns <- length(Data[1,])
for (i in 2:columns) {
  datatype <- typeof(Data[1,i])
  if (datatype == "character") {
    Data[,i] <- as.numeric(gsub("%","",Data[,i]))
  }
}

#County Model
CModel <- lm(formula = Data$County_TurnoutDiff ~ Data$Cper_Female + Data$C_MinorPop +
Data$CPer_Unemployed + Data$CPer_PovertyLine + Data$X4_Uni + Data$Ccompletion_Rates +
Data$X9_Cdropouts + Data$CHighSchool_Grad + Data$CUni_Grad + Data$CPar_2016 + Data$CPar_2020)
summary(CModel)

#State Model
SModel <-lm(formula = Data$State_TurnoutDiff ~ Data$Sper_Female + Data$SPer_Unemployed +
Data$SPer_PovertyLine + Data$S_MinorsPop + Data$X9_SDropouts + Data$SCompletion_Rates +
Data$SHighSchool_Grad + Data$SUni_Grad + Data$Civic_Literacy + Data$SPar_2020 + Data$SPar_2016)
summary(SModel)

#total Model
Model <- lm(formula = Data$County_TurnoutDiff + Data$State_TurnoutDiff ~ Data$Cper_Female +
Data$C_MinorPop + Data$CPer_Unemployed + Data$CPer_PovertyLine + Data$X4_Uni +
Data$Ccompletion_Rates + Data$X9_Cdropouts + Data$CHighSchool_Grad + Data$CUni_Grad +
Data$CPar_2016 + Data$CPar_2020 + Data$Sper_Female + Data$SPer_Unemployed + Data$SPer_PovertyLine +
Data$S_MinorsPop + Data$X9_SDropouts + Data$SCompletion_Rates + Data$SHighSchool_Grad +
Data$SUni_Grad + Data$Civic_Literacy + Data$SPar_2020 + Data$SPar_2016)
summary(Model)

#Interaction State Gender and High School Graduation Rates
Int_GenEdu <- aov(Data$State_TurnoutDiff ~ Data$Sper_Female * Data$SHighSchool_Grad, data = Data)
summary(Int_GenEdu)

#Interaction State Gen and College
Int_SUniGen <- aov(Data$State_TurnoutDiff ~ Data$Sper_Female * Data$SUni_Grad, data = Data)
summary(Int_SUniGen)

#Interaction State Gen and College
Int_CUniGen <- aov(Data$County_TurnoutDiff ~ Data$Cper_Female * Data$CUni_Grad, data = Data)
summary(Int_CUniGen)

Int_SUniGen <- aov(Data$State_TurnoutDiff ~ Data$Sper_Female * Data$SUni_Grad, data = Data)
summary(Int_SUniGen)

```