CITATIONS 2022

LaGrange College's Journal of Undergraduate Research

With Articles by
Nicole Morales
Jaydon Parrish
Lindsey Green
Andrew Cunningham
Madison Demkowski
Evan Sampers

Table of Contents

What Really Failed Students: The COVID-19 Policies or School Funding?

Madison Demkowski
POLS 4430 Senior Seminar
22 March 2022
Dr. John A. Tures

Abstract

During 2020 the whole world was hit by the pandemic known as COVID-19. The uncertainty of the virus shocked a lot of people. Therefore, in the United States, many schools shut down and went virtual for precautionary measures. The question many asked at the time was this: what was the new reality? Could all students adjust to the new normal until the virus was safer? The theory this study investigates is did online learning affected students in Georgia or was it the lack of resources that some counties in Georgia didn't have. I am testing to see if the problem was a COVID-19 problem, or if it was a bigger issue that has been forming for years. The independent variable for my test is the students' test scores before COVID-19 and after, with the dependent variable being the budget that each county in Georgia receives to go towards education expenses. I am testing this theory to see if there is a correlation between testing scores and COVID-19 learning, and to see if there is correlation between testing scores and the budgets a school district receives.

Literature Review

In 2020 when COVID-19 hit, many schools closed for safety measures of preventing the spread of an unknown virus at the time. According to Danilo from *The Pediatric Infectious Disease Journal,* this was the "first nonpharmaceutical interventions adopted around the world as a COVID-19 disease containment strategy" (Danilo, 2021). Kamenetz from NPR stated that schools from 185 countries closed when COVID-19 first started and with those statistics, showed that 9 out of 10 school children worldwide were out of school (2022). The school closures were made to prevent the spread of COVID-19 which could impact students or teachers.

Chernozhukov from *PNAS* Journalism found significant data that showed the increase in spread if schools were to open during the first few months of the peak of the pandemic. The significance of his findings was those counties that opened their K-12 schools with in-person learning experienced a significant growth in infection rates for COVID-19. The data was taken from the time of April 1, 2020 to December 2, 2020. The data provided in Table 1 shows that K-12 schools before opening in person had a mean of 0.045 being infected with the virus of COVID-19 than after opening schools in person had a mean of 0.161 which increased significantly in the spread of the virus. The difference of the means for the K-12 schools particularly was 0.116.

Table 1.

	Weekly Case Growth	Weekly Death Growth	K-12 School Visits Cases
In Person			
Before Opening			
Mean	0.091	0.013	0.045
N	52,258	52,258	67,070
After Opening			
Mean	0.143	0.034	0.161
N	45,749	45,749	46,030
Difference in Means	0.052	0.021	0.116

The data for the hybrid style of learning can be seen in Table 2 and provided a different outcome of results for the number of infected individuals. Before opening for the style of hybrid, the mean for K-12 schools was 0.036 were infected. After opening for the style of hybrid, which means the students would return to the classroom for half the time and do online for the other half of the time, the mean for that category is 0.126. The difference in means for the hybrid style of learning was 0.090 which is a lower infection rate then the fully open in person schools.

Table 2.

	Weekly Case Growth	Weekly Death Growth	K-12 School Visits Cases
Hybrid			
Before Opening			
Mean	0.096	0.024	0.036
N	234,820	234,820	260,573
After Opening			
Mean	0.121	0.042	0.126
N	166,605	166,605	167,206
Difference in Means	0.025	0.019	0.09

The next style of learning was remote learning, which was the fully virtual learning for K-12 Students. This data can be seen in Table 3. This means the student would not enter the classroom they would join their class online and learn virtually. Before opening the remote learning, the mean was 0.032 and after opening the remote learning mean for K-12 schools went up to 0.088. With the slight increase the difference of means for K-12 schools was 0.056 which out of all three of the styles of learning this was the lowest rate of infection for school learning.

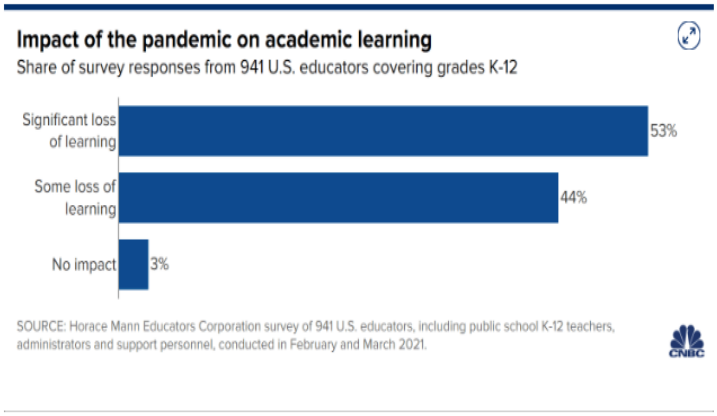
Table 3.

	Weekly Case Growth	Weekly Death Growth	K-12 School Visits Cases
Remote			
Before Opening			
Mean	0.099	0.035	0.032
N	76,796	76,796	82,165
After Opening			
Mean	0.103	0.033	0.088
N	50,127	50,127	50,183
Difference in Means	0.004	-0.002	0.056

With the following data and literature, it is more likely to assume that schools closing and promoting remote learning for grades K-12, would be the safest health strategy. This would explain why the schools closed in preparation of keeping the transmission rate of the virus down trying to keep students and teachers safe in a time of uncertainty.

The COVID-19 pandemic affected everyone; it affected everyone not only through physical health but also affected students' academic success. Specifically, the pandemic affected students in Georgia with their literacy scores. Research has shown that from 2019, the year before COVID-19, to the year 2021, when Georgia students returned to the classroom, there is a flipped result of the reading scores from the Georgia Milestone Assessment System that students take every year. The Georgia Milestone Assessment is a standardized test to measure the growth of a student's learning through a whole year of being in a particular grade level. The students would be tested on their skills in English language arts, mathematics, science, and social studies. This assessment is also a standardized test to see if a student is ready to move on to the next level of learning or if the student should have retention in the grade level, they are currently in. Many claim the reason behind the decrease in passing test scores is because of the students not learning from the online learning methods that were provided to them during the pandemic. Camacho states in her article that they have seen "higher rates of failing grades and chronic absenteeism" (2020). With students not even showing up to their virtual learning, they are not receiving any type of learning, which is causing them to not grow in their academic success.

Figure 1: The Impact of the pandemic on academic learning.

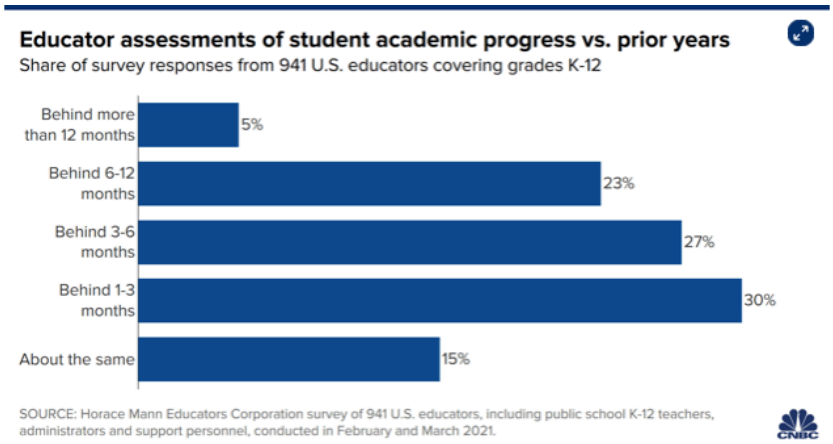


Camacho explains the type of online programs that school programs are using; for example, Seesaw, Khan Academy, Google Classroom, and Lexia (Camacho, 2020). These learning programs have tried to help prevent students from falling behind while having to be online during the pandemic, but were they successful? In Georgia, research has shown that most students in the Georgia school systems have struggled with their testing scores specifically reading scores which has caused a gap in learning.

It is important to note that the policymaking for times of crisis can affect not only some individuals but also a whole generation of students. In my research, I am testing to see if virtual learning had an impact on students' education, and if it could potentially be the problem for the poor test scores. My research is testing whether the policies made for education in Georgia can impact a student's education; for example, looking into how resources are distributed, the budget that went into each county for education, school opening dates, and what schools did online learning. Then, I am going to test if these policies were effective or ineffective for students in Georgia during a time of crisis. I hope to test whether COVID-19 virtual learning was more than just an online issue or was it an outcome of multiple disparities, and all could have been different by implementing policies that were beneficial for everyone.

First, it is important to understand how serious the COVID learning gap is. Professor Dara Hill mentions how we have seen schools shut down for months before. For example, schools that were impacted by Hurricane Katrina and the schools were shut down for months. The problem now is that COVID-19 has impacted way more individuals and school districts no matter how prepared a school district is for a time of crisis. Hill makes a good point that not all households are prepared for all trends; meaning not all households can adapt to a crisis financially and logistically. Some parents were not able to afford the technology that COVID-19 schooling required along with not having the time availability to be a replacement of their child's teacher. Hill states that research shows how far a student can be behind due to the absence of in-person schooling and not having the resources to do online schooling. Hill states that they "found that students, on average, could be behind by up to nine months in math, for example. For students of color, it increased to 12 months.

Figure 2: Educator assessments of student academic progress vs. prior years.



That finding seems to be largely supported by data from individual districts, where many schools are seeing sharp increases in the number of failing grades." (Hill, 2021). Hill also mentions that it could be years before a school can get rid of the learning gap from COVID-19 along with seeing a new era of long-term home schooling rather than students returning to the classrooms. Dickler reported that more than 97% of educators had reported that they have seen a learning loss in students since COVID-19 started and 57% of those students are more than three months behind in their social-emotional progress (2021). There was an impact based off the policies that were made for the education system during the pandemic – no one questions that –but was the only blame for the failing scores just because of online schooling or is there a more significant issue that causes these learning losses?

Once the pandemic hit, many schools went online, which meant students logged onto a source of learning to have virtual class with their teacher every day. This decision was a policy implemented by the government to protect citizens of the unknown virus at the time. Since then, the news media has covered the strong views on the policy from both sides of the spectrum. There was a group that protested about putting their kids back in school, and then there was the group that wanted to protect their kids by not exposing them to the virus at school.

Since the start of the pandemic in 2020 to 2021, when schools started to return to a normal classroom style still with COVID-19 restrictions, there has been data put out that supports the idea that students are now behind due to school closure and having to learn virtually. More importantly, this data did not exist until students returned to the classrooms and were evaluated on their academic levels. This is interesting because that means that the problem has been growing, but no one knew of the problem until years later when they saw the results on paper. North wrote in her article that, "17 percent of students nationwide lacked a computer at home, and 18 percent lacked broadband Internet access." (2021). This leads to a bigger issue - online schooling wasn't the sole responsibility for the gap in student's learning success. It shows that the "pandemic has widened existing racial and socioeconomics disparities in education" (Reilly, 2020). Due to the pandemic, the school systems that have not been supported financially have been impacted the most and are struggling now the most with learning loss. Reilly states, "while all students are suffering, those who came into the pandemic with the fewest academic opportunities are on track to exit with the greatest learning loss" (2020).

Lack Of Resources

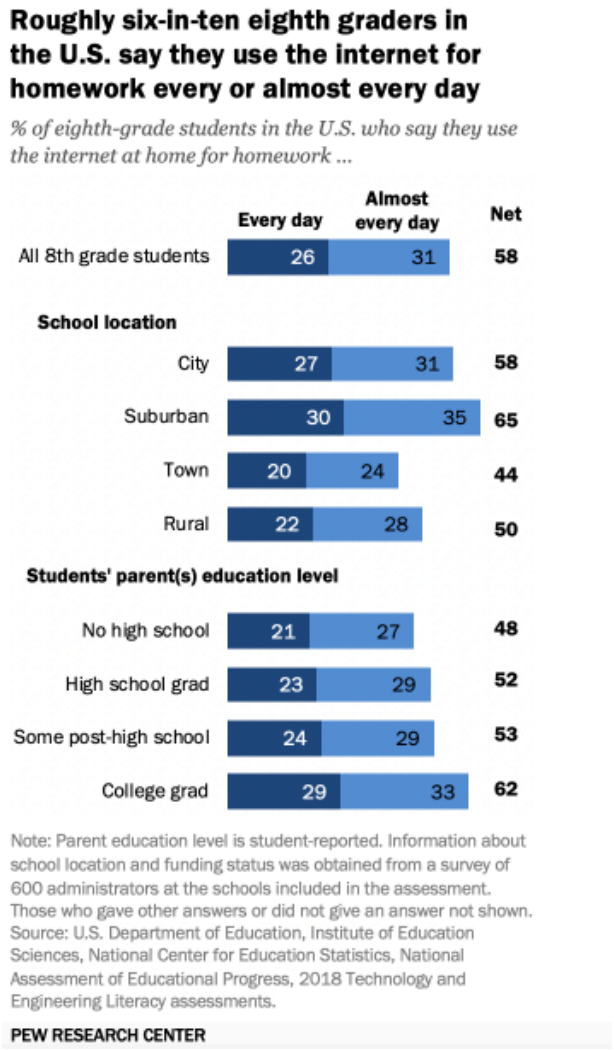
A disparity that was overlooked in the pandemic prior to when policies were made was the lack of resources certain families had for their children to be successful during virtual learning. The Pew Research Center found that lower-income families struggled more than higher-income families in tech-

related issues during the pandemic (2020). Many students did not have access to the technology resources to be successful in their schooling during the pandemic. Stafford from *The Atlanta Journal Constitution* mentions how the schools were caught off guard and were not prepared for this new stage of learning. Stafford mentions how the need for technology resources has grown through school systems (2020). Due to budgeting, the schools have no other option but to partner with local businesses and philanthropies to raise money to receive these resources (2020). These partnerships would provide either laptops for the students or would help secure or find discounted Wi-Fi for the students to use during the period of COVID. Blankenship from Georgia Public Broadcasting states that, "in the United States 17 million students, mostly students of color, don't have adequate access to Internet to get their work done" (2020).

In Bibb County, Georgia, the school system had received 1,500 cellular broadband Wi-Fi hotspots to help these students with Internet access to do their schoolwork. However, because the demand for these hot spots was so high, long lines formed every day to receive their hotspots. The downside of this was the fact that many parents got turned away and did not receive a hotspot for their kids to do their schoolwork, so schoolwork was not done. The alternative for some schools who didn't have the access to Internet was for them to go to the school to pick up their packets of work or even a laptop. Williams from the *Georgia Recorder* writes that schools in the southeast Georgia school districts did not have the transportation to pick up these resources and Williams also points out that some families did not know this was an option for their kid (2020). Williams also mentions that a percentage of Georgians did not have access to Internet in their households. Williams states, "1.6 million Georgians do not have access to high-speed Internet, and in Georgia school systems with fewer than 1,000 students, 56% of households do not have high speed Internet available" (2020).

Unfortunately, the lack of resources for students outside of school are not isolated just in Georgia. This problem occurs all over the world. The Pew Research Center provides statistics prior to COVID-19 where students needed these resources prior to COVID but still did not have the access to them. In 2018 the Pew Research Center found that one in five teens in the ages 13 to 17 said they are often unable at times to complete their homework due to the lack of not having access to a laptop or Internet connection (Auxier 2020). To understand the importance of having Internet access and a computer for a student, the Pew Research Center provides data that shows roughly how many students typically use the Internet for homework. As their evidence reveals, there are about 50% of students that say they use the Internet for homework every day. This data can be visualized in Figure 3. In the town and rural areas there are less students that reported that they use the Internet every day. Non-high school students are also less likely to use homework every day but keep in mind this is all prior to

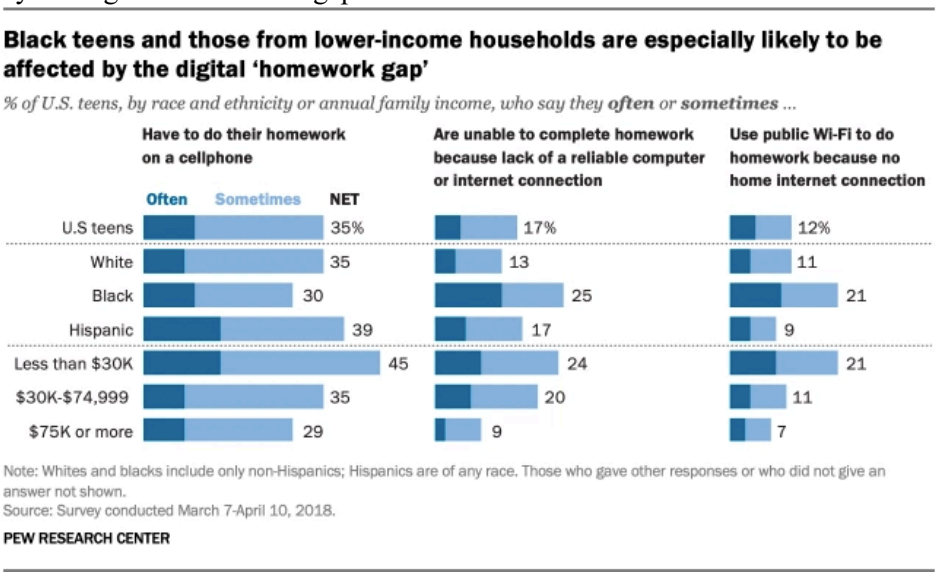
Figure 3.



COVID so the results today would be different than the ones back then. Only 6% of students according to the Pew Research Center claim that they never use the Internet at home for this purpose, which informs us that majority of students need Internet access to complete their assignments and to successfully learn in their classes.

Auxier from the Pew Research Center takes the data from the number of students that reported that they use the Internet every day to complete homework and finds that, due to some students not having those resources that a "homework gap" was formed, which hurt some students in their academic success. The "homework gap" is created by the students not having access to the Internet to complete their assignments are simply behind compared to the students that do have access to the Internet. What Auxier then founds is that there is a certain group of individuals that are more impacted by this "homework gap" rather than other groups of people. For example, Auxier found that lower income teens and Black teens were more likely to be impacted by the "homework gap" than the higher income teens and White teens. In Figure 4, you can see that lower income teens are more likely to have to do homework through a cell phone than having access to a laptop. It is also seen that Black teens have reported higher than most for not being able to complete homework because of the lack of a reliable computer or Internet connection. Therefore, Black teens were reported at higher rates to use public Wi-Fi to do homework because they did not have access to the resource at their house. Also listed for every category you can tell that the lower income teens are the higher for having the least amount of Internet access and computer access.

Figure 4: Black teens and those from lower-income households are especially more likely to be affected by the digital 'homework' gap.



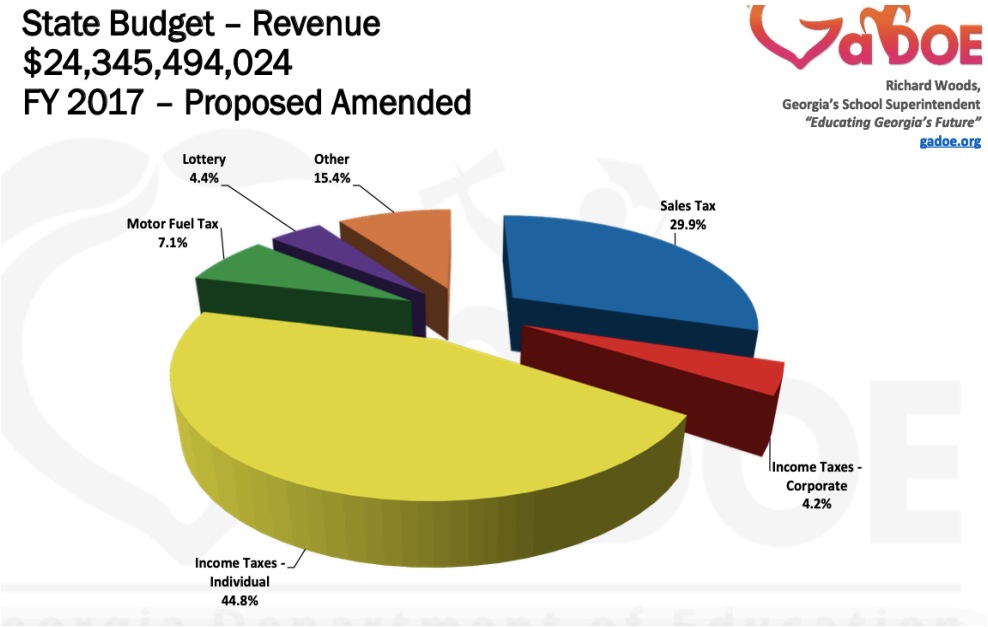
This is an example of a disparity that was formed not during the time of COVID but worsened when times of crisis did occur.

Distribution of Funding

The next question is, how did some schools do well with resources for their students and some did not have any resources to give their students? The answer is the difference with every county's

budget. The Georgia education budget varies for different counties; some counties receive more money towards their budget for education than others. According to the Education Data Initiative, Georgia spends 40% of the state budget towards K-12 education. The state receives its budget based off the taxes which is the government's revenue from the citizens of that state, so they can fund programs to help support the residents of their state. Figure 5 depicts how in 2017 the percentages of how the state of Georgia received their revenue from taxes. Georgia receives majority of its revenue budget from the income taxes of its residents. Income taxes cover 44.8% of the state of Georgia's budget which is the highest percentage of taxes the state is getting to form their budgets.

Figure 5. State Budget Revenue, FY 2017.



The problem with this is that not every county makes the same amount of income. Therefore, the tax amount that state receives back is different per counties. In the state of Georgia there are recommended expenditures and appropriations which is the programs the state wishes to give money to and the percentage budget they wish to spend on those programs. For programs that involve educating Georgia, depicted in Figure 6, the state in 2017 wished to put 52.4% in educating Georgia. This means that out of the $24 billion the State of Georgia received from taxes they hope to spend 52.4% of that number towards educating programs for Georgia residents. Where it gets difficult is how that education spending is really issued and who receives the money for the education spending.

Figure 6. State Budget: Recommended Expenditures & Appropriations, FY 2017

But as you can see in Figure 7, K-12 learning only receives 37.1% of that budget and that is for all counties in the state of Georgia. Pre-K education is in its own budget along with Student Finance Commission, Teacher's Retirement System, Department of Technical Education, and Board of Regents which all goes into the 52.4% of the state's budget. The real disparity from the budgeting side of the Education system is the school systems that tend to have wealthier students receive more resources because they pay more tax dollars than some counties that have residents that don't make enough to pay for taxes therefore the government is not receiving money from them to fund their schools.

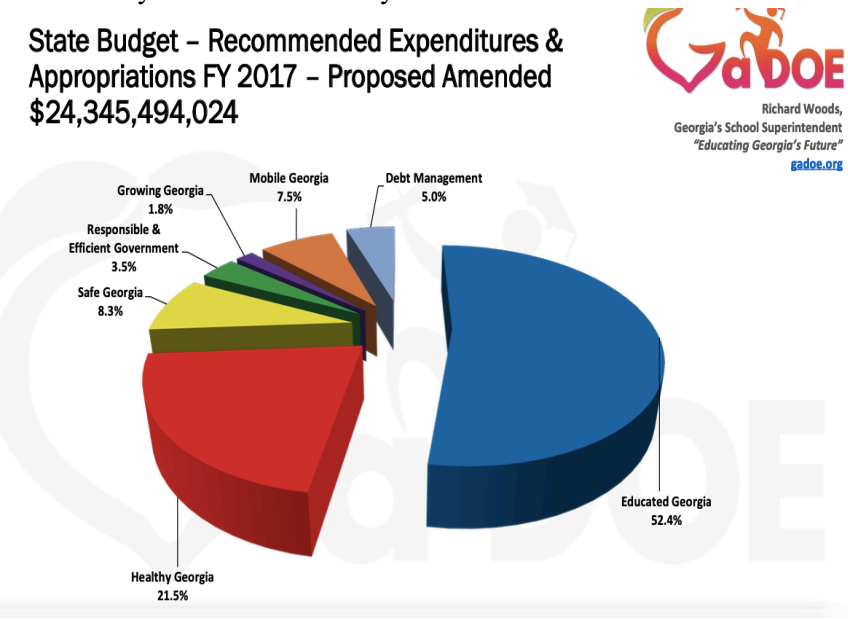
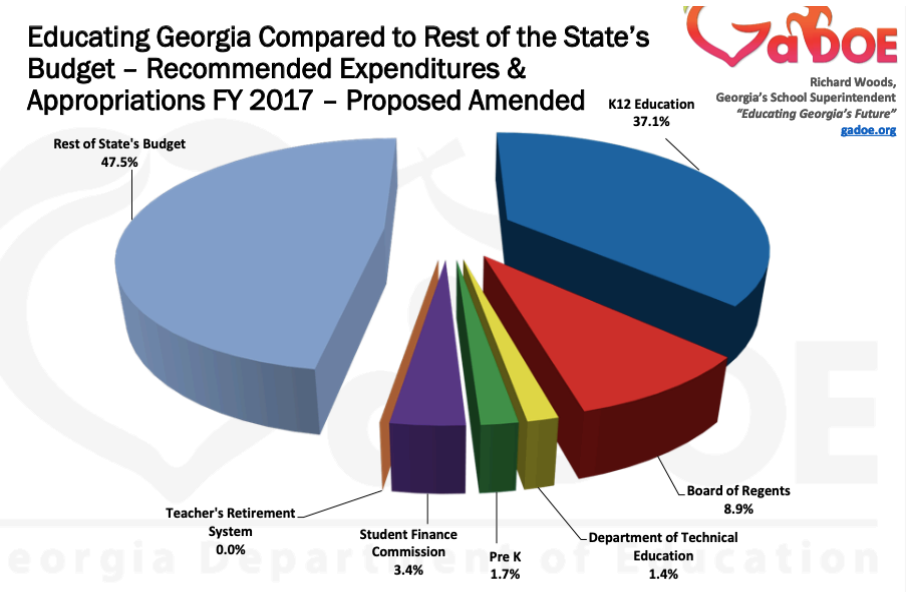


Figure 7. Educating Georgia Compared to Rest of the State's Budget

Owens states that, "61% of Georgia students come from economically disadvantage homes, living at or near the poverty line, and family income is closely linked to education attainment" (2018). The taxes of the state are crucial because school districts with a smaller tax base rely on local taxes when the state's budget isn't sufficient for them. This is how districts are disproportionally different with their resources to help students with their academic success. Owens states that school districts typically respond to these spending cuts by, "furloughing teachers, increasing class sizes, and eliminating some electives" (2018). All these factors can affect a student's education and their academic success which can result in lower test scores and retention rates.



In Georgia there are counties that receive different percentages of funding from the federal level, state level, and the local level. Provided by the Georgia Department of Education, there are graphs that provide that information, and it is there for every county in Georgia. I selected 24 counties in Georgia to look and compare test scores with the percentage of funding the counties receive from the government. This data is presented in Table 4. In the first column of the spreadsheet is

the Federal percentage, which informs the researcher in that counties' education budget they receive a set percentage from the federal government. Compared to the state and local governments the Federal government does not spend as much of their budget on education. The next column over is the local government's percentage towards the counties' education funds. Those highlighted in red means that that specific county is funded mostly by the local government rather than the state government. In the next column over after the local column is the state column which represents the budget the county receives from the state. Cases highlighted in green means that specific county receives most of its education funding from the state level.

Table 4. Federal. Local and State Funding of Select Georgia Counties' Education

The percentages of how a counties' education department is funded is important because, the more a local government must pay for their county's education department, the less that county is receiving from the state. When a county receives less from the state and the income tax revenue is low in that county the local government is not able to pay for the resources for those students. Therefore, disparities around the state of Georgia then form and allow some students quality education and others not so much. This is important because the GMAS test scores from COVID-19 and prior reflect the disparities and the students that live in the lower income counties had no chance of scoring above average due to the lack of resources they have. Table 5 is a spreadsheet that represents the reading scores from the GMAS test that third graders in 2019 took the winter before COVID-19.

Funding	Federal	Local	State
Carroll County	8.50%	34.80%	56.70%
Cobb County	6.00%	53.00%	41.00%
Douglas County	8.10%	40.40%	51.40%
Gwinnett County	6.30%	44.90%	48.80%
Atlanta Public	6.70%	72.50%	20.70%
Paulding County	5.40%	35.50%	59.10%
Troup County	9.10%	43.80%	47.10%
Pike County	5.00%	32.90%	62.10%
Burke County	12.20%	73.20%	14.50%
Fayette County	3.20%	54.50%	42.30%
Cherokee County	4.70%	51.00%	44.30%
Coweta County	5.20%	49.40%	45.40%
Hall County	8.00%	42.40%	49.70%
Haralson County	7.60%	28.40%	64.00%
Heard County	7.90%	43.50%	48.60%
Jasper County	13.70%	35.20%	51.00%
Tift County	12.60%	32.00%	55.40%
Columbia County	5.00%	44.80%	50.20%
Appling County	10.70%	42.90%	46.40%
Bacon County	11.30%	22.70%	66%
Bartow County	7.10%	45.70%	47.20%
Dawson County	5.10%	59%	35.90%
Dekalb County	8.40%	50.10%	41.50%

Table 5. Reading Scores for Select Georgia Counties, 2019.

2019 Reading Scores	Below Average	Above Average
Carroll County	63.20%	36.80%
Cobb County	12.60%	87.40%
Douglas County	21.80%	78.20%
Gwinnett County	25.70%	74.30%
Atlanta Public Schools	46.70%	53.30%
Paulding County	14.40%	85.60%
Troup County	NA	NA
Pike County	53.30%	46.70%
Burke County	37.10%	62.90%
Fayette County	21.40%	78.60%
Cherokee County	28.80%	71.20%
Coweta County	15.70%	84.30%
Hall County	44.30%	55.70%
Haralson County	25.70%	74.30%
Heard County	17.60%	82.40%
Jasper County	NA	NA
Tift County	27.20%	72.80%
Columbia County	27.90%	72.10%
Appling County	17.20%	82.80%
Bacon County	21.70%	78.30%
Bartow County	27.90%	72.10%
Dawson County	14.00%	86.00%
Dekalb County	29.50%	70.50%

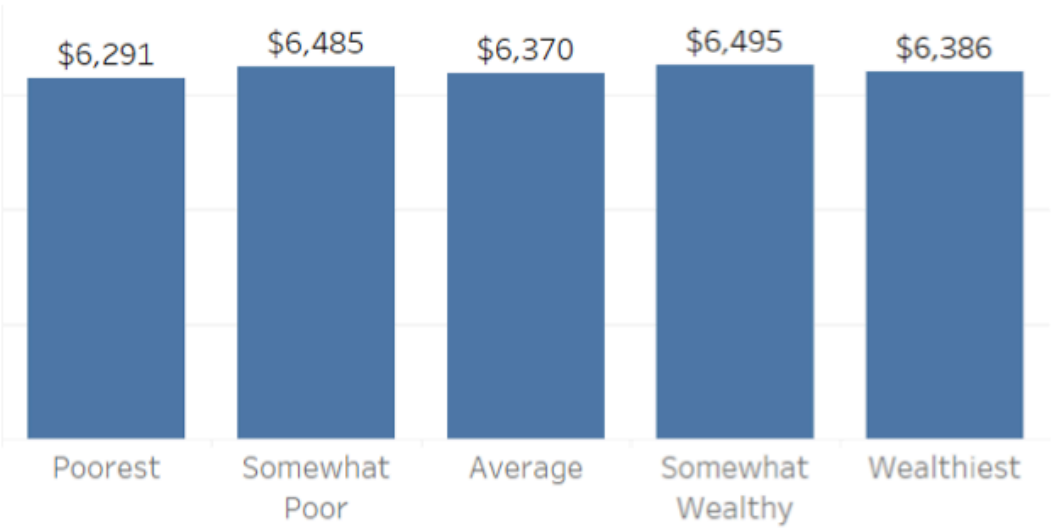
The first column represents the percentage of third graders that received scores below average on the reading section of the GMAS. The right column is the percentages of those third graders that scored above average in the reading section of the GMAS. The counties highlighted in yellow are the outliers that happened to be funded more by the state, but did worst after COVID-19, unlike the other state funded counties. This supports the argument that COVID-19 was the sole reasoning of why student's test scores lacked once they returned to their schools after virtual learning.

Table 6 is a spreadsheet that represents the 2021 Reading scores of third graders that took the GMAS in the spring of 2021.

Table 6. Reading Scores for Select Georgia Counties, 2021

2021 Reading Scores	Below Average	Above Average	
Carroll County	47.80%	52.20%	
Cobb County	32.80%	67.20%	
Douglas County	36.70%	63.30%	
Gwinnett County	24.60%	75.40%	
Atlanta Public Schools	69.80%	30.20%	
Paulding County	24.80%	75.20%	
Troup County	47.50%	52.50%	
Pike County	29.30%	70.70%	
Burke County	55.20%	44.80%	
Fayette County	21.70%	78.30%	
Cherokee County	30.40%	69.60%	
Coweta County	29.70%	70.30%	
Hall County	42.80%	57.20%	
Haralson County	44.40%	55.60%	
Heard County	22.70%	77.30%	
Jasper County	48.40%	51.60%	
Tift County	41.70%	58.30%	
Columbia County	22.90%	77.10%	
Appling County	41.40%	58.60%	
Bacon County	33.10%	66.90%	
Bartow County	40.70%	59.30%	
Dawson County	28.80%	71.20%	
Dekalb County	53.30%	46.70%	

Figure 1: Georgia QBE FY21 Funding, by District Poverty



These are the first results of the GMAS scores since the effects of COVID-19 and the effects of virtual learning. In the first column is the percentage of third graders in that specific county that scored below average on the reading section of the GMAS. The next section over is the percentage of third graders that scored above average. In the first column, the percentages highlighted in green mean the "below average" percentages dropped since the 2019 scores, meaning there was improvement from the learning styles than prior to COVID. The percentages highlighted in red represent the counties that saw an increase in third graders that scored below average than from before COVID in 2019. The most important part of this spreadsheet is the third column with the red highlighted cells. Those represent the counties that are primarily funded by their local government, and they still see such a high number of "below average case percentages for their students. This is important because there is not a single county in Georgia that is primarily funded by their local government that saw a better "above average" percentage of cases, unlike the counties that are primarily funded by the state. This supports the claim that there were disparities within the school system prior to COVID and the testing scores demonstrate the differences more drastically after COVID than before. The counties that lack the funding from the state are struggling to get resources out to their students. Especially in times of adversity, it is hard to support them when there is no income in the system to give these students the resources they need. Therefore, how the state of Georgia and other states craft their budget creates an ongoing cycle, a cycle that is constantly setting students back and only allowing some students to be academically successful.

In addition to the current funding each county is given, once COVID hit in 2020, the Georgia Legislature enacted in a 10% cut in state aid for K-12 education (McKillip 2020). The total amount of this cut for all of Georgia was $950 million which was equally distributed between all counties, but it showed an unequal impact on certain counties. McKillip mentions how Georgia typically runs a "flat fund" across the school districts, which means that there is no increase in funding for school districts that are higher in poverty rates. Figure 8 is an example of how much a student is funded at average for the state and local level in Georgia.

Figure 8. Georgia Funding By School Districts in FY21.

The 10% cut took away about $95 per student for every student, no matter what their financial situation ip, 2020). This is concerning because the poorest students are still receiving less funding to give them access to resources that they need to be academically successful. The somewhat wealthy still makes more than the poorest and the average income of a student which is why there is a continuing cycle of lower income schools not performing well. It is important to know that the cut was proposed because in 2020 students were not in school; they were at home learning virtually. An alternative opinion to this cut that was proposed was that if the funding never was decreased then the aid could have been useful to provide resources for students who did not have the resources to do online learning during COVID-19.

To test the significance of the data I performed a Chi-Square statistics test to see if the data that I found provided any significant results for my test. It can be seen in Table 8 that the independent variables are whether a county was locally funded, or state funded. For the dependent variable the counties either increased in below average student testing scores from 2019-2021 or they decreased in below average student testing scores from 2019-2021. Table 7 provides the statistics, while Table 8provides a summary of data found from my research.

Table 7. Chi-Square Test for School Funding Method and School Scores

	Dependent Variable (Y)			
Independent		**Increase In Below Average Student Scores**	**Decrease In Below Average Student Scores**	Row Total
Variable	**Local-Funded**	**8**	**0**	8
(X)		5.714285714	2.285714286	
	State-Funded	**7**	**6**	13
		9.285714286	3.714285714	
	Column Total	15	6	21
Pearson	Chi-Square Statistic	5.169230769	3.841	
Degrees of Freedom = (# of rows-1)(# of columns-1)				
Is Chi-Square Statistic Statistically Significant At The .05 Level?				
Statistically Significant				

Table 8: How School Funding Types Scored On Tests Before And During the Pandemic

# Of local funded counties that had an increase in below average students: 8	# Of local funded counties that has a decrease in below average students: 0
# Of state funded counties that has an increase in below average students: 7	# of state funded counties that has an decrease in below average students: 6

For the first set of data, it is predicted that 5.714 of locally funded counties were supposed to increase in below average student testing scores. My research found that out of the 21 counties I sampled, 8 of the counties increased in below average student testing scores. That is more than predicted which indicates that the locally funded counties did worst then they were estimated too. For state funded counties it was estimated to have 9 counties that increased in below average student testing scores, but out of the sample, only 7 counties increased in below average student testing scores. This predicts that primarily locally funded counties did worst with their testing scores than primarily state funded counties. This supports the idea that locally funded counties struggled during COVID-19 due to the lack of funding from the state. The next column shows the decrease in below average student testing scores. It was estimated that 2.28 in local funded counties would experience a decrease in below average student testing scores, but the sample showed different with showing that 0 of the local funded counites felt a decrease in below average student testing scores, compared to 6 state funded counties that did decrease in the below average scores. This is double the amount that was predicted for the state funded counties, meaning the state funded counties did better than expected after COVID-19 with testing scores. This supports the statement that primarily state funded counties had more resources and a better budget to allow their students to perform better on testing during COVID-19. The Chi-Square statistic showed significant numbers with such a small sample of 21 counties. This not only is significant but important because if it is already showing a significance with a small sample of counties, the importance of this is there is data that shows the importance of the bigger issue in the policies of budgeting in the education system.

Conclusion

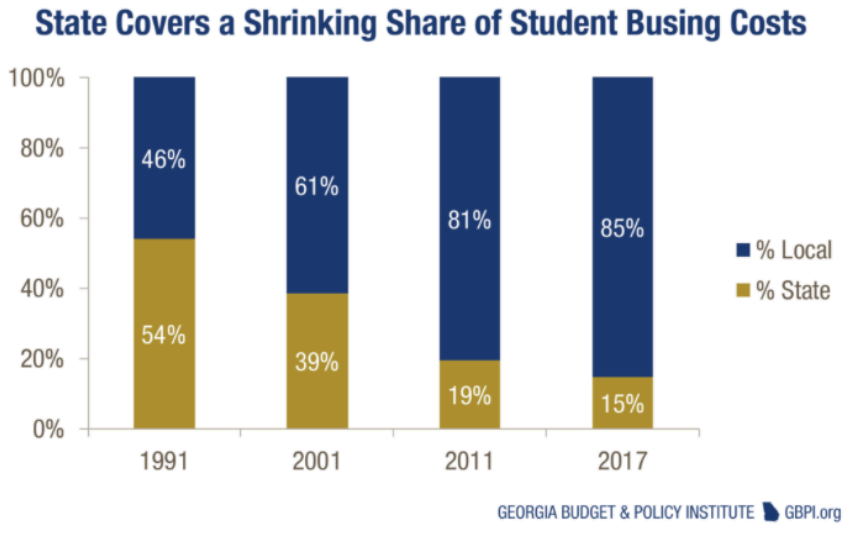
In conclusion to the research above, it is reasonable to say that COVID-19 affected everyone in some way, whether it was the wealthy side of a district or the poorest side of the district. In contrast to that statement is that COVID-19 policies in education did impact a certain group more than the other group. The group touched the most was the lower income counties in Georgia. This is possible because these counties are lower income counties which do not give back the same amount to the state in income taxes such as the higher income counties. Because these districts do not give back the same amount of income tax dollars than the wealthier counties, they do not receive as much funding from the state level of things. Instead, these lower income counties receive more funding from their local government. The

problem with this is if the county is already in a lower income county, then the money the local government has to offer to them is also a low amount. This is how the disparities within the education system have started and they continue in this cycle until the budget changes.

It is common for people to see these disparities more through a time of crisis because they are more visible, due to the lack of resources. It is easy to assume that if a county is not funded enough, then it will experience a lack of resources to help those students academically. When a county does not have the funding for basic resources in their schools, then the counties could not have funding for computers and hot spots to give their students when virtual learning was the only option. The reading scores on the GMAS represent this for the counties that are funded more by the local governments because there is not even one of them that increased in their reading scores after COVID. Instead, those lower income counties continued to increase in students that are below average for their reading scores. Unlike the counties that were funded by the state, some of their reading scores increased with students scoring above average with some exceptions. The counties that are majority funded by the state for education have shown to have a better chance of succeeding even through times of a crisis, rather than counties that are mostly funded by their local government.

How do you fix this ongoing cycle of disparities? Owens from *The Georgia Budget and Policy Institute* gives examples of ways that Georgia could prevent this ongoing cycle from continuing to happen. First, Owens mentions the need to track spending at the school level. Typically in Georgia, the state along with the local government gives a school board of directors the funding amount, and the board budgets the money for each school in the districts. The problem with that is the schools don't get a say so in what their exact needs are. If they were able to track the individual schools' expenditures than they would be able to see what resources and funding certain schools needs and they will be able to adjust the budgets for the school's needs. Owens then mentions to restore funding for bus transportation. In Figure 9, it is shown that the percentage of funding the state gave to schools for student busing cost have gone down a lot over the years. In 2017 the state only funded 15% bus transportation in Georgia as compared to more than half of the costs in 1991.

Figure 9: Georgia Covers Less Student Busing Costs Than It Did In The 1990s



Owens believes that if the state was to increase that percentage again, then it would provide safe and reliable transportation for students and take away the cost from the local level. The local level could then place that funding to another project for the schools that need it the most. By also providing more money

towards transportation, it would allow more people to be willing to drive buses which would make the transportation process quicker and more efficient for the students and the drivers. Owens concludes his ideas of change by stating that, “72% of Georgians in 2018 said they would support spending more money on schools if a study showed that it was needed” (2018). What would be a more perfect time than now after a crisis like COVID-19 when the school system is struggling with, and data is there to back up the learning gaps that have been caused due to these disparities within the system to see that there is a study that shows there needs to be change. The study is the crisis the United States went through during the year of 2020 and how these students were impacted due to the lack of resources and funding. This study shows the students need more support to become academically successful.

Works Cited

Auxier, Brooke, and Monica Anderson. “As Schools Close Due to the Coronavirus, Some U.S. Students Face a Digital 'Homework Gap'.” *Pew Research Center*, Pew Research Center, 27 July 2020, https://www.pewresearch.org/fact-tank/2020/03/16/as-schools-close-due-to-the-coronavirus-some-u-s-students-face-a-digital-homework-gap/.

Blankenship, Grant. “Before Virtual School, the Struggle to Go Online.” *Georgia Public Broadcasting*, 7 Sept. 2020, https://www.gpb.org/news/2020/09/07/virtual-school-the-struggle-go-online.

Camacho, Maritza. “Opinion: Why Online Learning Is More Difficult for Elementary School Students than College Students.” *The Oak Leaf*, 11 Dec. 2020, https://www.theoakleafnews.com/opinion/2020/12/10/opinion-why-online-learning-is-more-difficult-for-elementary-school-students-than-college-students/.

Chernozhukov, Victor. “The Association of Opening K–12 Schools with ... - Pnas.org.” *PNAS*, Oct. 2021, https://www.pnas.org/doi/10.1073/pnas.2103420118.

Dickler, Jessica. “Virtual School Resulted in 'Significant' Academic Learning Loss, Study Finds.” *CNBC*, CNBC, 12 Oct. 2021, https://www.cnbc.com/2021/03/30/learning-loss-from-virtual-school-due-to-COVID-is-significant-.html.

Dorn, Emma, et al. “COVID-19 and Learning Loss--Disparities Grow and Students Need Help.” *McKinsey & Company*, McKinsey & Company, 23 June 2021, https://www.mckinsey.com/industries/public-and-social-sector/our-insights/COVID-19-and-learning-loss-disparities-grow-and-students-need-help.

From the *Department of Woman and Child Health and Public Health. “Schools Closures during the COVID-19 Pandemic: A... : The Pediatric Infectious Disease Journal.” *LWW*, https://journals.lww.com/pidj/fulltext/2021/04000/schools_closures_during_the_COVID_19_pandemic__a.10.aspx.

Georgia Department of Audits. *COVID-19’s Impact on K-12 Education - Audits.ga.gov*. https://www.audits.ga.gov/PAO/files/21-031PGSUM.pdf.

Georgia Department of Education. “School-System-Financial-Information // .” *Financial Review*, https://www.gadoe.org/Finance-and-Business-Operations/Financial-Review/Pages/School-System-Financial-Information.aspx.

Hill, Dara. “How Serious Is the COVID ‘Learning Gap’?” *Dearborn*, https://umdearborn.edu/news/how-serious-COVID-learning-gap.

Kamenetz, Anya. “Two Years Ago Schools Shut down around the World. These Are the Biggest Impacts.” *NPR*, NPR, 15 Mar. 2022, https://www.npr.org/2022/03/15/1086054482/COVID-school-shutdown-biggest-impacts.

McKillip, Mary. *Georgia: Equal Education Cuts, Unequal Impacts - Eric*. https://files.eric.ed.gov/fulltext/ED609011.pdf.

North, Anna. “The Debate over How to Handle Kids' ‘Lost Year’ of Learning.” *Vox*, Vox, 23 Apr. 2021, https://www.vox.com/22380650/school-remote-distance-learning-pandemic-COVID-19.

Owens, Stephen. “Beyond Basic Education: Five Ways for Georgia to Fund Schools Fairly.” *Georgia Budget and Policy Institute*, 26 Feb. 2021, https://gbpi.org/beyond-basic-education-five-ways-for-georgia-to-fund-schools-fairly/.

Owens, Stephen. “Online Instruction Could Leave Rural Schools, Vulnerable Students Behind.” *Georgia Budget and Policy Institute*, 19 May 2020, https://gbpi.org/online-instruction-could-leave-rural-schools-vulnerable-students-behind/.

Owens, Stephen. “State of Education Funding in Georgia (2020).” *Georgia Budget and Policy Institute*, 19 May 2020, https://gbpi.org/state-of-education-funding-in-georgia/.

Reilly, Katie. “Students Have Lost Months of Learning in the Pandemic.” *Time*, Time, 8 Dec. 2020, https://time.com/5918769/coronavirus-schools-learning-loss/.

Schaeffer, Katherine. “What We Know about Online Learning and the Homework Gap amid the Pandemic.” *Pew Research Center*, Pew Research Center, 1 Oct. 2021, https://www.pewresearch.org/fact-tank/2021/10/01/what-we-know-about-online-learning-and-the-homework-gap-amid-the-pandemic/.

Stafford, Leon. “Metro Atlanta Schools Struggling with Computer, Wi-Fi Supplies.” *Ajc*, The Atlanta Journal-Constitution, 14 Aug. 2020, https://www.ajc.com/news/atlanta-news/metro-atlanta-schools-struggling-with-computer-wi-fi-supplies/DZ24FF3NENGMHDHQLSOPTPOU4U/.

Williams, Ross. “COVID-19 Highlights Digital Divide between Georgia Students.” *Georgia Recorder*, 7 Apr. 2020, https://georgiarecorder.com/2020/04/06/with-georgia-classrooms-closed-for-the-school-year-digital-divide-emerges/.

Medical Triumphs in the Midst of Disaster:
The Historic Cocoanut Grove Fire
By Lindsey Green
HIST 4499: Medicine and Society
April 21, 2023

As is the nature of the world, the course of history has proven to be both tragically challenging and positively innovative in human experience. In the modern twenty-first century alone, tragedies have become innumerable. However, as unfortunate as each disaster is in its infliction of pain, there is a lesson to be learned in all of them that will result in the propelling of human understanding. Almost identical to this perspective is the purpose of science and medicine: when presented with a problem, it is the responsibility of humanity to find the solution. Consequently, the use of an analytical, retrospective approach in reviewing the historical advancement of medicine can reveal some of humanity's greatest triumphs over immense disasters to avoid reoccurrences. In American history, one of the clearest examples of medical and societal advancements following a disaster is the Cocoanut Grove fire. The Cocoanut Grove fire left a tainted scar on American history as the country's deadliest nightclub fire while calling to medical and legal attention the need for improvement or further advancement in several categories: burn treatments, smoke inhalation, crisis management plans, safety codes and standards, and blood banks.

Founded in 1927, the Cocoanut Grove nightclub in downtown Boston, Massachusetts had established its popularity as a speakeasy during the Prohibition Era. Because of its mob-affiliated founders, Mickey Alpert and Jacques Renard, the club quickly became known to Bostonians as an area where the generally accepted rules of society would not apply and, consequently, garnered mass consumer appeal. However, this booming business proved to be somewhat short-lived during the Great Depression as its previous customers no longer retained enough disposable income to enjoy the activities they had once frequented the nightclub so often for.

In a turn of fate, the club returned to its Pre-Depression popularity levels following World War II and its acquisition by the mob-affiliated Barnett Welansky. Welanksy, a lawyer and the club's newest owner proved himself to be a businessman strictly focused on profit and the execution of his biggest desires for the future of Cocoanut Grove. The oasis-themed restaurant was filled with paper decorations of items like palm trees that lined the restaurant to appeal to customers. Although having just recently acquired the facility, Welanksy, surprisingly, did not conform to legal safety standards relating to evacuation routes. The nightclub owner had "been remarkably careless in attending to this matter [of safety]. False doors obscured exits; some exits were locked, and others equipped with defective anti-panic hardware"[1] It is widely speculated that the restriction of customers to one shared entry and exit point was done in an attempt to encourage additional spending while inside the nightclub. One singular revolving door allowing entrance from Piedmont Street served as the main entrance to the single-story building. While the motive behind the owner's decision regarding limited entrance is not proven, its consequences proved to be fatal.

On November 28, 1942, the Cocoanut Grove nightclub experienced a surge in consumer activity. Being a Saturday, the club was expected to be busy. To add to this, the Boston College

[1] Edward W. Hautamaki "The Element of Mens Rea in Recklessness and 'Criminal Negligence.'" *Duke Bar Journal* 2, no. 1 (1951): 55–69.

football team had played Holy Cross College and lost at Fenway Park earlier in the day. The possibility of the Boston College team attending a bowl game following a win ensured that the city had become alive with activity. Both the notable Buck Jones, a cowboy movie star, and Joseph A. Boratyn, a Holy Cross football player, were in attendance at Cocoanut Grove following the Boston College football game.

It was reported that at 10:15 PM, an employee of the club noticed a missing lightbulb in one of the dining areas. The chore of replacing it was delegated to a younger employee, Stanely Tomaszewski, and the "16-year-old bar boy… lighted a match to replace the bulb."[2] What should have been a routine chore very quickly ignited into a flash fire that became uncontrollable by the nightclub's staff. The overabundance of paper decorations only further escalated the fire until it consumed the entire building. It was claimed by Welansky that all of the decorations were "fireproofed," but the fire continued to consume all of the decorations inside the club.

There were an estimated 1,000 occupants in Cocoanut Grove which had an occupancy limitation of only 600 people. Occupants became panicked and rushed towards the nearest exits. However, many of these exits were found to be locked or falsely marked by the crowds. It was reported that "Deputy Fire Chief John F. McDonough testified that one door of the night club was equipped with a panic lock, which would open under pressure, but that this was out of order and the door was secured by another lock… he found a number of bodies piled near this door, none was nearer than 10 feet."[3] Following the discovery of inaccessible doors, the crowd realized the only way out was the way all of them had come in: the revolving door located on Piedmont Street. Hundreds of people lost their lives to the inefficiency of this revolving door in its response to the crisis. The herd of people pushed into the door that gave little leeway as bodies began to pile around the entrance. In legal, proceedings that followed, a customer who was in attendance during the fire, George J. Hayes, said, "'If it wasn't for that revolving door; two or three hundred persons would have gotten out.' [and] Fire Commissioner William A. Reilly interjected: 'I think you're right.'"[4]

Some of those trapped inside were able to reach unmarked and secret exits with the help of employees of the club. Others who were trapped with the crowd were overcome with "a gaseous flame, that filled one end of the foyer seconds after the first call of fire."[5] At 10:20 PM, the Boston Fire Department received its first notice of the incident. A second notice was made within the minute for Cocoanut Grove, and it was followed by additional notices made at 10:23 PM, 10:24 PM, and 11:02 PM. Upon arrival, the Fire Department found large stacks of bodies in and around the club. As grim as this was, not all of the bodies were dead as some of these unconscious, engulfed people were trampling victims. This would prove to be an issue in the declarations of death for first responders on the scene. As previously stated, estimates claim that at least one thousand customers were in the nightclub at the time of the fire. Final counts showed that of these customers, four hundred and ninety-two people died because of the fire, and

---

[2] "Boston clamps dancing ban on 1,161 night spots." (1942, Dec 02). *The Atlanta Constitution (1881-1945)*

[3] "Bus Boy's Match Blamed for Fire." *The Atlanta Constitution* (1881-1945), Nov 30, 1942.

[4] "Revolvinig Door Cost 200 Lives, Probers Told: Reflameproofing Testimony also Given Boston Fire Inquiry Board." *The Atlanta Constitution* (1881-1945), Dec 03, 1942.

[5] "Police Check Gaseous Flame in Boston Fire: New Evidence of Poisonous Gases is being Investigated." *The Atlanta Constitution* (1881-1945), Dec 04, 1942.

hundreds experienced injuries. The city of Boston immediately began to feel the pressure of this catastrophe.

As the fire was put out, bodies were sorted and sent to either a hospital or the morgue. Luckily, Boston City Hospital, one of the hospitals in the nearest proximity to the nightclub, was as close to being fully staffed at the time as it could have been. Due to the celebration of a holiday party for the nurses at the time of the incident, "not only were many off-duty nurses and most of the resident students in attendance but also dropping by to pay their courtesies were a number of the hospital's regular staff."[6] However, most of the other hospitals and morgues in the area were neither as prepared nor as equipped as the staff at this hospital, and after the initial rush of patients, even the well-prepared Boston City Hospital began to feel the strain of the influx in patients. Doctor Maxwell Finland, a staff member at Boston City Hospital during the patients' first arrival, recorded that "131 casualties… were distributed on 31 wards in eight different buildings… ward rounds were a continuous process, 24 hours a day, for the first three or four days."[7] While hospitals were thought to have been the only facilities presented with survivors, some bodies that had been declared dead upon the arrival of responders were found to be breathing upon their arrival in the morgues.

The massive strain that was now being placed on medical resources left medical professionals to address three main problems: infections, burn treatments, and smoke inhalation. To explain further, many of the survivors who found themselves in critical condition at various hospitals began to experience bacterial infections relating to their wounds. Of these, thirty-nine were given Penicillin as a trial drug to diminish the infection. These trial patients were first given a drug called Sulfadiazine, a Sulfa-drug, for the first six days of their symptoms. After this time window, the patients' temperatures were reexamined. If the patient had maintained a fever over 101 degrees Fahrenheit, the patient was administered Penicillin through a muscular injection. This was the first time in history that the drug had been recorded as having been used in treating bacterial infections in burn victims.

Penicillin was first discovered by Alexander Flemming in September of 1928 when he discovered that his culture plate "was covered with the recognizable colonies of staphylococci, except in the vicinity of a growth of mould near the edge of the plate… the colonies were ghost-like and transparent, and quite close to the mould there were none at all."[8] This "mould," which would become known as Penicillin, became a medical breakthrough in anti-biotics, and its use following the Cocoanut Grove Fire set a precedent in burn treatments while serving as a cornerstone in the drug's timeline. In fact, Abraham claimed that "the only significant release of American penicillin for civilian use during this [mid-1900s] period was after [the] devastating fire at the Cocoanut Grove… which left many survivors with serious infectious burns."[9]

---

[6] Edward Keyes "Cocoanut Grove." New York: Atheneum, (1984): 81.

[7] Charles S. Davidson "The Cocoanut Grove Disaster." *The Journal of Infectious Diseases* 125 (1972): S58–59.

[8]Gywn Macfarlane "Alexander Fleming: The Man and The Myth." Cambridge, Massachusetts: Harvard University Press, (1984): 117.

[9] Edward Abraham "Penicillin and Its Successors: A Personal View." *Bulletin of the American Academy of Arts and Sciences* 39, no. 1 (1985): 8–27.

Other than the use of Penicillin for burn infections, there were other treatments for burn victims that were developed in response to the incident at the Cocoanut Grove nightclub. Doctor Bradford Cannon, who was only thirty-five years old at the time, was monumental in the concentrations of burn therapies and plastic surgery and the application of these practices following the incident. In the early 1940s, the use of harmful dyes and tannic acid was the most widely accepted method for treating burned tissues. However, following a recent study he had conducted, Dr. Cannon refused to use these treatments on Massachusetts General Hospital patients from the nightclub as he had deemed this method as dangerous. As a substitution, "he and colleagues used gauze containing boric acid and coated with petroleum jelly. They excised the most severely burned tissue and used grafts taken from elsewhere in the body."[10] Due to the publishing of his work in the *Annals of Surgery* in 1943, Dr. Cannon's work in using the substitution of petroleum jelly and boric acid and his efforts in skin grafting in burn victims served as a catalyst in the treatment of such victims of fire.

Going deeper than surface-level wounds, great strides were also made in the research and development of treatments for Cocoanut Grove fire victims being affected by smoke inhalation. As previously mentioned, the building was quickly filled was gas upon the first sight of flames, and many customers believed "there unquestionably was 'something poisonous in the smoke besides carbon monoxide and flame.'"[11] The documentation of such poisonous gas and the presence of respiratory problems in high numbers of Cocoanut Grove victims led to studies within the hospital which yielded results contrary to initial beliefs held by doctors.

As an example, it was first noted that there was no visible correlation between the severity of skin burning and the presence of respiratory damage, but "closer analysis of the cases observed at the Boston City Hospital… shows a fairly good representation between the extent of the surface burns and the respiratory symptoms."[12] Symptoms of respiratory injuries resulting from the fire at Cocoanut Grove included fevers, hyperpyrexia, pulmonary involvement, delayed antecedent respiratory disease, and others. It was hypothesized in this study that – based on the research conducted – the cause of such respiratory damage was one of the following: incomplete combustion of the paper decorations, nitrous fumes, phosgene, and refrigerated fumes, or fire gases and particles. After the consideration of this research, chemotherapy was recommended as a treatment for some of the victims' pulmonary infections. The results of the use of this treatment were inconclusive in its results as its effectiveness varied depending on the symptom experienced. It was ineffective in controlling fevers but was effective in controlling the spread of severe respiratory infections. While treatments produced indeterminate results, the amount of research that was able to be collected regarding smoke inhalation and respiratory damage due to the number of patients admitted who experienced such symptoms at once was vital to the progression of the medicinal world's understanding of the injuries.

---

[10] Caroline Richmond "Bradford Cannon: A Pioneer In The Treatment Of Burns." *BMJ: British Medical Journal* 332, no. 7541 (2006): 611–611.

[11] "Police Check Gaseous Flame in Boston Fire: New Evidence of Poisonous Gases is being Investigated."

[12] Maxwell Finland Charles S. Davidson, and Stanley M. Levenson. "Clinical and Therapeutic Aspects of the Conflagration Injuries to the Respiratory Tract Sustained by Victims of the Cocoanut Grove Disaster." *The Journal of Infectious Diseases* 125 (1972): S60–73.

Consequently while it was catastrophic, the Cocoanut Grove fire played a vital role in the advancement of the concentration of burn treatment and medicine overall through research and trial cases. Additionally, the massive influx of patients throughout the city provided a basis for the importance of crisis management, safety codes and standards, and pre-existing blood reserves. The highlighting of such public health methods resulted both in reevaluations of current practices and further developments in foundational operations.

As an example, the execution of crisis management plans during the onset of the crisis proved to be ineffective in salvaging lives. Ultimately, both the Cocoanut Grove nightclub and the city of Boston were underprepared in terms of enacting a crisis management plan that concerned so many victims. Developing an emergency plan is important because "inefficiencies in planning [can] lead to loss or damage that could have been averted."[13] In terms of the Cocoanut Grove nightclub, Welanksy failed to properly plan for any potential case of mass exodus from the club. If he had done so, he would have realized the dangers of restricting the customers to only one clear entrance and exit. The marking of emergency exits, as there were some unlocked exits hidden from customers, or the creation of a general escape plan could have saved many lives. In looking at the general city of Boston, the lack of human capital available to help was not the result of maliciousness, but it did not aid in the city's response to the crisis. No tragedy on this scale had ever happened as quickly as the Cocoanut Grove nightclub fire did in the city of Boston, so no recognizable plan was in effect. However, the fatalities resulting from this disaster proved that simply because something has not happened yet, it did not mean that it never would.

Relating to emergency preparedness, the Cocoanut Grove fire became a precedent in emergency avoidance and the enacting of various safety codes and standards. To illustrate, the fire resulted in "more jurisdictions… considering the adoption of the Life Safety Code (still known as Building Exits Code)."[14] This code was monumental in requiring buildings to operate in consideration of escape plans and overcrowding in relation to fire and other possible disasters. Furthermore, the nightclub fire resulted in legal proceedings relating to responsibility for the fireproofing of flammable decorations in the club. They revealed that "the decorative materials were fireproofed when installed, but required reflameproofing at least once a year." [15] Testimonies, in this case, proved the seriousness of Boston authorities in determining who was responsible for this safety standard and set a precedent for other businesses to follow. Until all of the legalities of this case were resolved, the Governor of Massachusetts banned dancing in Boston nightclubs until each one could be reinspected according to safety standards.

While the revision of safety codes and the creation of emergency plans are two ways that the disaster revealed room for growth, it revealed the importance of the recent growth and development of blood banks. The medical profession had become much more comfortable with the use and transfusion of blood in the early twentieth century. However, the idea of blood banks was not conceptualized until the 1930s by Dr. Bernard Fantus. His definition of a blood bank was

---

[13] Water Environment Federation. 2013. *Emergency Planning, Response, and Recovery*. Alexandria: Water Environment Federation.

[14] Marilyn E. Kaplan"Safety and Building Codes: The Recent Past and Future for Historic Structures." *APT Bulletin: The Journal of Preservation Technology* 40, no. 3/4 (2009): 11–18.

[15] "Revolvinig door cost 200 lives, probers told: Reflameproofing testimony also given Boston fire inquiry board."

one that 'combined a stockpile of blood controlled by the hospital with a new category of blood donor."[16] Eventually, Dr. Fantus' idea became more popularized and blood banks expanded in terms of geographic location. During the aftermath of the Cocoanut Grove fire, the blood bank proved itself to be a vital resource in managing medical disasters. The large number of burn patients being serviced with short notice required large reserves of blood to be used in necessary medical treatments. The only medical practice sufficient in doing so is the stockpiling of blood for future medical use. While many had been skeptical of the usefulness or safety of maintaining a stockpile of blood, blood banks were proven during the treatment of Cocoanut Grove victims to be effective in managing large-scale medical disasters.

Overall, the incident that occurred at the Cocoanut Grove nightclub in November of 1942 left a tragic stain on the history of America. Hundreds of innocent Bostonians were killed or injured at the expense of a singular revolving door and a businessman who desired to maximize his profits. And, while the incident was disastrous and a horrible reflection of the selfishness of humanity, it provided both medicine and society the opportunities to grow and improve upon previous mistakes. As a result of this fire, both research and potential treatments were developed in the areas of bacterial infections resulting from burns, skin grafting of fire-damaged tissue, skin tissue treatments, and smoke inhalation. Furthermore, upon a review of the incident, deficiencies in crisis management plans and safety codes were discovered while the importance of blood banks was highlighted. Thus, while the fire at the Cocoanut Grove nightclub was a devastating moment in American history, it emphasized the unequaled beauty of humanity in its acceptance of the responsibility of medicine and society in problem-solving, addressing mistakes, and reformation.

Bibliography

Primary Sources

"Boston Clamps Dancing Ban on 1,161 Night Spots." *The Atlanta Constitution* (1881-1945), Dec 02, 1942.

"Bus Boy's Match Blamed for Fire." *The Atlanta Constitution* (1881-1945), Nov 30, 1942.

"New Burn Shock Treatment." *The Science News-Letter* 45, no. 5 (1944): 68–68.

"New Treatment for Face Injury is Described: Boston Specialist in Macon, Tells of New Methods." *The Atlanta Constitution* (1881-1945), Jan 13, 1943.

"Police Check Gaseous Flame in Boston Fire: New Evidence of Poisonous Gases is Being Investigated." *The Atlanta Constitution* (1881-1945), Dec 04, 1942.

"Revolving Door Cost 200 Lives, Probers Told: Reflameproofing Testimony also Given Boston Fire Inquiry Board." *The Atlanta Constitution* (1881-1945), Dec 03, 1942.

Secondary Sources

[16] Kara W. Swanson. 2014. *Banking on the Body : The Market in Blood, Milk, and Sperm in Modern America*. Cambridge, Massachusetts: Harvard University Press.

Bennett, Kate, and Gillian Bennett. “Witnesses, Bereavement, and the Sense of Presence.” In *Alas Poor Ghost*, 77–114. University Press of Colorado, 1999.

Macfarlane, Gwyn. “Alexander Fleming: The Man and The Myth.” Cambridge, Massachusetts: Harvard University Press, 1984.

Keyes, Edward. “Cocoanut Grove.” New York: Atheneum, (1984): 81.

Swanson, Kara S. 2014. *Banking on the Body : The Market in Blood, Milk, and Sperm in Modern America*. Cambridge, Massachusetts: Harvard University Press.

Water Environment Federation. 2013. *Emergency Planning, Response, and Recovery.* Alexandria: Water Environment Federation.

Roth, Jeffrey J. and William B. Hughes. 2015. *The Essential Burn Unit Handbook.* Vol. 2nd ed. New York: Thieme.

Journal Articles

Abraham, Edward. “Penicillin and Its Successors: A Personal View.” *Bulletin of the American Academy of Arts and Sciences* 39, no. 1 (1985): 8–27.

Davidson, Charles S. “The Cocoanut Grove Disaster.” *The Journal of Infectious Diseases* 125 (1972): S58–59.

Finland, Maxwell, Charles S. Davidson, and Stanley M. Levenson. “Clinical and Therapeutic Aspects of the Conflagration Injuries to the Respiratory Tract Sustained by Victims of the Cocoanut Grove Disaster.” *The Journal of Infectious Diseases* 125 (1972): S60–73.

Hautamaki, Edward W. “The Element of Mens Rea in Recklessness and ‘Criminal Negligence.’” *Duke Bar Journal* 2, no. 1 (1951): 55–69.

Kaplan, Marilyn E. “Safety and Building Codes: The Recent Past and Future for Historic Structures.” *APT Bulletin: The Journal of Preservation Technology* 40, no. 3/4 (2009): 11–18.

Richmond, Caroline. “Bradford Cannon: A Pioneer In The Treatment Of Burns.” *BMJ: British Medical Journa*l 332, no. 7541 (2006): 611–611.

Apple Pie & Afternoon Tea: Awlaki's Impact on Western Terrorism

By Jaydon Parrish

Select Topics: POLS 4410 Terrorism

October 26, 2021

Dr. John A. Tures

I. Introduction

Since the events that occurred on September 11th, 2001, terrorism has become a prevalent part of research, politics, and the media. Special emphasis has been placed on terrorist leadership, those who can plan and influence people to overcome human emotions to resort to acts of terror. However, it seemed once the issue of terrorism began to receive widespread academic and media attention, terrorism was shifting to adapt to a more technological world.

The idea of this shift is symbolized by an American. Born in Las Cruces, New Mexico on April 21, 1971, Anwar al-Awlaki would become a key figure in translating radical jihadi teachings to the Western world. Beginning in 2005, lectures by the Colorado State graduate would become a common thread among counterterrorism investigations across the Western world (Berger 2011). The key to Awlaki's success was his ability to take the radical teachings of earlier teachers of Jihad and convert them in a way that applied to Muslims in the Western world. At the pinnacle of his influence, the imam had become an increasingly crucial figure for Al-Qaeda in the Arabian Peninsula (AQAP) whose links to the actions of terrorists throughout the West landed him on the CIA's kill list (Pelofsky 2010).

On September 30, 2011, drones sanctioned by the United States government fired hellfire missiles killing Awlaki and fellow American Samir Khan. The two would become the first American citizens since the Civil War to be hunted down and killed without due process from orders by a president (Shane 2015).

In this paper, I attempt to measure the impact Awlaki has had on jihadi terrorism in the West by measuring his known influence in attacks. I also look to see how his impact has affected the United Kingdom and the United States in which the imam spent time before his conversion to radical teachings. In addition, I look to determine whether or not the U.S.-sanctioned killing of Awlaki had an impact on his ability to create and influence homegrown terrorists in the Western world.

II. Literature Review

From logical to radical

In an interview with the *Washington Post* following 9/11 in October 2001, Anwar al-Awlaki stated that:

"Muslims still see Bin Laden as a person with extremely radical ideas. But he has been able to take advantage of the sentiment that is out there regarding US foreign policy. We're

totally against what the terrorists had done. We want to bring those who had done this to justice. But we're also against the killing of civilians in Afghanistan."

In many ways, Awlaki's stance on terrorism was viewed similarly to that of many Muslims during this time. Awlaki would gain national attention in the wake of 9/11, when he proclaimed, "We came here to build, not to destroy… We are the bridge between America and 1 billion Muslims worldwide" (Shane, 86). His moderate view on the actions of 9/11 made him a voice for Western Muslims. It was applauded by onlookers so much so that afterwards Awlaki became a key figure for the promotion of coexistence between Islam and Western culture being interviewed by many media outlets. The Imam of Dar al-Hijrah Mosque in Falls Church, Virginia was even invited to a dinner at the Pentagon that was part of an "outreach program which sought contact with leading members of the Muslim community" (Orr 2010). So how did a respected conservative imam born in America become the key inspiration for homegrown terror in the West?

Despite the imam's popularity during the early 2000's, evidence suggests that even before 9/11 Awlaki was not the moderate bridge builder that the media and public opinion thought he was. Awlaki's journey from logical to radical is not clear, but it is originally thought that Awlaki first encountered Islam extremism while in Islam conferences in London. There he encountered Salafi Jihadists who had moved to England after the Afghan War against the Soviet Union had ended. Salafi Jihadists who agreed on the basic platform that Western Muslims needed to "resist integration into the materialistic Western culture" (Meleagrou-Hitchens 2011, 37). Through learning from these traditionalists, Awlaki transformed the way that he viewed Islam and would eventually become the leader of the Salfi Jihad movement in the western world being able to convey these traditionally Afghan ideals into a way that Western Muslims could understand it. Awlaki did this by focusing on Islam identity. As an imam, Awlaki began to use his growing platform to spread populist ideology that there was an imminent threat to Islam and that it could be solved through knowledge of Allah and Muslim history as well as becoming active member in the worldwide Muslim ummah" (Meleagrou-Hitchens, 39).

According to his college roommate at Colorado State, Awlaki spent a summer in Afghanistan during the early 1990's. When he returned, he became less interested in the engineering classes that the two took together and more interested in his faith, announcing that he wanted to become an imam (J.M. Berger 2011). In addition, there were three FBI investigations that looked into Awlaki when he was imam before 9/11. This occurred because Awlaki was a vice president of a nonprofit organization known as the "Charitable Society for Social Welfare, whose ostensible purpose was to raise money for 'orphans, refugees, and the needy' in Yemen" (Shane, 110). The president of the organization, Abdul Majeed al-Zindani would later be placed on a list of designated terrorists, as the FBI testified that the nonprofit was actually a "front organization to funnel money to terrorists" (Shane, 110). However, there was no evidence to implicate that Awlaki knew anything about it.

Even more suspicion about Awlaki being a voice of moderation was raised after the 9/11 Commission began to look into Awlaki because of his potential relationship with at least two of the hijackers. The FBI had discovered that "two of the hijackers, Nawaz al-Hazmi and Khalid al-Mihdar had prayed at al-Awlaki's mosque in San Diego, and some congregants, and some congregants thought he had even met with them privately" (Shane 2015). This was worrisome

enough that it warranted an investigation from the FBI who had a surveillance team follow him 24 hours a day even as the imam grew in popularity as he preached Muslim unity following the 9/11 attacks (Shane 2015).

Being a respected imam throughout North America, it was very ironic that the imam would run into the law on multiple occasions when it dealt with soliciting prostitution. FBI sources in 2004 had revealed that "Awlaki, who had twice been arrested for soliciting prostitutes in San Diego in the 1990s, had been observed crossing state lines with prostitutes in the DC area" and the FBI even considered "invoking the little-used Mann Act, a federal law prohibiting the interest transport of women for 'immoral purposes,' to arrest him" (Rhee & Schone 2009). As a fellow imam at Dar al-Hijrah, Johari Abdul Malik, reflected on Awlaki's motivation on leaving America, "while Awlaki was selling us this jive about politics and university lecturing, maybe there was another motivation: to get out of there before they publicly uncovered his dirt" (Meleagrou-Hitchens, 27).

In 2009, it was revealed that just a day before Awlaki was intercepted by airport security as a potential suspected terrorist, The US Attorney's Office had cancelled his felony arrest warrant. This caused Awlaki to be let go even though he was on the terror watchlist and the office had been "fully briefed" on Awlaki's ties to terror (Rhee & Schone 2009). After being allowed to fly, Awlaki would leave for England in 2002 where he would give a series of lectures on the Islamic Book of Jihad across the country that were very popular, especially among the younger Muslim population (Meleagrou-Hitchens, 29). As Shane describes Awlaki's time in England, his audiences were no longer interested in building bridges but were looking for an explanation for the "sting of discrimination and disdain from the British majority" (Shane pg 150). Awlaki was able to do this by dividing the world into the umma, Muslim believers, and the non-Muslim nonbelievers, who he described as "misguided at best, sinister at worst" (Shane pg 150). As America continued its War on Terrorism by invading Afghanistan and then Iraq, Awlaki became more radical in his teachings as he was able to teach "the sixth century-old Book of Jihad suddenly took on new relevance and Awlaki was there to explain it" (Shane pg 152).

Spreading Jihad

In early 2004, Awlaki would leave Great Britain returning to Yemen where he spent the majority of his childhood growing up. He would begin lecturing at Iman University in Sanaa which was led by Sheik Abdul Majeed al-Zindani who was described by some officials as Osama bin Laden's spiritual advisor (Raghavan 2009). In 2005, Awlaki issued a 5-hour series of lectures called "Contestants on the Path of Jihad" which has been described as the turning point from scholar to radical (Berger 2011). Berger called it "one of the single most influential works of jihadist incitement in the English language" (Berger 2011). The original work was written after 9/11 by Al-Qaeda in Saudi Arabia founder Yusuf al-Uyayri in Arabic, but Awlaki translated the text to English and then revised it adding details that Western Muslims would be able to relate to (Berger 2011). Posting this on online forums, it quickly spread around the Internet and would eventually begin turning up in multiple terrorism investigations.

On August 31, 2006, Yemeni authorities arrested Anwar al-Awlaki and two other colleagues for a tribal issue dealing with the kidnapping of a Shiite Muslim (Shane, 164). Awlaki would spend eighteen months in prison where despite multiple rumors and accusations, he was

never charged with any crimes (Shane, 165). Awlaki would be released in December of 2007, and he would immediately continue building his religious following through interviews, lectures, and research into the Quran (Shane, 172-173). In February 2008, the website www.anwar-alawlaki.com was created giving him a new centralized platform for the imam to release his lectures. It also contained a blog section where he would comment on current events and a way to personally contact him (Shane, 174).

At this time, Awlaki was beginning to publish content consistently every couple of weeks. He moved to his family's tribal homeland, Al Saeed, where he managed to become active in the tribal community as well as online (Shane, 176). This grew increasingly concerning to US officials especially since Awlaki had already been linked to multiple terrorist incidents in the US and UK. According to a former Department of Homeland Security intelligence analyst Howard Clark: "Al-Qaeda had begun to put huge stock into the internet as a perfect conduit for their messaging and propaganda. By August 2008, Awlaki was all over YouTube and the rest of the Internet, and his website was skyrocketing in readership. The statistics were extremely concerning, particularly the number of visitors from the United States and Britain" (Meleagrou-Hitchens, 70).

As Awlaki's online presence continued to grow, so did his continuation on the path of radicalization. Now openly encouraging jihad, Awlaki posted his "44 Ways to Support Jihad" lecture in August 2008. It would become one of his most popular posts and would be the first time Awlaki openly campaigned for Western Muslims to join a campaign against the Western world (Meleagrou-Hitchens, 73). Together with fellow American Samir Khan, *Inspire* magazine published the first issue titled "How to make a bomb in your mom's kitchen" which was released online in June 2010. The magazine would become a cited inspiration for many terrorists. In total, 16 issues of the magazine have been released with seven issues being released before Awlaki and Khan's death.

By 2010, Anwar al-Awlaki was at the pinnacle of his influence. Born in New Mexico, the radicalized imam had posted 1,910 videos on YouTube, one of which had been viewed over 164,000 times. Many of the videos urged English-speaking Muslims to take action against the Western World that oppressed them (Scarborough 2017). One of these lectures was known as, "The Call to Jihad," in this lecture, Awlaki endorses attacks on Americans. However, his most notable moment in this text was when he used Islamic texts to predict an uprising in Iraq making the imam a prophet in the eyes of the Islamic State (Shane 2016). On March 19, 2010, Awlaki released a statement announcing the transformations that Jihad had made since 9/11 (Millstone 2010): "Eight years after 9/11 and the declaration of war against terrorism, Jihad is still reaching the shores of Europe and America. Not from the outside, but from within. Jihad is not being imported but is being homegrown. The media around the globe is painting Jihad in the worst possible colors. Day and night the masses are hearing an orchestra of smear against the mujahideen. In such an inhospitable environment, Jihad is still flourishing, like a blessed tree sprouting through an earth of waste and pollution. The Jihad movement has not only survived but is expanding. Isn't it ironic that the two capitals of the war against Islam, Washington D.C. and London have also become among the centers of Western Jihad? Jihad is becoming as American as apple pie and as British as afternoon tea."

In seven years, Anwar al-Awlaki had transformed himself from inspiring Western Muslims to become a bridge between Islam and Western culture to an individual who openly inspired hatred and terror to be enacted in the West. Even after his ordered death by an American drone, YouTube and his online magazine *Inspire* has continued to spread jihadi rhetoric alongside "practical instructions on shootings and bomb-making" (Shane 2015). In my research, I found data that looked toward measuring just how successful an influence Awlaki was in spreading Western Jihad.

Western Democracy	Amt. Linked to Awlaki	Amt. Not Linked to Awlaki	Total	% influence
Australia	2	7	9	22.22%
Austria	0	2	2	0.00%
Belgium	1	8	9	11.11%
Canada	3	4	7	42.86%
Denmark	1	5	6	16.67%
Finland	0	1	1	0.00%
France	11	30	41	26.83%
Germany	1	13	14	7.14%
Holland	0	4	4	0.00%
Ireland	0	1	1	0.00%
Italy	0	3	3	0.00%
New Zealand	0	1	1	0.00%
Norway	0	2	2	0.00%
Spain	0	3	3	0.00%
Sweden	0	2	2	0.00%
Switzerland	0	2	2	0.00%
United Kingdom	10	10	20	50.00%
United States	23	16	39	58.97%
Total:	52	114	166	31.33%

III. Research Design

For my theory, I examined the impact of Anwar Al-Awlaki on Jihadi terror in the West. This is further split into three different hypotheses which I used to better measure Awlaki's impact on terrorism in Western democracy. In these, my independent variable is the influence of Al-Awlaki in terrorist attacks against the West and my dependent variables are the impact he made before vs. after his death, the impact Awlaki has had on inspiring major terrorist attacks in the West, and the impact Awlaki has had specifically on the United Kingdom and United States.

Hypothesis I: Awlaki has been most effective at spreading jihadi terror in the US and UK.
Hypothesis II: Awlaki was just as effective at influencing acts of jihad on the West before his death as he was after.
Hypothesis III: Awlaki has been a common thread among major terrorist events in Western democracies.

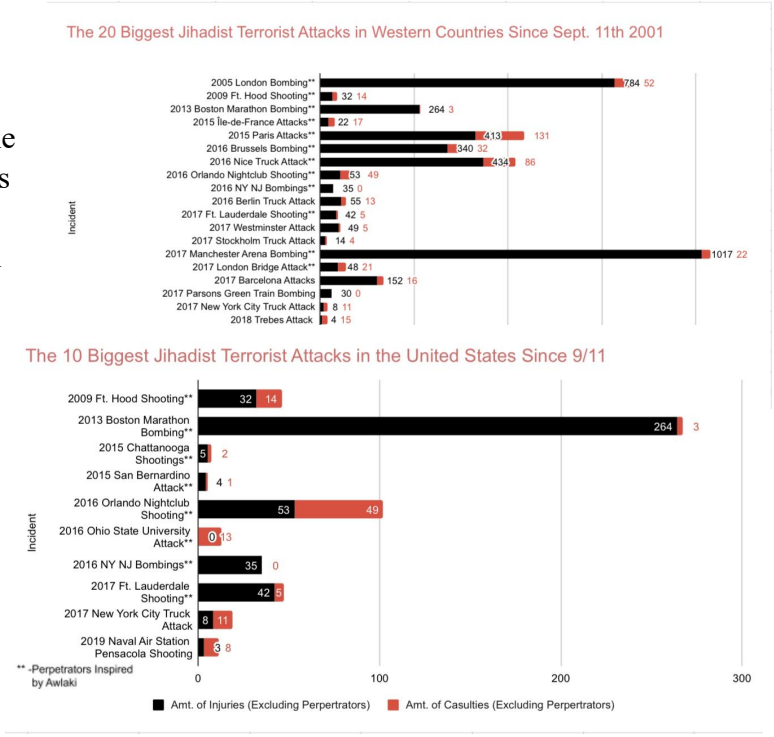
To determine the impact of Awlaki on Western Jihadi Terrorism, I attempted to look at every confirmed terrorist attack in which the perpetrator either carried out the attack or was stopped in the act of carrying out the attempt. However, I realize that I may be missing some of the more minor attacks that have occurred throughout Western democracies. In total, I looked at 166 terrorist attacks spanning from 2005 to 2021. I made sure that each case analyzed was tied to or believed to be tied to a form of Jihad. I then looked at whether or not the incident was linked to Al-Qaeda and then the amount of people injured or killed in each incident. I also looked to see whether or not the attacks carried out were planned by multiple people or part of the growing lone wolf style terrorism. The final thing I looked for was a link to Anwar Al-Awlaki and other forms of online media that showed a link to radicalization online.

In my data overall, I found that Awlaki played some sort of role in the life of one or multiple perpetrators in 52 out of 166 attacks since 2015. I found that Awlaki's influence was greatest in countries that spoke English in which he made an impact on 10 of 20 cases (50%) in

Western Democracy	Amt. Linked BD	Amt. of Attacks BD	% Impact BD	Amt. Linked PH	Amt. of Attacks PH	% Impact PH	Total
United Kingdom	3	6	50.00%	7	14	50.00%	20
United States	6	8	75.00%	17	31	54.84%	39
Total	12	27	44.44%	40	139	28.78%	166
					BD= Before Death		
					PH= Posthumous		

the United Kingdom and 23 out of 39 cases (58.97%) in the United States. This shows that Awlaki was best at influencing English-speaking listeners online and through lectures.

Despite what is commonly thought about in regards to killing terrorists and increasing terrorist activity, I found that Awlaki was connected to a higher percentage of cases before his death than he was after. However, I believed that this was because it coincided with an increase in jihadi terrorist attacks in non-English speaking countries. Because of this, I also compared the impact Awlaki had on terror attacks in the West by looking at the United Kingdom and the United States where he had the biggest impact. After looking at this, I still found that Awlaki had an impact on 50% or more of the attacks in both countries. However, his impact in the United States went down from a link in 75% of attacks before his death to a link in 54.84% of attacks afterwards. Overall, I find my data inconclusive on whether or not Awlaki's death impacted his influence on acts of Jihad.



Using my dataset, I found the top twenty biggest terrorist incidents in Western democracies. I then looked to see whether or not Awlaki was linked to one or multiple of the perpetrators in the attack. Using data, I found that out of the largest 20 Jihadist terror attacks since September 11, 2001, Awlaki could be linked to eleven out of the twenty biggest attacks since 9/11. Furthermore, I found that out of the ten biggest attacks, only two had no link to Awlaki. This data supports the idea that Awlaki has a stronger influence on causing perpetrators to cause more large-scale attacks. However, I could also see that this data could point toward the media having more coverage of these large-scale events. With more media coverage, there is more research devoted to finding motives on perpetrators meaning. This could point towards Awlaki having a larger impact on terrorist attacks than I have found; perhaps it is just that it was either not reported to the media by the authorities or not as much research was done into the background of the perpetrators when compared to some of the larger events.

When it comes to Awlaki's impact on major jihadi terrorist incidents in the US, I found that he had an impact on the perpetrators in eight of the ten biggest attacks in the United States. This continues to prove that Awlaki either has a large impact on big attacks on Western democracies or that increased research on these attacks has uncovered links to the radical imam meaning that his impact as a whole is larger than my dataset suggests.

IV. Inspiring Terror: Major Links between Awlaki and Western Terrorism

A. 2005 London Bombings

The 2005 London Bombings was a string of four suicide bombings executed by 18-year-old Hasib Hussain, 19-year-old Germaine Lindsay, 30-year-old Mohammed Sidique Khan, and 22-year-old Shehzad Tanweer. The bombings were executed across the city during the early morning commute killing 56 including the four suicide bombers and injured 784 (BBC 2015). The attack was reportedly motivated by the UK and US invasions of Afghanistan and Iraq (Moghadam 2008).

It is reported by numerous sources that Awlaki played an influential role in the bombings. According to a counterterrorism informant after the bombings, three of the four perpetrators were present at many of Awlaki's lectures. They would become the first time Awlaki would be attributed rather intentionally or unintentionally inspiring an act of jihadi terror (Shane pg. 148).

It is also reported that the London bombers had transcribed many of Awlaki's lectures convincing themselves to commit to the event. Material on Awlaki was also found in many of the suspected accomplices of the perpetrators (Gardham & Sherwell 2009).

B. 2009 Fort Hood Shooting

Nidal Malik Hasan was born in Virginia to Palestinian parents. Against his parents' wishes, Hasan joined the military and worked as a psychiatrist for Walter Reed Medical Army Center. He was described by the training director at the time, Dr. Thomas Grieger, as very quiet and as far as he knew loyal to the military. However, Hasan's internet activity caught the FBI's attention with his postings one of which involved him comparing a suicide bomber to a soldier throwing themselves on top of a grenade to protect other soldiers (BBC 2009). On November 5, 2009, Hasan opened fire at a processing center for soldiers killing 13 and wounding 32. Upon several officers' arrival, Hasan was shot and became paralyzed from the chest down. (Rubin et al. 2013).

Although not explicitly a member of al-Qaeda, Hasan was found to be exchanging emails with al-Awlaki for up to 6 months before the shooting. One of these stated Hasan stating that he could not wait to meet al-Awlaki in the afterlife. Investigators found that Hasan donated $20,000 to $30,000 overseas to Islamic charities, some of which fund terrorist groups. Following the attack, al-Awlaki posted a blog post describing himself as Hasan's confidant and praising him as a "hero" who could not live his contradictory life (Ross et al. 2009).

C. 2009 The "Christmas Bomber"

Umar Farouk Abdulmutallab, the Christmas bomber, was born on December 22, 1986, in Lagos, Nigeria. He was seen by many as a model student who grew up in Northern Nigeria. His

dad, a wealthy businessman and former Nigerian Federal Commissioner for Economic Development made sure his son received high-quality education internationally. He attended a boarding school where his loneliness led him to become devoutly religious and mockingly was given the nickname "pope" (Hosenball 2010).

On December 25, 2009, Abdulmutallab boarded a plane from Amsterdam to Detroit carrying a bomb concealed in the lining of his underwear. Shortly before landing, Abdulmutallab attempted to detonate the bomb, which did not explode, but instead set fire to the bomber. Shortly after, Abdulmutallab was restrained by passengers and given a life sentence (*USA vs. Umar Farouk Abdulmutallab 2010*).

Following the failed attempt, Anwar al-Awlaki admitted to knowing Abdulmutallab and is believed to be the man who introduced him to AQAP and inspired him to attend school in Yemen, where he could become more closely affiliated with the terrorist organization. Abdulmutallab was considered the first example of someone that Awlaki mentored and went to Yemen because of his invitation. After being arrested, Abdulmutallab gave authorities names and provided locations of other AQAP operatives which helped change the view of Awlaki from a propagandist to a potential mentor and recruiter for al-Qaeda (NPR 2010).

D. 2013 Boston Marathon Bombing

Dzhokar and Tamerlan Tsarnaev used homemade bombs on April 15, 2013, which they placed near spectators at the Boston Marathon. The two bombs would go off 14 seconds apart killing 3 and injuring 264. Once they were identified, a search hunting down the two brothers followed with thousands of police officers being issued to track the two in nearby Watertown, Massachusetts. Tamerlan Tsarnaev was killed by law enforcement by a bullet as well as being run over by his younger brother who was attempting to escape from authorities (Cramer & Schworm 2014). There were additional casualties in an armed confrontation.

Following the manhunt, Dzhokar was brought in alive by authorities. He was asked a series of questions in which he told authorities that he and his brother were not working with any other terrorist organization. He also stated that they learned to create bombs out of pressure cookers by reading an *Inspire* magazine issue online. Dzhokar also claims that their actions were part of the defense of Islam against the West that threatened it in Afghanistan and Iraq (Cooper et al. 2013). In 2020, the death sentence for Tsarnaev was controversially appealed with a motion for the death penalty to be reinstated heard before the Supreme Court in October 2021 (Boboltz 2021).

E. 2015 Paris Attacks

On November 14, 2015, nine perpetrators who had declared allegiance to the Islamic State committed a series of attacks that would leave 130 people killed and 416 injured. Of the nine perpetrators, three were suicide bombers that struck outside the 80,000-capacity stadium the Stade de France while the French national team was playing a friendly soccer match against Germany. Meanwhile, a second group of attackers used automatic weapons on innocent citizens dining at Parisian cafes and restaurants. A third group of attackers carried out a hostage-taking and mass shooting scenario in the Bataclan Theatre. Overall, this was the deadliest attack on French soil since WWII and had huge political and social repercussions (BBC 2015).

The attacks were planned by a cell of the Islamic State based in Brussels, Belgium. During the attacks, two of the perpetrators, Chérif Kouachi and Saïd Kouachi, had repeatedly announced their loyalty to Awlaki. The two brothers had traveled to Yemen between 2009 and 2012, and it was reported that during Saïd's time in Yemen, he had met with Awlaki and had temporarily been a roommate to Christmas Day bomber Umar Farouk Abdulmutallab. In an interview between the brother and France media that occurred before the two were killed, both announced their commitment to the cause because of Awlaki. "I, Cherif Kouachi was sent by Al Qaeda in Yemen, I went there, and it was Sheikh Anwar al-Awlaki who financed me" (Shane 2015). In the eyes of both brothers, Awlaki had been the key inspiration behind their attacks and there are also reported connections between Awlaki's lectures and many of the other attackers.

F. 2017 Manchester Arena Bombing

Born in Manchester, England on December 31, 1994, Salman Ramadan Abedi grew up the son of Libyan asylum seekers. Abedi was described as a "keen Manchester United" supporter who grew up in a family that practiced very traditional Salafi Islam (BBC 2017).
On May 22, 2017, Salman Abedi carried in his backpack a self-made bomb that he would detonate at the Manchester Arena during a concert by Ariana Grande. Abedi would detonate the bomb in a room outside the Arena which had an estimated attendance of around 14,000. Abedi would kill 23 people including himself as well as injuring 1,017 people with many more suffering from forms of psychological trauma from the incident (Kerslake Report 2018).

After the attack, the city of Manchester opened an inquiry regarding the life of Salman Abedi. The inquiry was released in 2020 and showed that Anwar al-Awlaki was named as a potential influence for Abedi to execute his attack. Upon searching the houses of Salman's relatives, investigators found a device at his older brother Ismail's house with a search history containing images about Islam extremism. These included images were said to show support for the Islamic States as well as pictures of Salman Abedi holding weapons as well as "videos of lectures by al-Qaeda idealogue Anwar al-Awlaki" (De Simone 2020).

V. Conclusion

In my analysis, I found that there were 52 instances of attacks linked to Awlaki out of 166 jihadi attacks on Western democracies. I found that Awlaki had a higher percentage impact on English-speaking Western democracies, most influenced by online searches about Jihad or Awlaki's lectures. Despite the martyr scenario that is often discussed when key terrorist figures are assassinated, I found that Awlaki tended to be about as impactful in inspiring jihadi terror after his death as he was during his life. My data also showed that Awlaki can be linked to a majority of the largest jihadi terrorist attacks on Western democracy. This either links Awlaki to large plots or could mean that higher levels of investigation have led to discoveries linking Awlaki to those who carried out the attack.

Generally, Awlaki is found overall to have a major impact on inspiring jihadi terrorists in Western democracies. His ability to help transform terrorism from a foreign ideal to a homegrown movement among Islamic radicals transformed terrorism against the West. If given more time, the data that I collected could be used to answer other questions like the types of attacks Awlaki is more likely to inspire or whether Awlaki was able to inspire more group plots

or lone wolf events. I would also like to take time to dig deeper within each of the individual cases in hopes of finding more possible connections between Awlaki and Western terrorist attacks.

Over seven years, Awlaki underwent a transformation from a Virginia-based imam preaching about building a bridge between the Western world and Islam to a radical terrorist preacher whose lectures openly campaigned for attacking the West and the cultural values it stood for. Awlaki was able to use his Western education and knowledge of growing up as a Muslim in the West to connect with his audience. His ability to take Arabic lectures and Islamic texts and apply them to Western Muslims in English has made him one of the most influential terrorist leaders ever. Although Awlaki does not have the notoriety of Bin Laden, Zarqawi, and al-Baghdadi, my data would argue that his influence on developing homegrown terror has led to the biggest impact on Western democracies.

Works Cited

Begg, Moazzam. "Cageprisoners and the Great Underpants Conspiracy." *Cageprisoners.com*. January 14, 2010. https://web.archive.org/web/20110817125353/http://old.cageprisoners.com/articles.php?id=30886

Berger, J.M. "The Myth of Anwar al-Awlaki." *Foreign Policy Insider*. August 10, 2011. https://foreignpolicy.com/2011/08/10/the-myth-of-anwar-al-awlaki/

Berger, J.M. "Constants on the Path to Jihad." *Combating Terrorism Center at West Point*. October 2011, Vol 4. https://ctc.usma.edu/the-enduring-appeal-of-al-awlaqis-constants-on-the-path-of-jihad/

Boboltz, Sara. "Supreme Court Justices Skeptical of Arguments for Boston Bomber Death Sentence." October 13, 2021. https://www.huffpost.com/entry/scotus-boston-bomber-death-penalty-hearing_n_6165f09de4b065a5496d0446

Cooper, Michael, Michael S. Schmidt, and Eric Schmitt. "Boston Suspects Are Seen as Zealots, and Self-Taught." April 24, 2013. https://www.nytimes.com/2013/04/24/us/boston-marathon-bombing-developments.html?hp&pagewanted=all

Cramer, Maria, and Peter Schworm. "Harvard Report Praises Response to Marathon Bombings." *The Boston Globe*. April 3, 2014. https://www.bostonglobe.com/metro/2014/04/02/harvard-university-report-draws-lessons-from-marathon-bombings/qhXQcxi6jCxQqQnojtC3dP/story.html

De Simone, Daniel. "Manchester Arena Inquiry: Salman Abedi 'Trained with Islamist Militia'." *BBC News*. June 12, 2017. https://www.bbc.com/news/uk-england-manchester-55232740

Gardham, Duncan and Philip Sherwell. "Fort Hood Shooting: Radical Islamic Preacher Also Inspired July 7 Bombers." November 23, 2009. https://www.telegraph.co.uk/news/worldnews/northamerica/usa/6630555/Fort-Hood-shooting-radical-Islamic-preacher-also-inspired-July-7-bombers.html

Hosenball, Mark. "Islamic Radicalization: Umar Farouk Abdulmutallab." *Newsweek.com*. https://www.newsweek.com/islamic-radicalization-umar-farouk-abdulmutallab-70905

Mekhennet, Souad. Shane, Shane. “Anwar al-Awlaki: From Condemning Terror to Preaching Jihad.” *The New York Times*. May 8, 2010. https://www.nytimes.com/2010/05/09/world/09awlaki.html

Meleagrou-Hitchens, Alexander. “As American as Apple Pie: How Anwar al-Awlaki Became the Face of Western Jihad.” *The International Centre for the Study of Radicalisation and Political Violence (ICSR)*. 2011. https://icsr.info/wp-content/uploads/2011/09/ICSR-Report-As-American-As-Apple-Pie-How-Anwar-al-Awlaki-Became-the-Face-of-Western-Jihad.pdf

Millstone, Ken. “Anwar al-Awlaki Hails Rise of ‘Western Jihad.’” *CBS News*. March 22,2010. https://www.cbsnews.com/news/anwar-al-awlaki-hails-rise-of-western-jihad/

Moghadam, Assaf. (2008). *The Globalization of Martyrdom: Al Qaeda, Salafi Jihad, & the Diffusion of Suicide Attacks*. The Johns Hopkins University Press

Orr, Bob. “Qaeda-Linked Imam Dined at Pentagon After 9/11.” *CBS News*. October 21, 2010. https://www.cbsnews.com/news/qaeda-linked-imam-dined-at-pentagon-after-9-11/

Pelofsky, Jeremy. “Government Urges Anwar al-Awlaki to Turn Himself in.” *Reuters.com*. November 8, 2010. https://www.reuters.com/article/us-usa-security-awlaki-idUSTRE6A70WI20101109

Raghavan, Sudarsan. “Cleric Linked to Fort Hood Attack Grew More Radicalized in Yemen.” *The Washington Post*. December 10, 2009. https://www.washingtonpost.com/wp-dyn/content/article/2009/12/09/AR2009120904422.html?sid=ST2009120904772

Rhee, Joseph and Mark Schone. “How Anwar Awlaki Got Away.” *ABC News*. November 29, 2009. https://abcnews.go.com/Blotter/FtHoodInvestigation/anwar-awlaki/story?id=9200720

Ross, Brian and Rhonda Schwartz. “Major Nidal Hasan’s E-mail: ‘I Can’t Wait to Join You’ in Afterlife.’” *ABC News*. November 19, 2009. https://abcnews.go.com/Blotter/major-hasans-mail-wait-join-afterlife/story?id=9130339

Rubin, Josh, and Matt Smith. “‘I am the shooter,’ Nidal Hasan Tells Fort Hood Court-Martial.” August 6, 2013. https://www.cnn.com/2013/08/06/justice/hasan-court-martial/index.html

Scarborough, Rowan. “Terror Groups Abandoning Complex Plots, Concentrate on Attacks by Digital-Savvy Loners.” *The Washington Times*. January 4, 2017. https://www.washingtontimes.com/news/2017/jan/4/terror-groups-abandoning-complex-plots-concentrate/

Shane, Shane. “In New Era of Terrorism, Voice from Yemen Echoes as France Declares ‘War.’” *New York Times*. January 11, 2015. https://www.nytimes.com/2015/01/11/world/middleeast/paris-attacks-anwar-al-awlaki.html

Shane, Shane. *Objective Troy: A Terrorist, A President, and the Rise of the Drone*. 2016. Tim Duggan Books.

Shane, Shane. “The Lessons of Anwar al-Awlaki.” *New York Times (Online)*. August 27, 2015. http://www.nytimes.com/2015/08/30/magazine/the-lessons-of-anwar-al-awlaki.html?partner=bloomberg

Shane, Shane. “The Enduring Influence of Anwar al-Awlaki in the Age of the Islamic State.” *Combating Terrorism Center at West Point*. July 2016, Vol. 9, Issue 7.

https://ctc.usma.edu/
the-enduring-influence-of-anwar-al-awlaki-in-the-age-of-the-islamic-state/
Veilleux-Lepage, Yannick. "Why Ramming Vehicles Has Become the Attack of Choice for Terrorists." *The WIRE*. June 19, 2017. https://thewire.in/external-affairs/vehicles-ramming
-terrorists
"Manchester Attack: Who was Salman Abedi?" *BBC News*. June 12, 2017. https://www.bbc.com/news/uk-40019135
"Officials: Cleric Had Role in Christmas Bomb Attempt." *National Public Radio*. February 19, 2010. https://www.npr.org/templates/story/story.php?storyId=123894237
"Paris Attacks: What Happened on that Night?" *BBC News*. December 9, 2015. https://www.bbc.com/news/world-europe-34818994#:~:text=EPA%2FEPA%2FReu%20The%20attacks%20in%20Paris%20on%20the%20night,Fly-through%20video%20shows%20how%20the%20Paris%20attacks%20unfolded
"Profile: Major Nidal Malik Hasan." *BBC News*. November 12, 2009. http://news.bbc.co.uk/2/hi/8345944.stm
"The Kerslake Report: An independent review into the preparedness for, and emergency response to, the Manchester Arena attack on 22nd May 2017." *kerslakearenareview.co.uk*. March 27, 2018. https://www.kerslakearenareview.co.uk/media/1022/kerslake_arena_review_printed_final.pdf
USA vs. Abdul Farouk Abdulmutallab 2010. Case 2:10-cr-20005. https://www.cbsnews.com/htdocs/pdf/Abdulmutallab_Indictment.pdf

Student Success in College Survey: The role of academic habits in college success

By Nicole Morales
Department of Psychological Science, LaGrange College
PSYC 2299: Research Methods
May 10, 2022

ABSTRACT

When someone defines a student as a "good" or "bad" student, they are typically referring to their academic habits. The goal of the present study was to examine the relationship between a student's academic habits and their GPA as their defining academic success. Fifty college students recruited participated in the study. Students completed the Academic Habits Scale and demographic questionnaire. A test of the results reveals that Pearson's correlation coefficients showed a positive linear relationship between academic habits and college GPA, though it was not significant $r(99) = .22$, $p = 0.065$. A statistically significant relationship was found when comparing academic habit scores for on-campus residing students to off-campus residing students ($p = 0.013$). Overall, this study contributed to the understanding of college success by studying the role of academic habits.
Keywords: academic habits, college, students, academic success

INTRODUCTION

In college, a student's academic habits are typically a focus for them relating to academic success. Previous research on academic habits defines them as, "the regular tendencies and practices that one depicts during the process of gaining information through learning" (Kumar, p. 18, 2015). During our research, our definition of academic habits addressed attendance, study skills, adjusting, self-control, and the concept of seeking more knowledge. Previous research on academic success defines it as "a student success is defined as academic achievement, engagement in educationally purposeful activities, satisfaction, acquisition of desired knowledge, skills and competencies, persistence, attainment of educational outcomes, and post-college performance" (York, Gibson, Rankin, 2015, p. 4). This article focuses on important variables that may help a student want to be more successful in school, such as: acquisition of skills and competencies, career success, satisfaction, and persistence These variables can appear differently for each student as they use different skills to assist them in being successful academically. Our students' success was simply measured by their self-reported GPA. Questions from our Academic Habit scale intertwined academic habits and success (ex, asking about how a student keeps their career goals in mind).

However, a possible confounding element is that there are most likely other factors that impact a student's academic success other than academic habits. Students' personal definitions may also differ from our definition of having a higher GPA (a "C's get degrees" mindset). Bhat and Khandai's research stated, "It was found that 73.5% college students have excellent study habits, 15% having very good study habits, 5.5% were having average, 3.5% were having unsatisfactory study habits and a very small proportion of students 2.5% were having very unsatisfactory study habits" (2016). Chapell, Blanding, Silverstein, Takahashi, Newman, Gubi, & McCann's research discusses how test anxiety can impact students' academic success (2005). They defined test anxiety as "a multidimensional construct that has been defined as 'the set of

phenomenological, physiological, and behavioral responses that accompany concern about possible negative consequences or failure on an exam or similar evaluative situation'" (2015, p. 268). The goal of this study was to examine the relationship between test anxiety and academic performance. Their results showed that females had higher test anxiety, but also had higher GPAs then males. While they continued into graduate school, females test anxiety increased significantly and they still had higher GPAs than males. Our study did not address test anxiety among students, nor the way participants may adjust their academic habits to accommodate test anxiety. The question is, are positive academic habits associated with academic success, or a higher GPA?

This study holds relevancy as it could reveal an association between a student's academic habits and their academic success, which would allow students to adopt better academic habits if they have a goal of succeeding academically. This research could also assist professors in understanding the role academic habits have in a student's academic success.

METHODS

Participants

Fifty college students enrolled at LaGrange College in LaGrange, Georgia participated in the study. 63.3% of participants reported as females and 36.67% reported as male. Most participants identified as European American/White (76%), with the next largest ethnic group identifying as African American/Black (18%). Smaller ethnic groups of students identified as Latinx (4%), and multiracial (2%). Participants' current class standing varied with 32% of students reporting junior standing, 30% of students reporting senior standing, 20% of students reporting sophomore standing, and 18% of students reporting freshman standing. Finally, 77.55% of students reported living on campus, and 22.45% of students identified as commuter students.

Materials and Procedure

Participants were recruited via convenience sampling conducted by student researchers. After consenting to the study, students were asked to fill out a questionnaire regarding their academic habits and answer demographic questions, which included their self-reported GPA.

Academic Habits

Academic habits were measured using a 30-item questionnaire. Responses are indicated on a 4-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). Each participant's responses were summed together for their total academic habits score. Summed responses with higher scores indicate a higher tendency to have positive academic habits, while lower scores indicate fewer academic habits or a lack of positive academic habits.

GPA

Student's GPAs were measured by self-reported responses given by the participant on a 4.0 scale.

Demographic Questions

Students were asked to fill out demographic questions related to gender, race and ethnicity, current class standing, student-athlete status, and whether they reside on or off campus.

Data Analysis

As the data was coded to be completely quantitative, it was analyzed using Jamovi software. Descriptive statistics of means and total scores were computed, as well as variable frequencies. T-tests were also computed to compare academic habit scores between athletes and non-athletes, between freshman and other classes, between on-campus and off-campus residing students, and between women and men. A correlation was found between academic habits scores and GPA.

RESULTS

Data was collected from March 9th, 2022, through March 15th, 2022. Frequency tables regarding demographics where computed and can be found in Tables 1-3. Table 1 depicts the frequency of students per academic grade level including freshmen, sophomores, juniors, and seniors. The juniors are the most represented student academic level composing 32% of our sample. The seniors composed 30% of our sample, the sophomores composed 20% of our sample, and the freshmen composed 18% of our sample.

Table 1
Frequencies of College Class

Levels	Counts	% of Total	Cumulative %
Freshman	9	18.0 %	18.0 %
Sophomore	10	20.0 %	38.0 %
Junior	16	32.0 %	70.0 %
Senior	15	30.0 %	100.0 %

Table 2 describes the frequencies of race and ethnicity of participants in our sample. European American/White participants represent 76% of our sample, while African American/Black participants represent 18% of our sample. Latinx participants composed 4% of our sample, with Multiracial participants representing 2% of our sample.

Table 2
Frequencies of Race/Ethnicity

Levels	Counts	% of Total	Cumulative %
African American/Black	9	18.0 %	18.0 %
European American/White	38	76.0 %	94.0 %
Latinx	2	4.0 %	98.0 %
Multiracial	1	2.0 %	100.0 %

Table 3 depicts the frequencies of gender within our sample. Our sample was 63.3% female, and 36.7% male.

Table 3
Frequencies of Gender

Levels	Counts	% of Total	Cumulative %
Female	31	63.3 %	63.3 %
Male	18	36.7 %	100.0 %

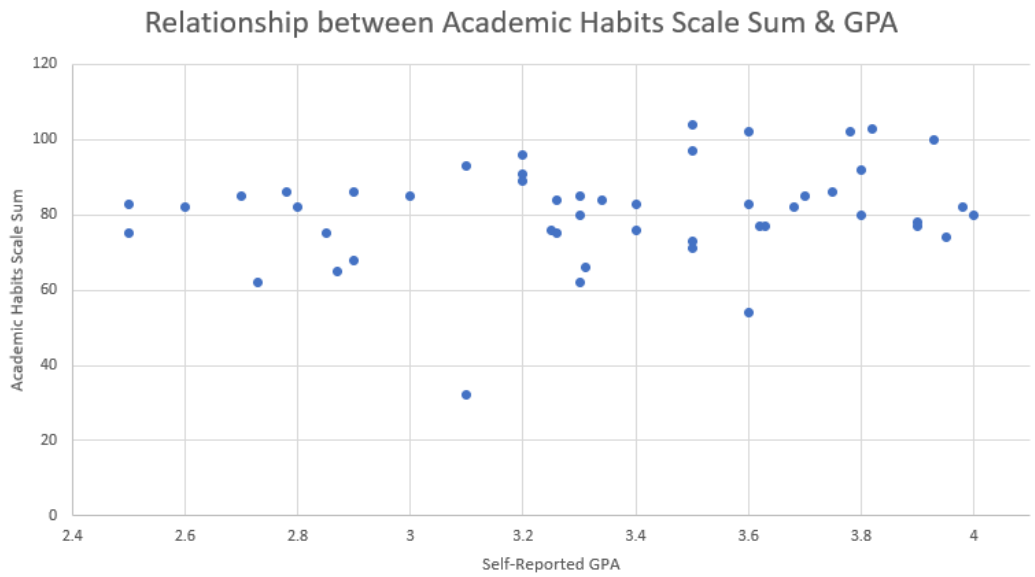
Descriptive statistics were also computed for the Academic Habits scale scores and students' GPAs and can be found in Table 4. Table 4 depicts that the mean sum of our Academic Habits Scale was 81.10 (SD = 13.056), with a minimum summed score of 32, and a maximum summed score of 104. Table 4 also shows that on a 4.0 GPA scale, the mean GPA of our sample was 3.35 (SD = 0.419), with the lowest GPA being 2.50, and the highest being a 4.0.

Table 4
Descriptive

	N	Mean	SD	Minimum	Maximum
Academic Habits Scale Sum	50	81.10	13.056	32	104
GPA	49	3.35	0.419	2.50	4.00

A correlation coefficient was calculated to determine linear association between academic habits and GPA. There was a positive linear association between academic habits scale sum and GPA, however it was not significant $r(99)= .22$, $p= 0.064$. This relationship between academic habits and GPA can be seen in Figure 1.

Figure 1



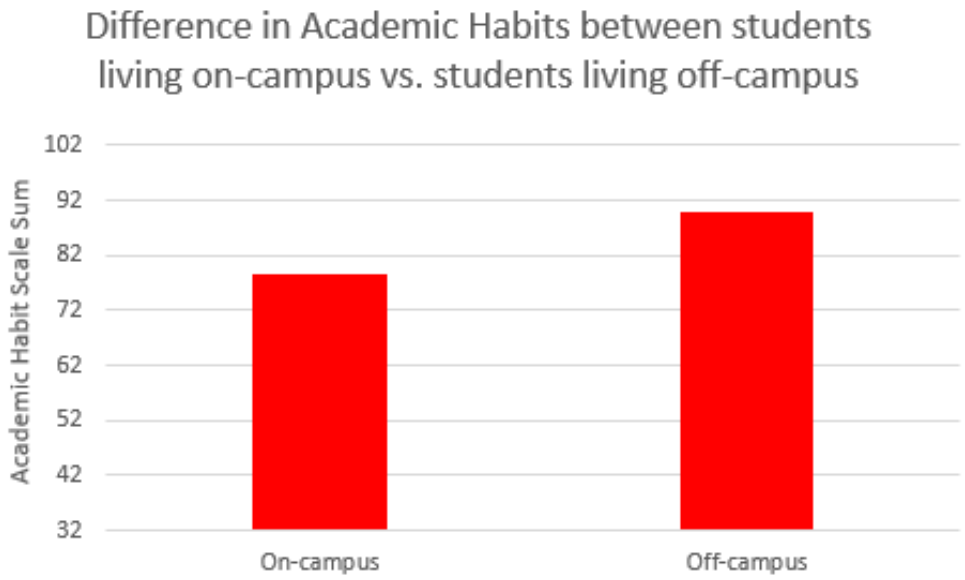
Post-Hoc analyses were conducted to identify any significant differences between Academic Habits Scale sums between athletes vs. nonathletes, freshman vs. other classes, on-campus vs off-campus residing students, and women vs. men. The results can be seen in Table 5.

Table 5

	t	df	*P*
Academic Habit Scale in athletes vs. nonathletes	0.56	48	0.581
Academic Habit Scale in Freshman vs. Other Classes	-0.96	48	0.344
Academic Habit Scale in on-campus vs. off-campus students	2.60	47	0.013
Academic Habit Scale different for women vs. men	-0.05	47	0.961

This table shows no significant differences in the Academic Habit Scale summed scored between athletes vs. nonathletes, freshman vs. other classes, nor women vs. men. There is a significant difference in the summed Academic Habits Scale scores between students residing on-campus and students residing off-campus (p= 0.013). Further, the mean academic habits scores between on-campus and off-campus residing students are shown in Figure 2.

Figure 2



DISCUSSION

Figuring out how to succeed in college with positive academic habits can be difficult. The goal of the present study was to examine whether there is an association between academic habits and academic success. Our overall findings discovered no association between academic habits and academic success relying on students' GPAs. However, students who live off-campus had higher academic habits scale scores than students who live on-campus. These findings may be associated with less on-campus involvement by off-campus students. This finding could impact students by motivating them to live off campus if they are struggling to achieve academic success on campus, in a way of distancing themselves from on-campus distractions. This finding could improve students' academic success by studying the study habits of off-campus residing students, and how on-campus residing students can utilize and benefit from these habits.

Limitations

There are several limitations to this study. First, our sample is from a smaller-sized liberal arts college and may not be representative of the college student population. Much of our sample was white, which may not be generalizable to other institutions or to students who identify as another race or ethnicity. There were also time constraints on our study as our survey was only available for approximately a week. Another limitation is that we have an unintentional restricted range on our GPA variable, as the college has a minimum GPA requirement to maintain good-standing and attendance. This could attribute to the overall study not having any statiscal significance, because other colleges and universities may allow lower GPAs to maintain attendance. Future studies could focus on the academic habits and academic success of off-campus and on-campus students, as well as focusing on other ethnicities and races, or a representative study including non-binary or transgender participants. Future studies could also

use other forms of sampling to recruit participants rather than convenience sampling, have a lengthier study, or have an unrestricted range on the GPA values.

REFERENCES

Bhat, Y. I., & Khandai, H. (2016). *Academic Achievements and Study Habits of College students of District Pulwama*. ERIC - Education Resources Information Center. Journal of Education and Practice. https://files.eric.ed.gov/fulltext/EJ1099587.pdf

Chapell, M. S., Blanding, Z. B., Silverstein, M. E., Takahashi, M., Newman, B., Gubi, A., & McCann, N. (2005). *Test Anxiety and Academic Performance in Undergraduate and Graduate Students*. Journal of Educational Psychology. https://doi.org/10.1037/0022-0663.97.2.268

Kumar, S. (2015). *Study Habits of Undergraduate Students*. Research India Publications. International Journal of Education and Information Studies. https://www.ripublication.com/ijeisv1n1/ijeisv5n1_02.pdf

Rankin, S., York, T. T., & Gibson, C. (2015). *Defining and Measuring Academic Success*. Scholar Works at UMass Amherst. https://doi.org/10.7275/hz5x-tx03

Development and optimization of RT-PCR of E1A expression in mouse adenovirus type 1 infected mouse 3T6 cells.

By Evan Sampers and Nickie Cauthen
Department of Biology, LaGrange College
LaGrange, Georgia

ABSTRACT

Studies with mouse adenovirus type 1 (MAV-1) in murine models have shown that the E1A region is vital for viral genome replication and viral transcription. In MAV-1, E1A mRNA can be used to determine if an infection has occurred. This experiment was undertaken to determine if MAV-1 E1A mRNA is present after the infection of MAV-1 in murine cells. This study was done by infecting or mock infecting mouse 3T6 fibroblast cells with MAV-1 at a multiplicity of infection (MOI) of 1. The primers were designed using the Z112.R plasmid encoding the E1A cDNA as the test template, and gradient PCR was used to find the optimal annealing temperature. RNA was isolated from the MAV-1 infected cells and RTPCR was used to amplify the E1A mRNA product. Gel electrophoresis and imaging were used to evaluate the PCR products. Bands resulting from the gradient PCR were detected for all temperatures tested and were equally as bright indicating that all temperatures successfully amplified the E1A gene. Additionally, after RTPCR amplification, the result suggests that the spliced MAV-1 E1A mRNA product was detected in MAV-1-infected but not mock-infected cells.

INTRODUCTION

Mouse Adenovirus Type 1 (MAV-1) is a nonenveloped double stranded DNA virus within the Mastadenovirus family that cause both acute and persistent infections in mice (Weinberg et al., 2007). MAV-1 shares similar morphological, physical, and some molecular characteristics to human adenoviruses, but the pathogenesis of the virus is species specific (Ball et al., 1998). Within the genomic sequence of MAV-1, there are several key regions including the E1A region (Spindler et al., 2007). More specifically the E1A region is important for early viral transcription and genome replication within mice (Lynch et al., 2019). Because of this, MAV-1 E1A is important for the pathogenesis and virulence of the virus (Tirumuru et al., 2016). Production of MAV-1 mRNA indicates a cell is actively infected. Thus, E1A mRNA can be used to determine if infections with low virus yield are infected or if the virus used to initiate the infection is detected in the plaque assay. The experiment is designed to evaluate if E1A mRNA is present in the infected cells using RTPCR and gel electrophoresis. This assay can then be used as a tool to determine if cells are actively infected with MAV-1.

METHODS AND MATERIALS

To test and optimize PCR primers used in this study, a plasmid, Z112.R, was used. The Z112. R plasmid encodes the E1A cDNA (E1A spliced gene sequence). Z112.R plasmid was a gift from Dr. Kathy Spindler, University of Michigan. A computer program, IDTDNA Primerquest Tool, was used to design primers. The primer set contains both a forward (F) and a reverse (R) primer (612F and 883R). The primer set is expected to amplify a region of the E1A gene within exon 1 and 2 (Fig. 1). Following the design of the primers, the Z112. R plasmid was

diluted with water to a concentration of 0.5ng/ul and used in optimization PCR reactions as follows. The 612F and 883 R primers were resuspended in water at100uM. A working stock of 10uM stock was used in PCR reactions. Gradient PCR was carried out at a range of temperatures from 53°C to 65°C to determine the optimal primer annealing temperature. In the thermocycler, PCR amplified under the following conditions: 95°C for 2 minutes, 95°C for 30 seconds, 53-65°C for 30 seconds, 72°C for 1 minute**,** 72°C for 5 minutes**,** and a 4°C hold. The amplification section of 95°C for 30 seconds, 53-65°C for 30 seconds, and 72°C for 1 minute was repeated 30 times. The products of the PCR reaction were visualized using gel electrophoresis. Separation of DNA fragments occurred on a 2% agarose gel made with TBE and containing GelRed. Ten microliters of PCR reactions containing loading dye were loaded onto gels. The gels were then run at 125-130 volts for 30-40 minutes. After gel electrophoresis, a LiCor Odyssey imager and Image Studio was used to image the gels.

To detect E1A mRNA in infected cell extracts, RNA was isolated from MAV-1 infected cells. Mouse 3T6 fibroblasts were grown in high glucose DMEM with 5% FBS. The cells were mock infected or infected with mouse adenovirus type 1 (MAV-1) at a multiplicity of infection (MOI) of 1 and harvested by scraping cells into the media at 48 hours post infection (hpi). The harvested cells were pelleted by centrifugation and frozen at -80°C. Total RNA was isolated from mock and MAV-1 infected cell pellets using the New England BioLabs (NEB) Monarch Total RNA Miniprep Kit (T2010S). Reverse transcriptase (RT) was then used to produce DNA (cDNA) from RNA extracts. cDNA was synthesized from mock-infected and MAV-1-infected cell extracts with reverse transcriptase and, as a control, MAV-1-infected cell extracts without reverse transcriptase (NEB One-Taq RT-PCR kit). These samples were then subject to PCR with E1A primers described above (NEB One-Taq RT-PCR kit). The 4 RTPCR samples included: mock cDNA, MAV-1 cDNA, MAV-1 no RT cDNA, 4-water (no nucleic acid; negative control). PCR mix and the primers (612F and 883R) were added to the 4 samples. Next, the samples were placed in a thermocycler and PCR amplified under the following conditions: 95°C for 30 seconds**,** 94°C for 30 seconds**,** 60°C for 30 seconds**,** 68°C for 1minute**,** 68°C for 5 minutes**,** 4°C hold. The amplification section of 94°C for 30 seconds**,** 60°C for 30 seconds**,** and 68°C for 1minute was repeated 30 times. Products were separated by gel electrophoresis and visualized as described above.

RESULTS

The MAV-1 E1A mRNA maps from 108 base pairs to 3260 base pairs in the MAV-1 genome (Fig. 1). Figure 1 shows the structure of the exons and introns of the MAV-1 E1A gene, where thick, black lines indicate exons and the carets between those lines indicate introns. Only exons are found in mRNA and are then translated into protein (indicated as coding regions, red boxes, Fig. 1). In this study, the amplified region of the E1A gene is between primers of 612 F and 883R (indicated by arrows, Fig. 1). There are 2 exons and 1 intron between primer pair. The exons found in the MAV-1 E1A mRNA; introns are spliced out. Thus, if a PCR reaction amplifies MAV-1 E1A DNA, the expected MAV-1 genomic DNA product is 272 base pairs. If a PCR reaction amplifies MAV-1 E1A mRNA (cDNA), the expected DNA product is 195 base pairs, making the source of the PCR template discernible.

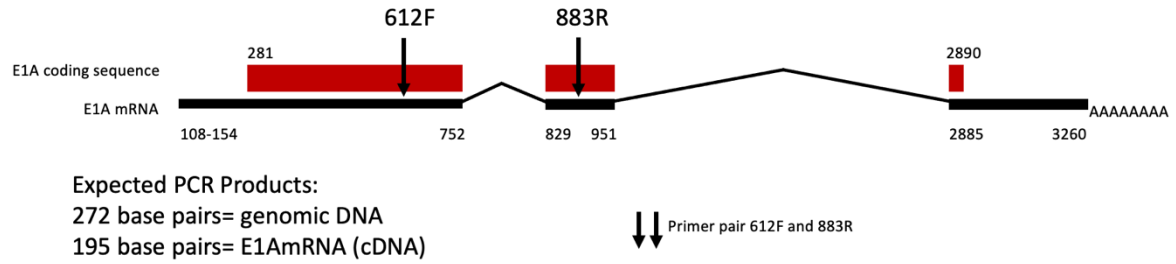


Figure 1 (Adapted from Ball et al., 1989): The transcription map of MAV-1 E1A mRNA. The bold lines represent mRNA exons, the carets represent introns, and the red boxes represent E1A coding regions. Primer set 612F and 883R span from the first and second exon of E1A; the location of each is indicated by arrows. Spliced E1A mRNA will not contain the noncoding intron that is in between the 2 exons. This figure is adapted from a study from Ball et al. (1989) describing genome organization of MAV-1.

To test primers 612F and 883R for specificity and to optimize primer annealing temperature, gradient PCR was performed using the Z112.R plasmid encoding the E1A cDNA. In figure 2, a product was amplified from all 8 PCR reactions with the expected size (195 bp) for the spliced E1A gene (Fig. 1 and 2). Each of the 8 PCR reactions was carried out at different temperatures to determine primer annealing temperature. All the bands in Figure 2 are about the same brightness, indicating all tested temperatures successfully amplified the product.

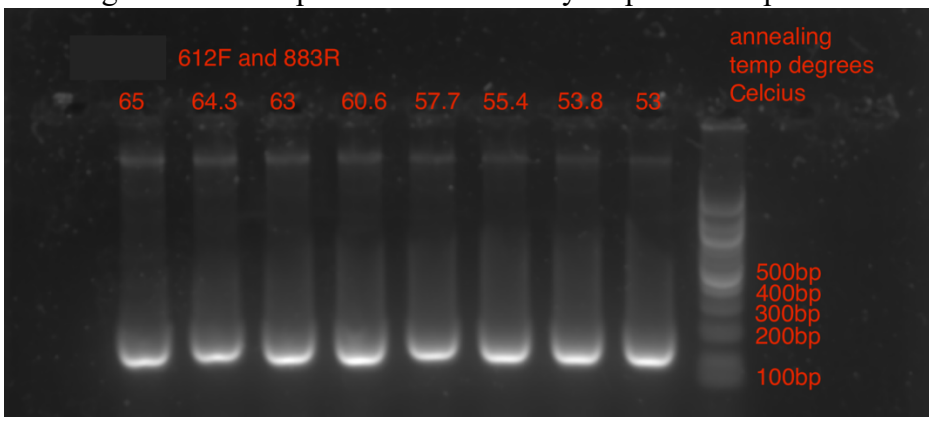


Figure 2: The optimal annealing temperature, in degrees Celsius, for PCR amplification of the MAV-1 E1A gene using primer set 612F and 883R. The Z112.R plasmid encodes E1A cDNA and was used as a template to optimize the E1A primer set using gradient PCR. The PCR samples were gel electrophoresed and imaged and used to determine the optimal annealing temperature for PCR amplification. Numbers above gel lanes indicate PCR annealing temperature (ºC) for each reaction. The last lane on the right is the 100bp DNA ladder (NEB) with band sizes indicated in base pairs (bp).

To determine if E1A mRNA from MAV-1 infected 3T6 cells can be amplified with this primer set, total RNA from cells was reverse transcribed and then PCR was carried out using the 612F and 883R primer set. In Figure 3, in lane 2 MAV-1 cDNA with reverse transcriptase, there are 2 bands present on the gel. The smaller band is approximately 195 base pairs, and the larger band is approximately 272 base pairs (Fig. 3). The bands likely represent the spliced and

unspliced E1A gene (Fig. 1 and 3). Spliced (195 bp) E1A mRNA indicated the virus has produced the E1A mRNA and the cells are actively infected. Unspliced (272 bp) E1A is the amplification of the genomic MAV-1 DNA, which is expected when genomic DNA is not completely removed during RNA extraction (Fig. 3). In Figure 3, lanes 1 and 4 are not expected to produce E1A PCR products because they do not contain MAV-1 nucleic acid. Lane 3 was not expected to produce the spliced (195 bp) E1A product because it was not treated with reverse transcriptase but may produce the unspliced (272 bp) E1A product from residual genomic DNA. The band present in sample 1, 3, and 4 is likely an artifact due to the GelRed stain used for the DNA (NEB technical services).

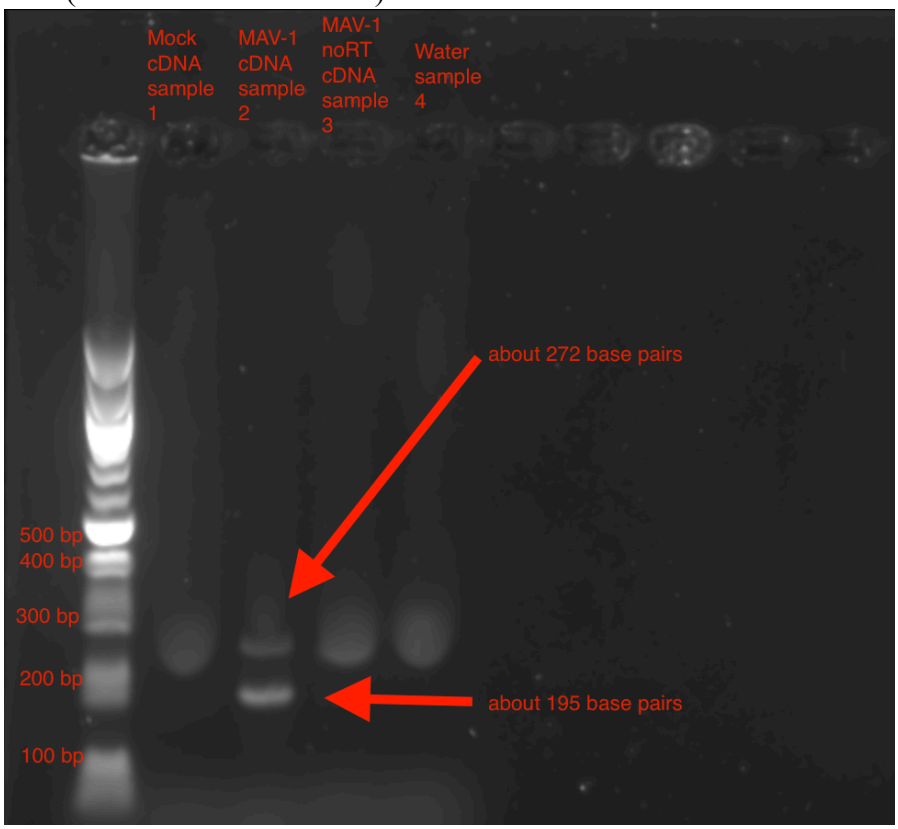


Figure 3: RTPCR amplification of the E1A mRNA spliced product from RNA isolated from mock or MAV-1 infected 3T6 cells. E1A cDNA was synthesized, and PCR amplified using NEB One-Taq RT-PCR kit. The cDNA was PCR amplified with primer set 612F and 883R. The samples underwent gel electrophoresis and were visualized. The first lane on the left is the 100bp DNA ladder (NEB) with band sizes indicated in base pairs (bp).

DISCUSSION

These experiments show that the primer set 612F and 883R amplified the E1A cDNA of the expected sizes (Fig. 1) from Z112.R plasmid at all temperatures tested and both E1A mRNA and genomic DNA from MAV-1 infected cells (Fig. 2 and 3). Figure 2 shows that a product of the expected size (195 bp) was amplified from Z112.R plasmid (E1A cDNA) at all annealing temperatures tested and all of the bands produced were equally bright indicating that all temperatures successfully amplified the E1A mRNA product (Fig. 2). Thus, any of these

temperatures could be used in future PCR reactions. Based on PCR reagents used in the experiments, an annealing temperature of 60ºC was used in subsequent experiments.

The 612F and 883R primer set was then used to amplify E1A mRNA via RTPCR from MAV-1 infected cells. In figure 3, RTPCR and gel electrophoresis, showed that spliced E1A mRNA was present in MAV-1 infected cells (Fig 3, lane 2). These results indicate that cells are actively infected. Based on the transcription map of the MAV-1 E1A gene with primers 612F and 883R, the spliced product is expected to be approximately 195 base pairs and the unspliced genomic DNA is expected to be approximately 272 base pairs (Figure 1). This assay detects the E1A mRNA (195 bp band, lane 2), which is made during the virus replication cycle in infected cells. The presence of a second band of approximately 272 bp in lane 2, MAV-1 cDNA, is likely the E1A gene amplified from viral genomic DNA (Fig. 3). Since some genomic DNA remains in the RNA extracts used in this experiment, optimization of DNase I treatment of RNA extracts, which destroys DNA, is necessary for the removal of genomic DNA in future experiments. Lanes 1, and 4 were expected to have no bands after RTPCR since no MAV-1 DNA is present (Fig. 3). Lane 3 could have a band of 272 bp if there is genomic DNA contamination of RNA extract (Fig. 3). There were faint, smudged bands present in lanes 1, 3 and 4 (Fig. 3). Due to the nature of the band, the presence of the bands in samples 1, 3, and 4 is likely an artifact due to the high sensitivity of the GelRed, which was used to stain the DNA so it can be visualized (NEB technical services). However, it has not been ruled out that these band presents MAV-1 genomic DNA present in these samples. The DNA fragments in these bands could be sequenced to definitively determine if they are amplified from MAV-1 genomic DNA.

These data together show that this primer set, 612F and 883R, amplifies the MAV-1 E1A gene and that it can amplify E1A mRNA from infected cell extracts using RTPCR. This assay can be used in future experiments to determine if MAV-1 exposed cells are expressing E1A mRNA and are thus actively infected.

ACKNOWLEDGEMENTS

Thank you to the LaGrange College Undergraduate Research Program and Biology Program for providing funding for the project and to Dr. Katherine Spindler for virus isolates, cell lines, and plasmids.

WORKS CITED

Ball, A. O., Williams, M. E., & Spindler, K. R. (1988). Identification of mouse adenovirus type 1 early region 1: DNA sequence and a conserved transactivating function. *Journal of Virology*, *62*(11), 3947–3957.

Ball, A. O., Beard, C. W., Redick, S. D., & Spindler, K. R. (1989). Genome organization of mouse adenovirus type 1 early region 1: A novel transcription map. *Virology*, *170*(2), 523–536.

Lynch, K. L., Gooding, L. R., Garnett-Benson, C., Ornelles, D. A., & Avgousti, D. C. (2019). Epigenetics and the dynamics of chromatin during adenovirus infections. *FEBS letters*, *593*(24), 3551–3570.

Spindler, K. R., Moore, M. L., Cauthen, A. N. (2007) Mouse Adenoviruses In A.S.(Eds.), The Mouse in Biomedical Research (49-62). Burlington, MA: Elsevier Inc.

Tirumuru, N., Pretto, C. D., Castro Jorge, L. A., & Spindler, K. R. (2016). Mouse adenovirus type 1 early region 1A effects on the blood-brain barrier. *mSphere*, *1*(2), e00079-16.

Weinberg, J. B., Jensen, D. R., Gralinski, L. E., Lake, A. R., Stempfle, G. S., & Spindler, K. R. (2007). Contributions of E1A to mouse adenovirus type 1 pathogenesis following intranasal inoculation. *Virology*, *357*(1), 54–67.

***We, the People*:**
The Electoral College is Not Constitutional. But Could it Be?

By Andrew A. Cunningham
POLS 4430 – Political Science Senior Seminar
Senior Capstone Project
Dr. John Tures
April 14, 2022

"We, the people of the United States," is a phrase recognized across the globe as the sounding call to American Representation. It is a rousing call from the founders of the nation, in the preamble to the world's longest-serving written constitution, to remember that it is the people of the United States who have the claim and ownership of the nation and government. Nowhere is this more obvious than in the system of representation, wherein over two hundred years ago the citizens were tasked with voting for their Congressional representatives, their state senators, and the leader of the nation. However, in recent times this system has come under fire. More specifically the system used to elect the president, the Electoral College, is the source of the special scrutiny.

Historically, the Electoral College has been an institution rife with controversy. In 1976, *the New York Times* posted an article calling for reform because future President Jimmy Carter only narrowly won the Electoral College, despite winning the popular vote by more than one million Americans.[17] This near contradiction of the people's wishes and the Electoral College was called a dangerous occurrence that, to that point, had not occurred since the election of 1888.[18] But this is hardly the only call for electoral reform, as the Electoral College has been the subject of the most proposed amendments in American history.[19]

Today, following multiple rapid instances of the popular vote failing to produce a president, there are calls to abolish the Electoral College altogether, instituting a direct popular vote or a ranked-choice system in its stead.[20] [21] These calls, however, are misguided; this is not a reason to abolish the system of electing the president, as the system was purposely made to account for more than the direct will of the people. There is reason to reconsider the Electoral College, but that reason comes from the subsequent legislation and legal precedent that has effectively made it unconstitutional. However, abolition is not the only, nor the best, solution to this problem. But before one can understand how exactly the Electoral College is unconstitutional, one must understand why the Electoral College exists and how it works. Both answers are found in the logs of the one-hundred-day-long debate of the Founding Fathers, better known as the Constitutional Convention.

From May to September 1787, representatives sent by each of the original thirteen colonies met in Philadelphia Pennsylvania to plan and write the founding documents of the new American Government following the poor performance of the Articles of Confederation. With a plethora of items on their docket, the founders set to work plotting out their new government.

---

[17] "Electoral College Reform." *The New York Times*. November 16, 1976.
[18] "Electoral College Reform."
[19] Beth, Judith. *The Case Against Direct Election of the President*. (London, England: Cornell University Press, 1975).
[20] Eder, Steve and Johnathan Mahler. "The Electoral College Is Hated by Many. So Why Does It Endure?" *The New York Times*. November 10, 2016.
[21] Bokat-Lindell, Spencer. "Can Ranked-Choice Voting Cure American Politics?" *The New York Times.* June 24, 2021.

One of the earliest items they became fixated on was the issue of electing their executive, not yet named "president." The first introduction of the issue was made on the fourth day of the convention, and an agreeable solution was not found until the final draft of the Constitution.[22] Many of the same arguments made today were made by our Founding Fathers during those months of debate. Some in attendance raised concerns over a direct popular vote, believing that the states would nominate and unanimously vote for one of their citizens, and the largest and most populous states would band together for success.[23] This was an obvious precursor to the modern argument of relevance for smaller states in the electoral process. Others in attendance felt elections partially or directly by the people were imperative to prevent corruption in an executive chosen by the legislature, with whom he may be indebted.[24] Eventually, the idea of apportioning votes among the states based on their population was proposed by James Wilson, a future member of the Supreme Court's first bench.[25]

Initially, the concept was met with less than positive reactions, only getting approval from two of the ten states present, but ultimately this would become the core of the executive's election system. Alongside this concept of the apportionment of votes was the idea of electors, chosen solely and specifically for the duty of electing the president to ensure they had no ulterior motives in support of specific states or against the Federal Government.[26] Together these concepts birthed the American Electoral College, a system described in Article Two of the Constitution, wherein each state would be given some votes equal to the total number of representatives and senators the state is afforded and the votes would be cast by electors nominated by the state for the sole purpose of electing the president.[27] Now, being codified into the Constitution would normally protect a concept from being deemed unconstitutional. This is not the case for the Electoral College. Despite being codified into the constitution directly, and being preserved since the document's ratification in 1788, the Electoral College has evolved to stand in direct opposition to its home document.

In the history of the United States, two monumental events turned our most important form of representation into a laughably disproportionate system. The first of these came in 1929, following the first and only time in the nation's history that Congress failed to properly reapportion the seats of Congress.[28] Every ten years Congress reapportions the seats of the house to the states based on the latest census, but extreme partisanship in the early 1920s prevented an agreeable redistribution of Congressional seats and resulted in the nation sticking to the apportionment based on the 1910 Census. At this time the number of seats in the house was also redecided with every census, which was the cause of disagreement between the parties.[29] Before reapportionment based on the 1930 Census was set to occur, Congress met to decide on a system to ensure that reapportionment would happen irrespective of partisan politics. The result was the Permanent Apportionment Act of 1929.

The 1929 Act forever changed how the United States House of Representatives would function in two parts. First, it permanently set the number of seats in the House to 435, the

---

[22] MacBride, Roger Lea. *The American Electoral College*. (Idaho: The Caxton Printers, 1953).
[23] MacBride. "The American Electoral College." pg. 16-17
[24] Ibid page 16-17
[25] Ibid page 14
[26] Ibid page 23
[27] United States Constitution. Article II § 1, Clause 3.
[28] "Congressional Apportionment." The New York Times. April 12, 1926.
[29] Small, Sam W. "Looking and Listening: The Congressional Apportionment Problem is Worrying Party Managers." *The Atlanta Journal Constitution.* October 13, 1927.

number decided in 1910 plus two seats for the introduction of New Mexico and Arizona to the union.[30] Second, it introduced and required the use of the Equal Proportions method of reapportionment, which automatically apportions seats in the house based on a mathematical equation that takes each state's individual population into account.[31] While this bill was focused on the House of Representatives, it certainly had implications for the Electoral College. Since the number of electors is tied to the number of representatives in the House and Senate, this bill effectively capped the number of electors at 535 until the 23rd Amendment added three votes specifically for the District of Columbia in 1961, bringing the Electoral College to its current maximum of 538 votes.[32]

While the Permanent Apportionment Act on its own does not make the Electoral College unconstitutional, a series of subsequent Supreme Court decisions do just that. The first of these cases is *Baker v. Carr*, which focused on a Texas law that prevented fair apportionment in the state and ended in a groundbreaking decision that established the justiciability of legislative apportionment.[33] Building on this decision came the 1963 case *Gray v. Sanders*, the case that established the "one person one vote," constitutional right. This case centered on the system that the State of Georgia used for electing its governor, one that was extremely similar to the Electoral College. This system involved a set number of points that were distributed to each county based on the county's population, and it heavily favored counties with fewer people. In their decision, the court found the system violated the Equal Protection Clause of the Fourteenth Amendment by giving citizens a powerful vote depending on where they live. The court determined that, within reason, every person is entitled to an equally powerful vote.[34] Finally, the case *Wesberry v. Sanders*, also from the State of Georgia in 1963, featured a decision that set the standard of fairness for Congressional representation. The plaintiff, James Wesberry, sued over the size of his district versus other smaller districts, which had nearly a third of the number of people.[35] In its decision, the court determined that the malapportionment of Georgia's districts was unconstitutional and also violated the Equal Protection Clause of the Fourteenth Amendment. Of note, the court acknowledged the near impossibility of true equality in districts but stated clearly that impossibility is no excuse for ignoring equality and a good faith effort for fair apportionment must be made.[36]

It is the combination of these, the Permanent Apportionment Act of 1929 and the three Supreme Court decisions from the 1960s, that make the Electoral College unconstitutional. The cap on Congressional representatives, and by extension electoral votes, must create a disproportionate number of people to electoral votes, that is the line of thinking that leads to the invalid constitutionality of the Electoral College. At least, in theory, that is the case. That theory must be evaluated and confirmed before any considerations of a solution can be entertained and doing that is remarkably easy. The process is simple: take the total population of a state and divide it by the number of electoral votes that each state is given. This gives you the ratio of

[30] U.S. Congress, Senate. *The Permanent Apportionment Act of 1929*. Senate Bill 312. Seventy First Congress, First Session. Introduced to the Senate June 18, 1929.
[31] U.S. Congress, Senate. *The Permanent Apportionment Act of 1929*.
[32] United States Constitution. Amendment XXIII.
[33] Baker v. Carr. 369 U.S. 186 (1962).
[34] Gray v. Sanders. 372 U.S. 368 (1963).
[35] Wesberry v. Sanders. 376 U.S. 1 (1964).
[36] Wesburry v Sander

people per electoral vote. Once you have done that for all fifty states, you can compare the ratios to determine if they are reasonably equal. It is a simple process for a very important conclusion.

After following the process above, the results were less than appealing. The Electoral College vote distributions from five different census years were tested, those being the present day's distribution based on the 2020 census, the previous distribution based on the 2010 census, the distribution based on the 1990 census, the distribution based on the 1960, and the distribution based on the last time seats changed from the 1910 census. To demonstrate the change over time, the results will be reviewed from 1910 through 2020 in chronological order. Each chart to be shown will feature a dot for each of the 50 states, not including the District of Columbia as it is not affected by reapportionment, and the dots represent states in alphabetical order. E.G., the first dot represents Alabama, and the final dot represents Wyoming. Each dot is placed dependent on its ratio of people-per-vote; the lower the dot, the fewer the people who must share one vote, and the stronger their vote becomes. The entirety of this compiled data can be found in the Appendix, Section I, before the bibliography.

It should also be noted that this data from 1910 does not include Alaska or Hawaii, as neither state was a part of the union at the time, and includes New Mexico and Arizona, which had not been properly assigned seats under a decennial reapportionment yet since they joined the union midway through the 1910s. As could be imagined, the 1910 distribution was consistent with its people-per-vote ratio; the outlier being Nevada which, at the time, had less than 100,000 people, as compared to New York, which had more than nine million more people. The respectable ratios of 1910 could be attributed to the fact that this distribution was determined at a time when Congressional seats were still being added every ten years in proportion to the population growth of the nation.

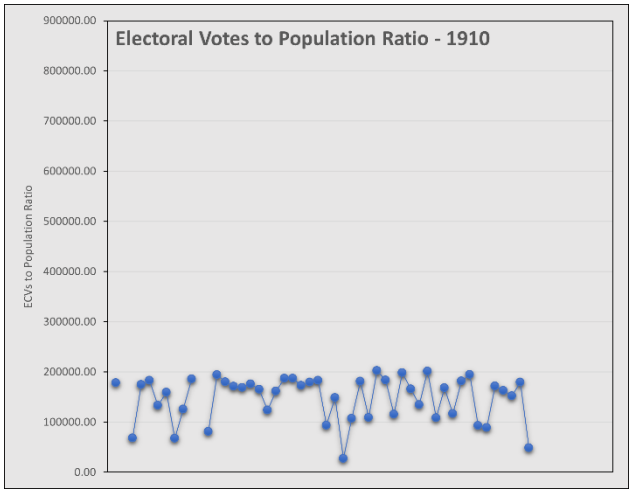


Figure 1 Graph Depicting the People-per-Vote Ratio of each U.S. State in relation to one another for the 1910-1920 Distribution of Votes.

Unfortunately, as time went on and with the introduction of the Permanent Apportionment Act, this relatively close ratio did not remain. After testing the distribution based on the 1960 Census, the first distribution to exist under the three monumental decisions from the Supreme Court that standardized equality of votes, the effects of the 1929 Act are made clear. Already the impact of capping the seats in the house, and by extension the number of electoral votes, can be felt. While the charts

exist to give a brief and clear comparison of the state's ratios, the numbers themselves do more to display the stark inequality in voter distribution. In 1960, the ratio of electoral votes to state population for California, the state with the highest people-per-vote ratio, was 392,930 people per electoral vote. Meanwhile, the ratio for Alaska, the state with the lowest ratio, was just 75,389 people per electoral vote. This means the vote of an Alaskan in 1960 was an astounding 5.2 times more powerful than the vote of a California of the time. Unfortunately, this trend does not end.

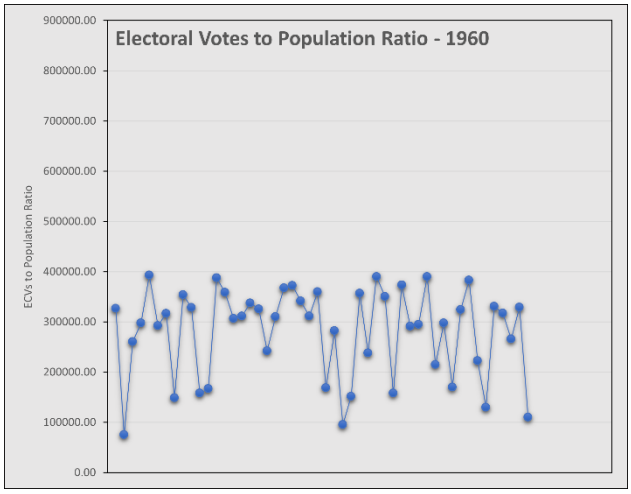


Figure 2 Graph Depicting the People-per-Vote Ratio of each U.S. State in relation to one another for the 1960-1970 Distribution of Votes.

While 1990 and 2010 were tested and remained in line with the pattern to be shown, they will not be included here to avoid repetitive information. Instead, the next distribution to be reviewed comes from the most recent census of 2020. And, as alluded to, the trend does not change. One hundred years since the political catastrophe of the failed 1920 reapportionment, electoral votes are drastically unequal. Where the difference between the most represented and least represented states in 1960 was over 200,000 people-per-vote, by 2020 that difference has skyrocketed to over 500,000 people-per-vote. Texas, now the state with the highest ratio, sits at 766,986 people per vote while Wyoming, the state with the lowest, has just 192,283 people per vote. The difference in power between the most and least represented states came down in 2020 with Wyomingites having 3.98 times the voting power as modern-day Texans, but the difference exists nonetheless and serves as a clear violation of the precedent of one person one vote established by the Supreme Court.

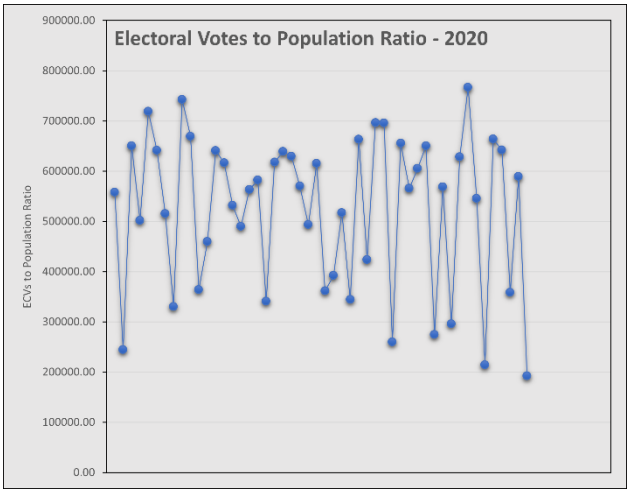


Figure 3 Graph Depicting the People-per-Vote Ratio of each U.S. State in relation to one another for the 2020-2030 Distribution of Votes.

So, if this is based on the precedent, we should throw out the whole system for being unconstitutional. It is time to abolish the Electoral College and turn the presidential election into a direct popular vote! Well, not quite. As aforementioned, the founders decided that the Electoral College serves an extremely important purpose in ensuring smaller states and their populations have a fair say in the election of the President. This point was made more reasonably by the decade as the size of larger states grew exponentially larger than the smaller states. Maybe more important than this, to abolish the Electoral College, it would take an amendment to the Constitution and one of those has not happened in thirty years.[37] This would be especially

[37] United States Constitution. Amendment XXVII.

challenging on a topic as contentious as the Electoral College, and any proposed amendment would likely add to the list of failed attempts to amend the system. Most important of all, there is an easier solution to this issue than the abolition of the Electoral College: we must expand Congress.

On its surface, expanding Congress seems like a completely disconnected topic, but remember the number of electoral votes is tied directly to the seats in Congress, and changing that would require an amendment as well. To increase the number of seats in Congress would only require an act of Congress to overwrite or repeal the Permanent Apportionment Act, which is much easier than passing a constitutional amendment. This is not a new idea, there have been calls to repeal the act since its creation. In fact, in 2008 there was a direct challenge to the law by a group of citizens from various underrepresented states. However, a federal district court in Mississippi denied the case and determined the subject a political issue, not a legislative one.[38] A more recent challenge to the act comes from a law review article from the University of the Pacific, wherein Quentin Barbosa argues the malapportionment of Congressional districts caused by the act.[39] In his article, "The (Im)permanent Apportionment Act," Barbosa reviews the constitutionality of federal legislative district apportionment using many of the same cases covered above to establish a legal issue in the current number of seats in the House of Representatives.[40]

Understandably, his solution is to expand the house, and to do so he discusses the two prevailing theories on how to determine the number of seats moving forward. The first is the Wyoming Method, an equation that would determine the number of seats in the house by dividing the population of the nation by the population of the smallest state, which has been Wyoming for the last several decades. The idea behind this concept is that it would ensure the average district size is equivalent to the size of the smallest state, since every state is guaranteed at least one district it would balance out the size of every district.[41] The second prevailing method is the Cube Root Rule, which would have the number of house seats equal to the cube root of the United States' total population minus one hundred, which accounts for the representation guaranteed by the Senate. The idea here is that the seats would always be represented by the nation's population first and foremost.[42] One method Barbosa does not mention is a simple proportional increase in seats based on the number of seats in Congress and the national population in 1910, which would reasonably create a similarly close ratio for the states. Each of these solutions would seriously increase the number of seats in the House, but would any of them solve the issue of the Electoral College's constitutionality?

[38] Baker, Peter. "Suit Seeks to Double Size of the House." The New York Times. July 12, 2010. https://thecaucus.blogs.nytimes.com/2010/07/12/suit-seeks-to-double-size-of-house/

[39] Barbosa, Quentin. "The (Im)Permanent Apportionment Act: Unequal Congressional Representation and Apportionment Reform." *University of the Pacific Law Review* 53, no 1. (2021).

[40] Barbosa. "The (Im)Permanent Apportionment Act."

[41] Ibid, Page 259-260

[42] Ibid, Page 260-261

Before testing any of these solutions, the number of seats under each system must first be determined. Finding this is not as simple as finding the ratio of electoral votes to state populations, unfortunately. The number of seats for each system can be found as described above and using the equations of "Figure 4"; by dividing the national population by the smallest state's population, by taking the cube root of the national population and subtracting one hundred, or by cross multiplying the number of seats, 435, and the number of people, 92,228,496, in 1910 to the number of people today and finding a proportional number of seats. Determining what states get what seats, however, is more challenging. The equal proportions method established in the Permanent Apportionment Act is the best way to answer that question, but the math is more complicated.

Cube Root Rule:

$$\sqrt[3]{National\ Pop} - 100$$

Wyoming Rule:

$$\frac{(Least\ \ Populated\ \ State\ \ Pop)}{(National\ \ Pop)}$$

1910 Proportional Method:

$$\frac{92228496}{435} \times \frac{(Current\ National\ Pop)}{x}$$

Figure 4 Mathematical Equations for Determining Total Number of Seats for a Given Decade, Split into Three Relevant Methods

In short, the equal proportions method uses a complicated equation to find a state's "priority value" based on the state's population, the number of seats it has been assigned so far, and the number of seats it would have should be given a new one.[43] Every state starts with a single seat, per Article One of the Constitution, and then the method begins to work.[44] The equation is applied to every state and then the state with the highest priority value is assigned a new seat. After this seat is assigned, the equation is applied to that state again and the new highest value is found.[45] This process is repeated until the total number of seats is satisfactory, which would normally be 435. Thankfully, for the purpose of this research, the process need not start from one seat per state. For each census year used the apportionment up to 435 is used and the process is simply continued from there.

Using the equal proportions method of apportionment in conjunction with the three methods for determining number of seats, the number of electoral votes per state can be determined, and then the ratio of people per vote can be found. All specific data for this process can be found in the Appendix, Sections II through IV (before the bibliography), but the most relevant information will be presented here. First, the number of electoral votes for each census year, using each method to find the number of Congressional seats, is determined. The same census years will be tested here for the historical vote-to-state population ratios above, except for 1910, which was not tested again as its constitutionality is not in question. The Wyoming Rule resulted in 893 votes for 1960, 648 votes for 1990, 650 votes for 2010, and 676 votes for 2020. Noticeably, the Wyoming Rule resulted in a decrease in electoral votes over time due to the difference between the smallest state's population and the national population getting relatively smaller over time. The Cube Root Rule resulted in 566 votes for 1960, 631 votes for 1990, 678 votes for 2010, and 695 votes for 2020. Lastly, the 1910 Proportional Method resulted in an astounding 949 votes for 1960, 1172 votes for 1990, 1559 votes for 2010, and 1666 votes for 2020. It is worth noting that the total number of votes includes the three guaranteed to the

[43] "Computing Apportionment." U.S. Census Bureau. Last Modified November 22, 2021. https://www.census.gov/topics/public-sector/Congressional-apportionment/about/computing.html
[44] United States Constitution. Article I § 2, Clause 3.
[45] "Computing Apportionment."

District of Columbia by the Twenty-Third Amendment, but the district will not be included in any compilations of data as it is not a traditional state, and its votes are not subject to change by increasing the size of the house.

With these votes determined, the equal proportions method was used to apportion them to the states and determine the distribution of electoral votes for each prospective census. With that number found, the people-per-vote ratios were found for each state, under each system, using each decennial census. Similar to the ratio comparison for the historical distributions, only 1960 and 2020 will be used to display the difference in ratio for each of these methods. The data for 1990 and 2010 will be used to determine what effect, if any, these systems would have had on different presidential elections. First up are the results of the three systems tested with the 1960 Census year. The Wyoming Rule certainly brought the ratios back into a respectable range, more in line with the 1910 distribution. With 893 total electoral votes the Wyoming Rule was nearly proportional to 1910 in its total votes to national population ratio. Using the Wyoming Rule, the state with the greatest people-per-vote ratio, or least power-per-vote, in 1960 is California with 221,339 people-per-vote. The state opposite California in this regard is Alaska, with 75,389 people-per-vote, which leaves a 2.93 times difference in power between the voters of the two states.

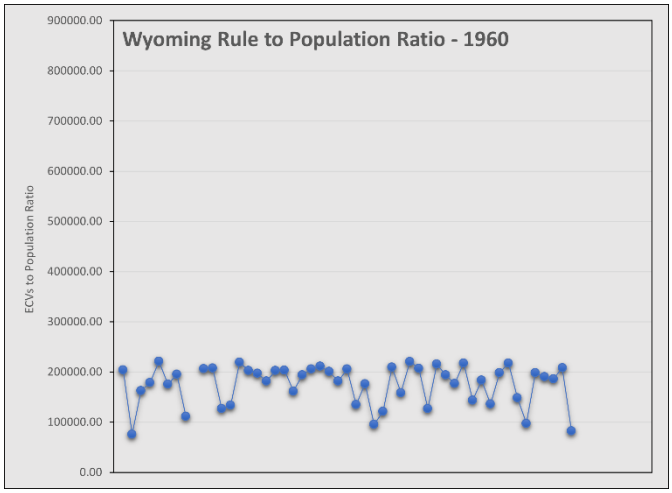


Figure 5 Graph Depicting the People-per-Vote Ratio of each U.S. State in relation to one another for the 1960-1970 Distribution of Votes under the Wyoming Rule.

Still testing in 1960, next comes the Cube Root Rule with a total of 566 votes across the fifty states and the District of Columbia. Unfortunately, in 1960 the Cube Root Rule did not do much to help the nation become fairer in electing the President. This rule resulted in a less fair distribution of votes than the historically accurate ratio tested in "Figure 2." Using the Cube Root Rule, California was awarded 40 electoral votes, giving the state a ratio of 392,930 people-per-vote. A keen eye might notice this is the same ratio as the nation experienced in the 1960s. That is because California did not gain any seats under this rule in 1960. Meanwhile, the state with the lowest people-per-vote ratio did change. Instead of Alaska, North Dakota had the lowest ratio at 63,244 people per vote. This is ten thousand fewer people-per-vote than Alaska had in the real world 1960s and a 6.21 times difference in voter power. While the least represented state did not gain more representation, the most represented did, and the gap between the two grew wider.

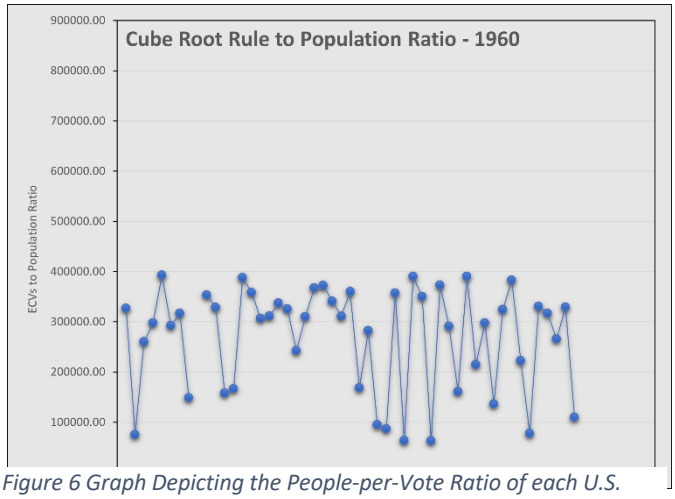


Figure 6 Graph Depicting the People-per-Vote Ratio of each U.S. State in relation to one another for the 1960-1970 Distribution of Votes under the Cube Root Rule.

Finally, the 1910 Proportional Method and its 949 votes were distributed and checked for equality. Believe it or not, doubling the number of votes made for a much more evenly distributed ratio. Being the most equal, the Proportional Method resulted in an average ratio of just 167,485 people per vote. Despite this, there was still a noticeable difference in the highest and lowest ratios across the states. The state with the highest ratio was New York, with 204,662 people per vote, and its opposite was Alaska with 75,389 people per vote. While the difference in these is still relatively large, a 2.71 times difference in voter power, it is the lowest disparity of each method tested for 1960 and fits cleanly within the average people-per-vote ratio.

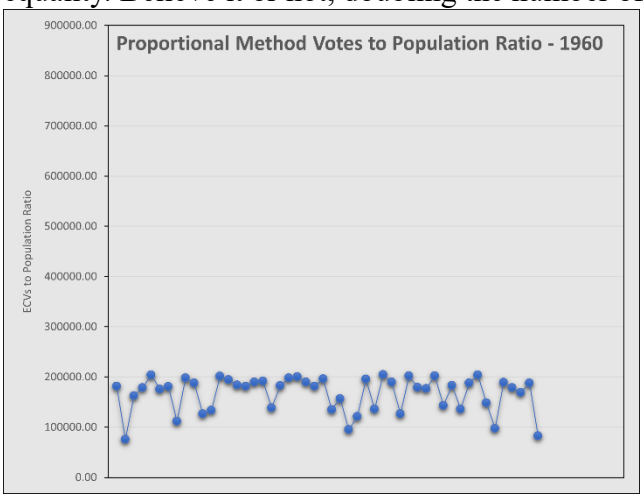


Figure 7 Graph Depicting the People-per-Vote Ratio of each U.S. State in relation to one another for the 1960-1970 Distribution of Votes under the 1910 Proportional Method.

Knowing about 1960 is all well and good, but the world has long passed the days of the Space Race and abundant leopard print. The question now is what effect the changes in seats would have on electoral equality today? Starting again with the Wyoming Rule, which would create fewer votes in 2020 with only 676 votes total, there is a much better people-per-vote ratio than currently exists under the 538 electoral vote cap. In comparison to the more than 500,000-person difference between the most and least represented states under the current cap, the Wyoming Rule would result in only about a 300,000 person-per-vote difference and a 2.89 times difference in voter power. California, now serving as the least represented, would have 556,876 people-per-vote and Wyoming, the most represented, would have 192,283 people-per-vote. But can it be closer than that?

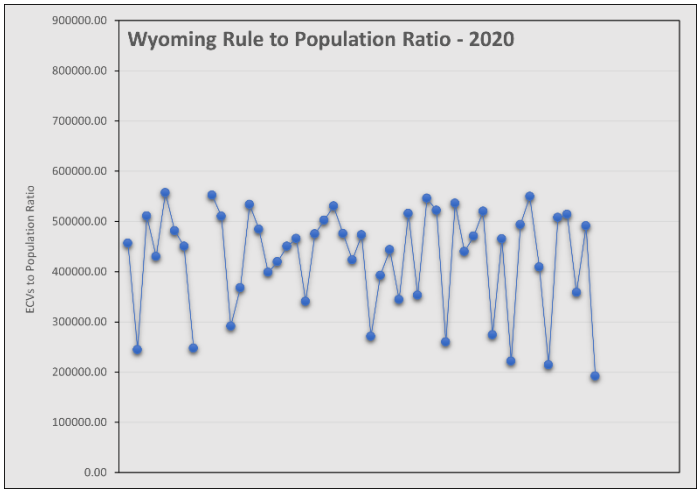


Figure 8 Graph Depicting the People-per-Vote Ratio of each U.S. State in relation to one another for the 2020-2030 Distribution of Votes under the Wyoming Rule.

Next up to the bat is the Cube Root Rule, which would bring the total number of electoral votes up to 695. As may be obvious at this point, increasing the number of electoral votes reduces the difference in people-per-vote ratios between states, but increasing the population has the opposite effect. In the 1960s the Wyoming Rule added a similar number of votes as the Cube Root Rule would now, but the nation's population almost doubled in that time. Unfortunately, the increase in population resulted in minimal gains in voter equality under the Cube Root Rule as opposed to the Wyoming Rule. California only gained one additional vote, decreasing the state's ratio to 541,619 people-per-vote. Wyoming remained the most represented with the same ratio as under its titular rule, and ultimately the difference between most and least represented only changed by around 15,000 people between the rules. The power balance only shifted to a 2.81 times difference between the states. So, the Cube Root Rule does make things a little more even and certainly fairer than the current system, but things could be better still.

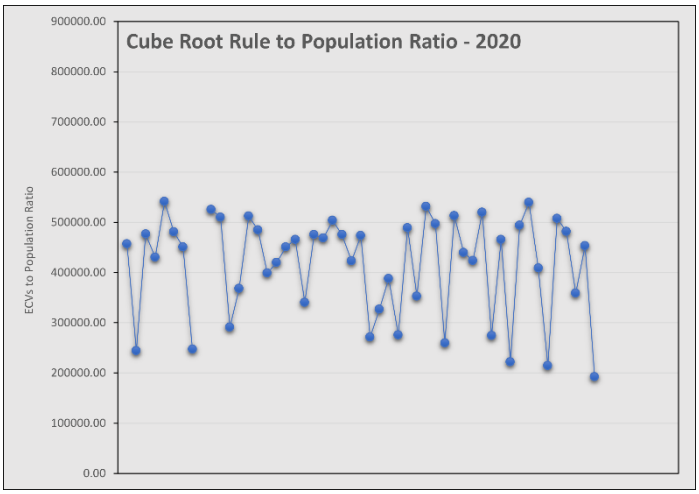


Figure 9 Graph Depicting the People-per-Vote Ratio of each U.S. State in relation to one another for the 2020-2030 Distribution of Votes under the Cube Root Rule.

The last one to test is the Proportional Method, which would result in a whopping 1,666 electoral votes for the nation, and over 1,000 new seats added to Congress. Far and away, the Proportional Method makes for the most equal distribution of people per vote in the United States. The 1,666 votes would ensure every state is within 100,000 people of the average people-per-vote ratio. The difference between the least represented state, once again being California but now with only 209,196 people-per-vote, and the most represented, Wyoming with 115,370 people-per-vote, is an astoundingly low 93,826. This is the lowest ratio difference of any method tested, for any year tested, including the historical distribution of votes from 1910. This difference results in just a 1.22 times difference in voter power between the residents of these states.

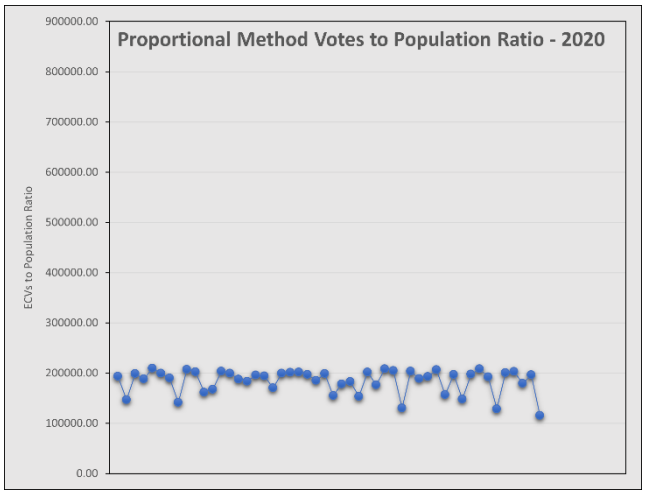


Figure 10 Graph Depicting the People-per-Vote Ratio of each U.S. State in relation to one another for the 2020-2030 Distribution of Votes under the 1910 Proportional Method.

Clearly, increasing the number of votes will slowly but surely get the Electoral College as close to a one person one vote ratio as possible. With a "measly" 1,128 additional seats in the House to make more electoral votes, the Proportional Method is obviously the best way to go on making the Electoral College constitutional again! That, of course, is sarcastic. There is a plethora of issues with tripling the number of seats in the house, not least of which is the increased cost of Congress.

Not only would you need to pay each of the new Congressional representatives their salary, but with them would come staff, who also have bills to pay, and any other necessary expenses of fulfilling their position as a representative. All told, using the current allowance and salary for each member of Congress, adding 1,128 seats would cost over 1.3 billion dollars minimum.[46] That is a rough minimum, and the cost would likely be much greater.

Of course, the cost of equality is one worth paying. That is the American way after all. And while the Wyoming Rule and Cube Root Rule do not make the Electoral College quite as fair as the Proportional Method, both rules would still make the system more equal for voters than it currently is and would be much more affordable, only adding a few hundred seats to the house each. While it would take an amendment to the Constitution, something this paper is expressly trying to avoid, a change in how the number of electoral votes is determined could also solve the violation of the one-person one-vote rule established by the Supreme Court. In any scenario, there is a solution to the wildly unconstitutional Electoral College that would not remove it entirely. Now the question is, would it still ensure the voice of the states as the founders intended?

The only way to know for sure is to take the newly distributed votes under each system and plug them into elections of years past and see if anything changes. Finally, the different alternate versions of 1990 and 2010 will come into play here. The elections selected to test are the following, in chronological order; the 1968 election of Nixon v. Humphries v. Wallace, the 1992 election of Clinton v. Bush (Perot did not get any Electoral College votes), the 2000 election of Bush v. Gore (Nader did not receive any votes in the Electoral College), the 2012 election of Obama v. Romney, the 2016 election of Trump v. Clinton, and the 2020 election of Biden v. Trump (all third parties were shut out of the Electoral College count).

These elections were not simply drawn from a hat, each one was chosen for a reason. The Election of 1968 was chosen for being the first election that could have feasibly been affected by the Supreme Court decisions, and it had a very prominent third-party candidate who won some electoral votes, a rare occurrence.[47] The 2000 Election was chosen for being the closest election in recent history, with a popular vote difference of just 500,000 votes, and for being the first election since 1888 to have a candidate win the popular vote but not the Electoral College.[48] The 2016 Election was chosen for a similar reason, also for being an election where the winning candidate did not take the popular vote, but this time by a much larger margin.[49] The 2020 Election was chosen for its proximity to the modern day, to show clearly the modern consequences of increasing the number of electoral votes. Lastly, the 1992 and 2012 Elections were chosen to ensure a balance between Republican-won elections and Democratic-won elections, and because the information for their census years was already compiled so not testing them would be a waste. While the 1992 Election also featured a prominent third-party candidate in Ross Perot, who garnered the most votes of any third-party candidate in American history, he did not win any electoral votes and thus his candidacy is not a factor in this research.

---

[46] "Frequently Asked Questions: What is the budget for most members of Congress?" United States House of Representatives. https://www.house.gov/the-house-explained/open-government/statement-of-disbursements/frequently-asked-questions

[47] "1968 Presidential Election." 270 to Win. https://www.270towin.com/1968_Election/
[48] "2000 Presidential Election." 270 to Win. https://www.270towin.com/2000_Election/
[49] "2016 Presidential Election." 270 to Win. https://www.270towin.com/2016_Election/

Before getting into the other systems, it is best to refresh one's memory on how these elections played out. In 1968 Richard Nixon defeated both his opponents with a total number of 301 electoral votes, securing his first term in office.[50] In 1992 Bill Clinton defeated the incumbent George H.W. Bush with a total of 370 electoral votes.[51] In 2000 George Bush narrowly defeated Vice-President Al Gore, the election coming down to a very heated and judicially challenging vote in Florida, with 271 electoral votes.[52] In 2012 Barrack Obama held onto his seat in office by defeating current Senator Mitt Romney with 332 electoral votes.[53] In 2016 Donald Trump won the Electoral College with 304 electoral votes despite losing the popular vote to his opponent, Hillary Clinton, by more than two million votes.[54] And finally, in 2020 former Vice-President Joe Biden defeated the incumbent Donald Trump with 306 electoral votes.[55] With that re-established, how would different methods of increasing the seats in Congress have affected these elections?

Before reviewing the election data, it is important to note how the electoral votes from Maine and Nebraska were handled. Since these two states award some of their electoral votes based on elections held in the votes corresponding district, determining exactly where their votes would go under the prospective systems with increased house sizes is not possible.[56] Therefore, the entirety of votes afforded to each state were given to the victor of the popular vote for each state. Similarly, the Elections of 1968 and 2016 each saw faithless electors who cast their votes differently from the will of their states.[57] In these instances, under the tested systems, the candidate who won the state is rewarded the entirety of the state's votes regardless of the historical actions of faithless electors. The only exception to this rule is the case of the missing electoral vote from the District of Columbia in the 2000 election, which would not have been affected by any changes to the seats in Congress alone. The election data under each system, for each election, can be found in full in the Appendix, Sections VI through VIII. Now, we go on to the results.

The Wyoming Rule starts with seemingly little effect on history, as Richard Nixon still secures victory now with 495 electoral votes to Humphries' 325 and Wallace's 73. Moving to 1992 there is still little effect on history, wherein Bill Clinton still handedly defeats his opponent with 448 electoral votes to Bush Sr.'s 189 votes. Reviewing the 2000 election under the Wyoming Rule results in the first potential change in course in United States history. As aforementioned, there was a missing ballot from the District of Columbia that should have gone to Al Gore. For this research, and with respect to the difference in origin for D.C.'s electoral votes, this missing vote was left historically accurate for the different methods tested. With this in consideration, under the Wyoming Rule, George W. Bush would have only defeated Al Gore by a single electoral vote.

Should the butterfly effect be found true, and the missing vote somehow reappears in this alternate Wyoming Rule-based history, the nation would have seen the first contingent election since 1837, when the Vice-President was still being elected separately and Richard Johnson lost

[50] "1968 Presidential Election." 270 to Win.
[51] "1992 Presidential Election." 270 to Win. https://www.270towin.com/1992_Election/
[52] "2000 Presidential Election." 270 to Win.
[53] "2012 Presidential Election." 270 to Win. https://www.270towin.com/2012_Election/
[54] "2016 Presidential Election." 270 to Win.
[55] "2020 Presidential Election." 270 to Win. https://www.270towin.com/2020_Election/
[56] "Maine and Nebraska." Fair Vote. https://www.fairvote.org/maine_nebraska
[57] "Faithless Electors." Fair Vote. https://www.fairvote.org/faithless_electors

twenty three electoral votes to faithless Virginian electors.[58] However, even in this hypothetical case, the election likely still would have gone to George W. Bush seeing as the Republican Party held the Congressional majority of the House at the time. Closing out the Wyoming Rule, the results return to historical normalcy.[59] Barrack Obama still secures reelection in 2012 with 402 electoral votes to Romney's 248, Donald Trump still wins without the popular vote by earning 369 electoral votes over Clinton's 281, and Joe Biden then defeats the incumbent Trump with 370 total electoral votes to his 280. All in all, despite a close call in the year 2000, the Wyoming Rule would not have altered the outcome of any tested election.

The Cube Root Rule fairs a little better in its impact on past elections. In 1968 Richard Nixon is still the victor, now with 330 electoral votes to Humphries' 191 and Wallace's 45. 1992 remains historically consistent with Bill Clinton earning 436 votes against Bush with 184. This time around, the election of 2000 would have followed history with George W. Bush winning 317 electoral votes, only four more than Al Gore. So, Florida would have remained the deciding state and the monumental lawsuit that followed would have remained intact.[60] The 2012 election is unchanged with Barrack Obama now earning 430 electoral votes to Romney's 265. The 2016 election still sees Donald Trump handily defeat Hillary Clinton with 395 electoral votes over her even 300. And finally, Joe Biden would still be the current president, having won the 2020 election with 394 electoral votes to Trump's 301. Once again, a more equal Electoral College has produced the same results as the unconstitutional one in effect today.

Finally, next is the Proportional Method of determining votes, the method found most equal. Keeping in line with the other systems tested, the Proportional Method remains historically accurate for the election of 1968, wherein Richard Nixon wins with a total of 524 votes over Humphries and Wallace with 347 and 78 votes respectively. The election of 1992 follows the historical trend, awarding an astounding 815 votes to Bill Clinton for the victory over Bush, who won 338 electoral votes. Unfortunately, all good things must come to an end. The trend of historical consistency ends when the Proportional Method is tested against the election of 2000. With 1172 votes between them, in an upset victory, Al Gore wins the election with 593 to Bush Junior's 578. Even winning the state of Florida would not have secured George W. Bush's victory under the fairest version of the Electoral College tested here. This change in history is likely due to the extreme increase in Congressional seats awarded to Democratic states like California or New York.

Using the equal proportions method to distribute the additional seats, California walked away with a baffling 128 Congressional seats or 130 Electoral College votes. By 2020, California would get even more votes, up to 189. Traditionally Republican states are also getting more seats under the Proportional Method, Wyoming finally earns its second seat for example, but only Texas gets close to California. Using the 1990 Census, Texas would have gone up to 75 electoral votes. However, the gain in Texas is balanced by the growth of New York, which went up to 78 electoral votes. Where originally Texas only had twenty-three fewer votes than California and New York combined, under the Proportional Method's distribution it would have sixty-three fewer votes. While every single state was given at least one additional seat, the

---

[58] NCC Staff. "The Day the Senate Picked a U.S. Vice-President of its Own." *National Constitution Center*. https://constitutioncenter.org/interactive-constitution/blog/the-day-the-senate-picked-a-u-s-vice-president-on-its-own

[59] "Party Divisions of the House of Representatives, 1789 to Present." History, Arts, and Archives of The United States House of Representatives. https://history.house.gov/Institution/Party-Divisions/Party-Divisions/

[60] Bush v. Gore, 531 U.S. 98 (2000)

Proportional Method resulted in more seats for the states that voted for Al Gore, and ultimately the method changed history.

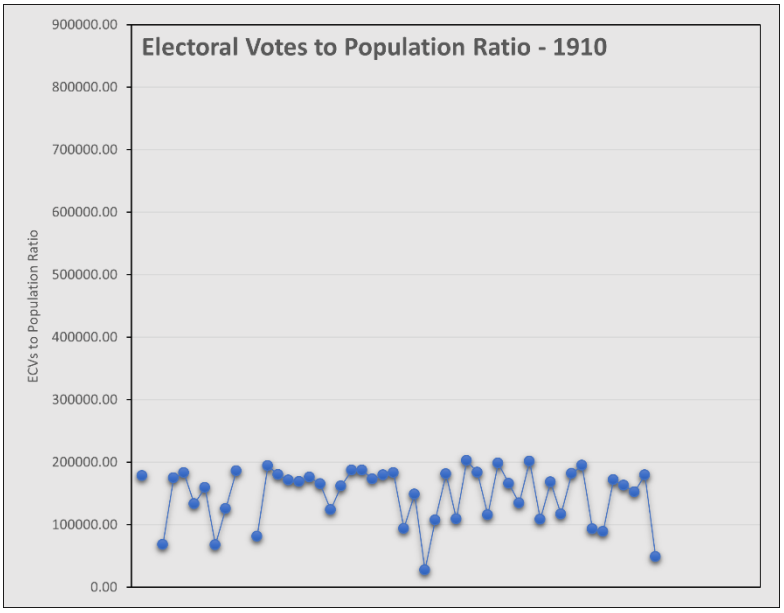
Continuing through history, assuming the victory of Al Gore in 2000 would not have set off a domino effect making Kanye West the President of the United States, the 2012 election goes as expected. Barrack Obama still earns his second term in office with 981 electoral votes to Romney's 578. The election of 2016 gives hope back to the Proportional Method with Donald Trump still defeating his more popular opponent with 881 electoral votes to Clinton's 678. Finally, the 2020 election would still play out the same with Joe Biden winning 898 electoral votes, nearly twice the total number of votes in the current Electoral College and 237 more votes than his opponent. While the Proportional Method cannot claim to fully protect the historical relevance of the elections, it should be no surprise that an election as close as Bush v. Gore can be altered by simply adding more votes into the mix. The fact that Donald Trump is still able to safely secure a victory despite losing the popular vote is evidence that even this system would protect the Founding Fathers' intentions of empowering smaller states.

That conclusion is shared between all three methods tested, especially the Cube Root Rule which saw no serious change or challenge to any election tested. When the Electoral College is verifiably unconstitutional, something must be done to ensure the voice of the people is properly heard. The repeal of the Permanent Apportionment Act of 1929 is the best direction to go, and the first step, in making the nation a fairer place and in line with the one person one vote precedent. Any one of these methods would satisfy the Supreme Court's requirement of a good faith effort to address the impossibility of one person one vote within the Electoral College, certainly more than the existing hundred-year-old cap on the system. The most realistic methods are certainly the Wyoming Rule and the Cube Root Rule, both of which would only expand Congress by a few hundred seats initially and then even fewer every ten years thereafter, but even a one-time massive expansion of Congress using the Proportional Method would make the Electoral College far more equal for decades to come. All this occurred without any of these changes seriously challenging the founder's intention for the Electoral College. The only instance where the power of the small states shifted was with the Proportional Method in the 2000 election, an election that was so historically close that any number of changes could have altered its results. Ultimately, there is no good reason for the Electoral College to leave so many people underrepresented based on where they live, and the solutions are simple to implement and long overdue. After all, it is "We, the People," not "Wyoming, the People," and it is time for the Electoral College to reflect that.

APPENDIX I – Historical Apportionment

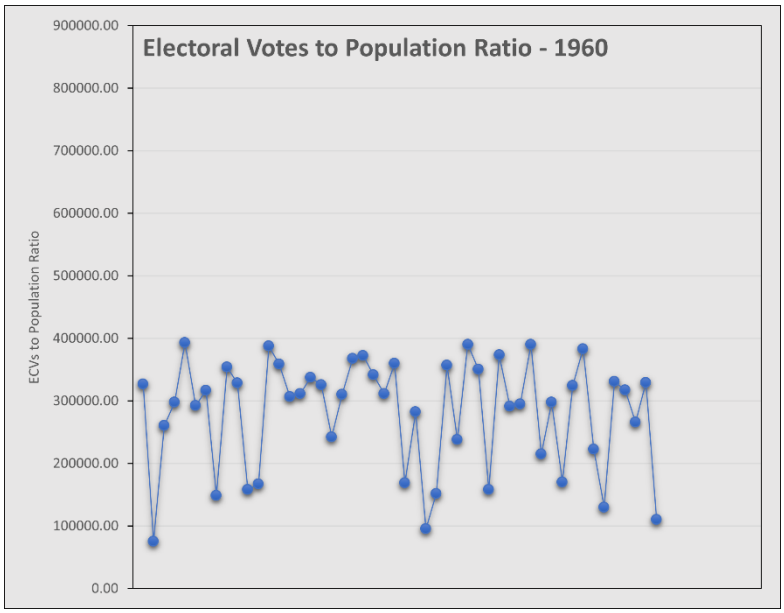
I. Historical Apportionment and Distribution Electoral Data and Ratios - 1910

1910 Census (Plus NM and AZ)				
State	Population	Seats	EC Votes	Ratio
Alabama	2,138,093	10	12	178174.42
Alaska	64,356			
Arizona	204,354	1	3	68118.00
Arkansas	1,574,449	7	9	174938.78
California	2,377,549	11	13	182888.38
Colorado	799,024	4	6	133170.67
Conneticut	1,114,756	5	7	159250.86
Delaware	202,322	1	3	67440.67
Florida	752,619	4	6	125436.50
Georgia	2,609,121	12	14	186365.79
Hawaii	191,874			
Idaho	325,594	2	4	81398.50
Illinois	5,638,591	27	29	194434.17
Indiana	2,700,876	13	15	180058.40
Iowa	2,224,771	11	13	171136.23
Kansas	1,690,949	8	10	169094.90
Kentucky	2,289,905	11	13	176146.54
Louisiana	1,656,388	8	10	165638.80
Maine	742,371	4	6	123728.50
Maryland	1,295,346	6	8	161918.25
Massachusetts	3,366,416	16	18	187023.11
Michigan	2,810,173	13	15	187344.87
Minnesota	2,075,708	10	12	172975.67
Mississippi	1,797,114	8	10	179711.40
Missouri	3,293,335	16	18	182963.06
Montana	376,053	2	4	94013.25
Nebraska	1,192,214	6	8	149026.75
Nevada	81,875	1	3	27291.67
New Hampshire	430,572	2	4	107643.00
New Jersey	2,537,167	12	14	181226.21
New Mexico	327,301	1	3	109100.33
New York	9,113,614	43	45	202524.76
North Carolina	2,206,287	10	12	183857.25
NorthDakota	577,056	3	5	115411.20
Ohio	4,767,121	22	24	198630.04
Oklahoma	1,657,155	8	10	165715.50
Oregon	672,765	3	5	134553.00
Pennsylvania	7,665,111	36	38	201713.45
Rhode Island	542,610	3	5	108522.00
South Carolina	1,515,400	7	9	168377.78
South Dakota	583,888	3	5	116777.60
Tennesee	2,184,789	10	12	182065.75
Texas	3,896,542	18	20	194827.10
Utah	373,351	2	4	93337.75
Vermont	355,956	2	4	88989.00
Virginia	2,061,612	10	12	171801.00
Washington	1,141,990	5	7	163141.43
West Virginia	1,221,119	6	8	152639.88
Wisconsin	2,333,860	11	13	179527.69
Wyoming	145,965	1	3	48655.00
	1910 Total Seats	435		Ratio Average
1910 Total Electoral College Votes			535	142974.50



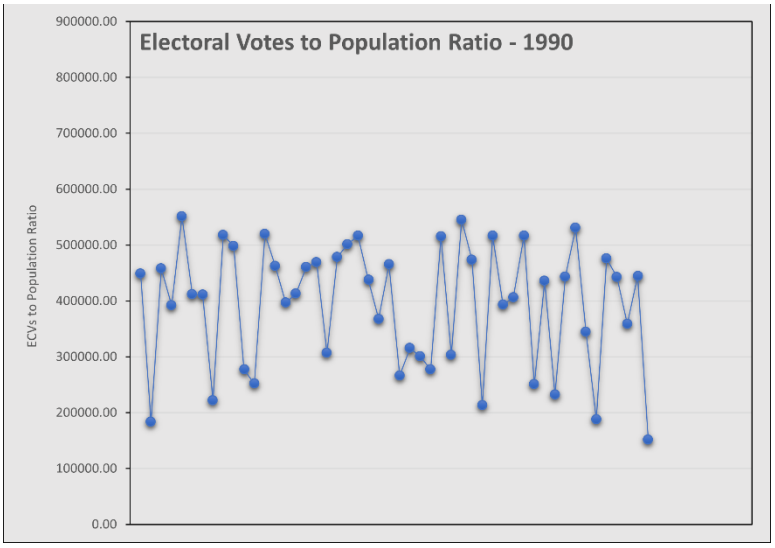
II. A Historical Apportionment and Distribution Electoral Data and Ratios - 1960

1960 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	3,266,740	8	10	326674.00
Alaska	226,167	1	3	75389.00
Arizona	1,302,161	3	5	260432.20
Arkansas	1,786,272	4	6	297712.00
California	15,717,204	38	40	392930.10
Colorado	1,753,947	4	6	292324.50
Conneticut	2,535,234	6	8	316904.25
Delaware	446,292	1	3	148764.00
Florida	4,951,560	12	14	353682.86
Georgia	3,943,116	10	12	328593.00
Hawaii	632,772	2	4	158193.00
Idaho	667,191	2	4	166797.75
Illinois	10,081,158	24	26	387736.85
Indiana	4,662,498	11	13	358653.69
Iowa	2,757,537	7	9	306393.00
Kansas	2,178,611	5	7	311230.14
Kentucky	3,038,156	7	9	337572.89
Louisiana	3,257,022	8	10	325702.20
Maine	969,265	2	4	242316.25
Maryland	3,100,689	8	10	310068.90
Massachusetts	5,148,578	12	14	367755.57
Michigan	7,823,194	19	21	372533.05
Minnesota	3,413,864	8	10	341386.40
Mississippi	2,178,141	5	7	311163.00
Missouri	4,319,813	10	12	359984.42
Montana	674,767	2	4	168691.75
Nebraska	1,411,330	3	5	282266.00
Nevada	285,278	1	3	95092.67
New Hampshire	606,921	2	4	151730.25
New Jersey	6,066,782	15	17	356869.53
New Mexico	951,023	2	4	237755.75
New York	16,782,304	41	43	390286.14
North Carolina	4,556,155	11	13	350473.46
NorthDakota	632,446	2	4	158111.50
Ohio	9,706,397	24	26	373322.96
Oklahoma	2,328,284	6	8	291035.50
Oregon	1,768,687	4	6	294781.17
Pennsylvania	11,319,366	27	29	390322.97
Rhode Island	859,488	2	4	214872.00
South Carolina	2,382,594	6	8	297824.25
South Dakota	680,514	2	4	170128.50
Tennesee	3,567,089	9	11	324280.82
Texas	9,579,677	23	25	383187.08
Utah	890,627	2	4	222656.75
Vermont	389,881	1	3	129960.33
Virginia	3,966,949	10	12	330579.08
Washington	2,853,214	7	9	317023.78
West Virginia	1,860,421	5	7	265774.43
Wisconsin	3,951,777	10	12	329314.75
Wyoming	330,066	1	3	110022.00
1960 Total Seats		435		Ratio Average
1960 Total Electoral College Votes			538	281745.13



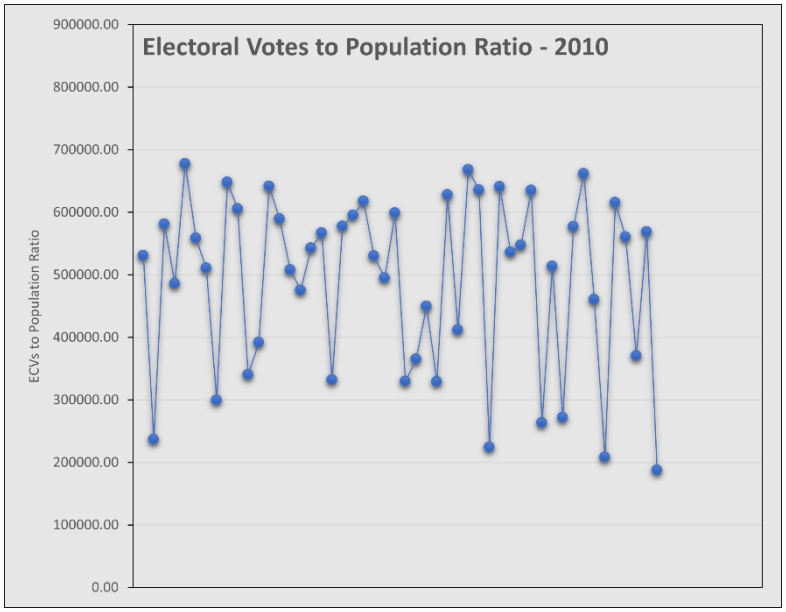
III. Historical Apportionment and Distribution Electoral Data and Ratios - 1990

1990 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	4,040,587	7	9	448954.11
Alaska	550,043	1	3	183347.67
Arizona	3,665,228	6	8	458153.50
Arkansas	2,350,725	4	6	391787.50
California	29,760,021	52	54	551111.50
Colorado	3,294,394	6	8	411799.25
Conneticut	3,287,116	6	8	410889.50
Delaware	666,168	1	3	222056.00
Florida	12,937,926	23	25	517517.04
Georgia	6,478,216	11	13	498324.31
Hawaii	1,108,229	2	4	277057.25
Idaho	1,006,749	2	4	251687.25
Illinois	11,430,602	20	22	519572.82
Indiana	5,544,159	10	12	462013.25
Iowa	2,776,755	5	7	396679.29
Kansas	2,477,574	4	6	412929.00
Kentucky	3,685,296	6	8	460662.00
Louisiana	4,219,973	7	9	468885.89
Maine	1,227,928	2	4	306982.00
Maryland	4,781,468	8	10	478146.80
Massachusetts	6,016,425	10	12	501368.75
Michigan	9,295,297	16	18	516405.39
Minnesota	4,375,099	8	10	437509.90
Mississippi	2,573,216	5	7	367602.29
Missouri	5,117,073	9	11	465188.45
Montana	799,065	1	3	266355.00
Nebraska	1,578,385	3	5	315677.00
Nevada	1,201,833	2	4	300458.25
New Hampshire	1,109,252	2	4	277313.00
New Jersey	7,730,188	13	15	515345.87
New Mexico	1,515,069	3	5	303013.80
New York	17,990,455	31	33	545165.30
North Carolina	6,628,637	12	14	473474.07
NorthDakota	638,800	1	3	212933.33
Ohio	10,847,115	19	21	516529.29
Oklahoma	3,145,585	6	8	393198.13
Oregon	2,842,321	5	7	406045.86
Pennsylvania	11,881,643	21	23	516593.17
Rhode Island	1,003,464	2	4	250866.00
South Carolina	3,486,703	6	8	435837.88
South Dakota	696,004	1	3	232001.33
Tennesee	4,877,185	9	11	443380.45
Texas	16,986,510	30	32	530828.44
Utah	1,722,850	3	5	344570.00
Vermont	562,758	1	3	187586.00
Virginia	6,187,358	11	13	475950.62
Washington	4,866,692	9	11	442426.55
West Virginia	1,793,477	3	5	358695.40
Wisconsin	4,891,769	9	11	444706.27
Wyoming	453,588	1	3	151196.00
1960 Total Seats		435		Ratio Average
1960 Total Electoral College Votes			538	395135.55



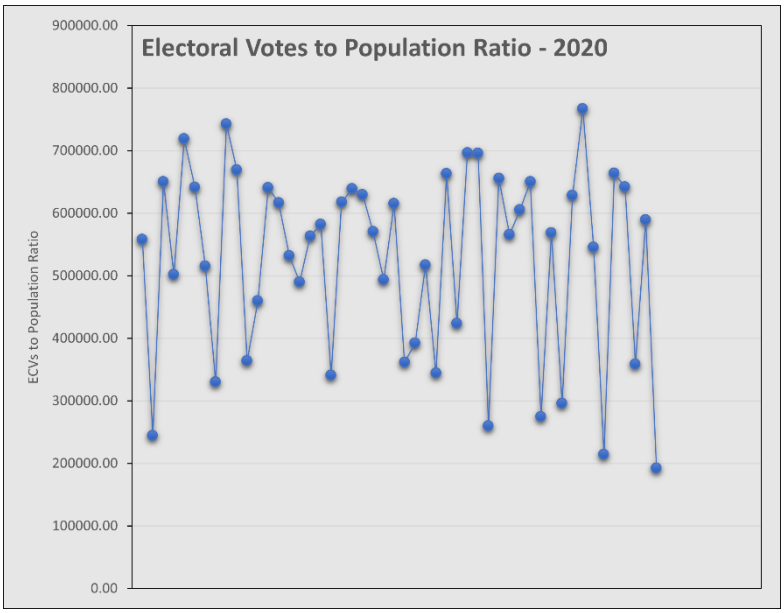
IV. Historical Apportionment and Distribution Electoral Data and Ratios - 2010

2010 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	4,779,736	7	9	531081.78
Alaska	710,231	1	3	236743.67
Arizona	6,392,017	9	11	581092.45
Arkansas	2,915,918	4	6	485986.33
California	37,253,956	53	55	677344.65
Colorado	5,029,196	7	9	558799.56
Conneticut	3,574,097	5	7	510585.29
Delaware	897,934	1	3	299311.33
Florida	18,801,310	27	29	648321.03
Georgia	9,687,653	14	16	605478.31
Hawaii	1,360,301	2	4	340075.25
Idaho	1,567,582	2	4	391895.50
Illinois	12,830,632	18	20	641531.60
Indiana	6,483,802	9	11	589436.55
Iowa	3,046,355	4	6	507725.83
Kansas	2,853,118	4	6	475519.67
Kentucky	4,339,367	6	8	542420.88
Louisiana	4,533,372	6	8	566671.50
Maine	1,328,361	2	4	332090.25
Maryland	5,773,552	8	10	577355.20
Massachusetts	6,547,629	9	11	595239.00
Michigan	9,883,640	14	16	617727.50
Minnesota	5,303,925	8	10	530392.50
Mississippi	2,967,297	4	6	494549.50
Missouri	5,988,927	8	10	598892.70
Montana	989,415	1	3	329805.00
Nebraska	1,826,341	3	5	365268.20
Nevada	2,700,551	4	6	450091.83
New Hampshire	1,316,470	2	4	329117.50
New Jersey	8,791,894	12	14	627992.43
New Mexico	2,059,179	3	5	411835.80
New York	19,378,102	27	29	668210.41
North Carolina	9,535,483	13	15	635698.87
NorthDakota	672,591	1	3	224197.00
Ohio	11,536,504	16	18	640916.89
Oklahoma	3,751,351	5	7	535907.29
Oregon	3,831,074	5	7	547296.29
Pennsylvania	12,702,379	18	20	635118.95
Rhode Island	1,052,567	2	4	263141.75
South Carolina	4,625,364	7	9	513929.33
South Dakota	814,180	1	3	271393.33
Tennesee	6,346,105	9	11	576918.64
Texas	25,145,561	36	38	661725.29
Utah	2,763,885	4	6	460647.50
Vermont	625,741	1	3	208580.33
Virginia	8,001,024	11	13	615463.38
Washington	6,724,540	10	12	560378.33
West Virginia	1,852,994	3	5	370598.80
Wisconsin	5,686,986	8	10	568698.60
Wyoming	563,626	1	3	187875.33
2010 Total Seats		435		Ratio Average
2010 Total Electoral College Votes			538	491941.50



V. Historical Apportionment, Distribution, and Electoral Data and Ratios - 2020

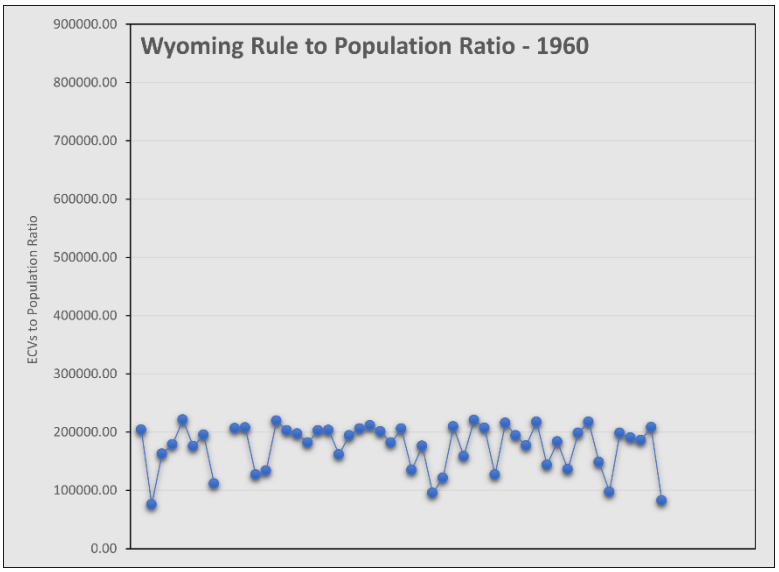
2020 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	5,024,279	7	9	558253.22
Alaska	733,391	1	3	244463.67
Arizona	7,151,502	9	11	650136.55
Arkansas	3,011,524	4	6	501920.67
California	39,538,223	53	55	718876.78
Colorado	5,773,714	7	9	641523.78
Conneticut	3,605,944	5	7	515134.86
Delaware	989,948	1	3	329982.67
Florida	21,538,187	27	29	742696.10
Georgia	10,711,908	14	16	669494.25
Hawaii	1,455,271	2	4	363817.75
Idaho	1,839,106	2	4	459776.50
Illinois	12,812,508	18	20	640625.40
Indiana	6,785,528	9	11	616866.18
Iowa	3,190,369	4	6	531728.17
Kansas	2,937,880	4	6	489646.67
Kentucky	4,505,836	6	8	563229.50
Louisiana	4,657,757	6	8	582219.63
Maine	1,362,359	2	4	340589.75
Maryland	6,177,224	8	10	617722.40
Massachusetts	7,029,917	9	11	639083.36
Michigan	10,077,331	14	16	629833.19
Minnesota	5,706,494	8	10	570649.40
Mississippi	2,961,279	4	6	493546.50
Missouri	6,154,913	8	10	615491.30
Montana	1,084,225	1	3	361408.33
Nebraska	1,961,504	3	5	392300.80
Nevada	3,104,614	4	6	517435.67
New Hampshire	1,377,529	2	4	344382.25
New Jersey	9,288,994	12	14	663499.57
New Mexico	2,117,522	3	5	423504.40
New York	20,201,249	27	29	696594.79
North Carolina	10,439,388	13	15	695959.20
NorthDakota	779,094	1	3	259698.00
Ohio	11,799,448	16	18	655524.89
Oklahoma	3,959,353	5	7	565621.86
Oregon	4,237,256	5	7	605322.29
Pennsylvania	13,002,700	18	20	650135.00
Rhode Island	1,097,379	2	4	274344.75
South Carolina	5,118,425	7	9	568713.89
South Dakota	886,667	1	3	295555.67
Tennesee	6,910,840	9	11	628258.18
Texas	29,145,505	36	38	766986.97
Utah	3,271,616	4	6	545269.33
Vermont	643,077	1	3	214359.00
Virginia	8,631,393	11	13	663953.31
Washington	7,705,281	10	12	642106.75
West Virginia	1,793,716	3	5	358743.20
Wisconsin	5,893,718	8	10	589371.80
Wyoming	576,851	1	3	192283.67
	2020 Total Seats	435		Ratio Average
2020 Total Electoral College Votes			538	525972.84



APPENDIX II – The Wyoming Rule

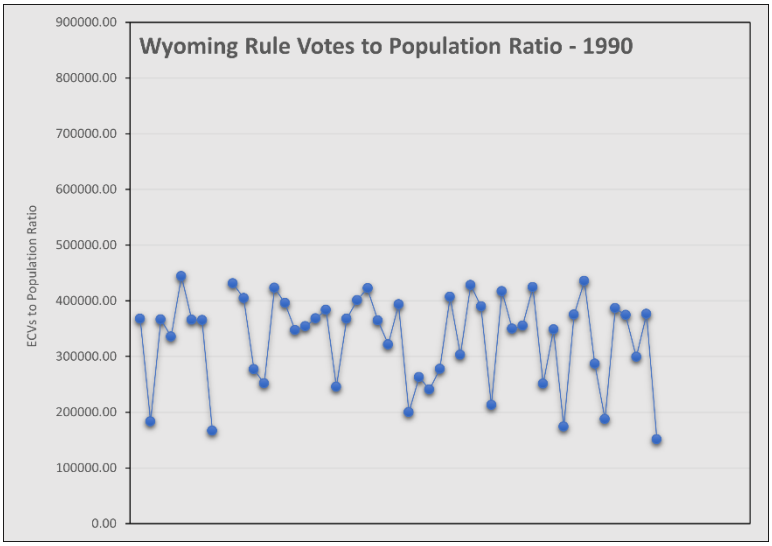
I. Apportionment, Distribution, and Electoral Data and Ratios under the Wyoming Rule – 1960

1960 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	3,266,740	14	16	204171.25
Alaska	226,167	1	3	75389.00
Arizona	1,302,161	6	8	162770.13
Arkansas	1,786,272	8	10	178627.20
California	15,717,204	69	71	221369.07
Colorado	1,753,947	8	10	175394.70
Conneticut	2,535,234	11	13	195018.00
Delaware	446,292	2	4	111573.00
Florida	4,951,560	22	24	206315.00
Georgia	3,943,116	17	19	207532.42
Hawaii	632,772	3	5	126554.40
Idaho	667,191	3	5	133438.20
Illinois	10,081,158	44	46	219155.61
Indiana	4,662,498	21	23	202717.30
Iowa	2,757,537	12	14	196966.93
Kansas	2,178,611	10	12	181550.92
Kentucky	3,038,156	13	15	202543.73
Louisiana	3,257,022	14	16	203563.88
Maine	969,265	4	6	161544.17
Maryland	3,100,689	14	16	193793.06
Massachusetts	5,148,578	23	25	205943.12
Michigan	7,823,194	35	37	211437.68
Minnesota	3,413,864	15	17	200815.53
Mississippi	2,178,141	10	12	181511.75
Missouri	4,319,813	19	21	205705.38
Montana	674,767	3	5	134953.40
Nebraska	1,411,330	6	8	176416.25
Nevada	285,278	1	3	95092.67
New Hampshire	606,921	3	5	121384.20
New Jersey	6,066,782	27	29	209199.38
New Mexico	951,023	4	6	158503.83
New York	16,782,304	74	76	220819.79
North Carolina	4,556,155	20	22	207097.95
NorthDakota	632,446	3	5	126489.20
Ohio	9,706,397	43	45	215697.71
Oklahoma	2,328,284	10	12	194023.67
Oregon	1,768,687	8	10	176868.70
Pennsylvania	11,319,366	50	52	217680.12
Rhode Island	859,488	4	6	143248.00
South Carolina	2,382,594	11	13	183276.46
South Dakota	680,514	3	5	136102.80
Tennesee	3,567,089	16	18	198171.61
Texas	9,579,677	42	44	217719.93
Utah	890,627	4	6	148437.83
Vermont	389,881	2	4	97470.25
Virginia	3,966,949	18	20	198347.45
Washington	2,853,214	13	15	190214.27
West Virginia	1,860,421	8	10	186042.10
Wisconsin	3,951,777	17	19	207988.26
Wyoming	330,066	2	4	82516.50
1960 Total Seats		790		Ratio Average
1960 Total Electoral College Votes			893	176183.28



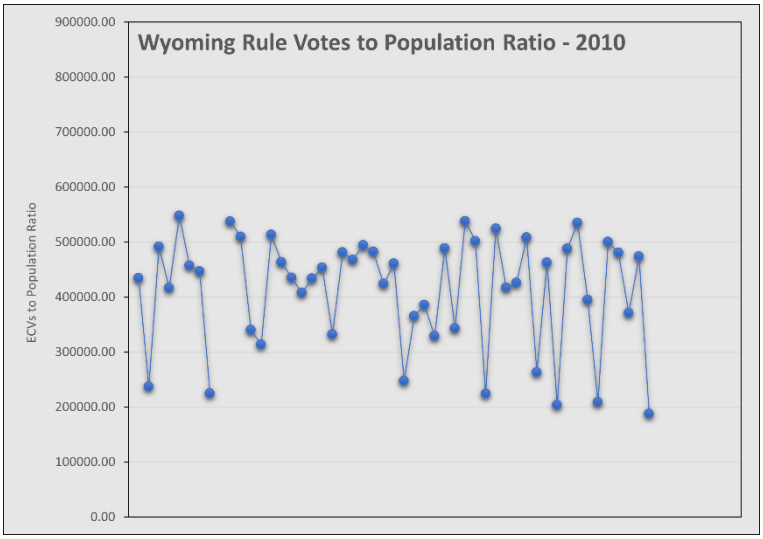
II. Apportionment, Distribution, and Electoral Data and Ratios under the Wyoming Rule – 1990

1990 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	4,040,587	9	11	367326.09
Alaska	550,043	1	3	183347.67
Arizona	3,665,228	8	10	366522.80
Arkansas	2,350,725	5	7	335817.86
California	29,760,021	65	67	444179.42
Colorado	3,294,394	7	9	366043.78
Conneticut	3,287,116	7	9	365235.11
Delaware	666,168	2	4	166542.00
Florida	12,937,926	28	30	431264.20
Georgia	6,478,216	14	16	404888.50
Hawaii	1,108,229	2	4	277057.25
Idaho	1,006,749	2	4	251687.25
Illinois	11,430,602	25	27	423355.63
Indiana	5,544,159	12	14	396011.36
Iowa	2,776,755	6	8	347094.38
Kansas	2,477,574	5	7	353939.14
Kentucky	3,685,296	8	10	368529.60
Louisiana	4,219,973	9	11	383633.91
Maine	1,227,928	3	5	245585.60
Maryland	4,781,468	11	13	367805.23
Massachusetts	6,016,425	13	15	401095.00
Michigan	9,295,297	20	22	422513.50
Minnesota	4,375,099	10	12	364591.58
Mississippi	2,573,216	6	8	321652.00
Missouri	5,117,073	11	13	393621.00
Montana	799,065	2	4	199766.25
Nebraska	1,578,385	4	6	263064.17
Nevada	1,201,833	3	5	240366.60
New Hampshire	1,109,252	2	4	277313.00
New Jersey	7,730,188	17	19	406852.00
New Mexico	1,515,069	3	5	303013.80
New York	17,990,455	40	42	428344.17
North Carolina	6,628,637	15	17	389919.82
NorthDakota	638,800	1	3	212933.33
Ohio	10,847,115	24	26	417196.73
Oklahoma	3,145,585	7	9	349509.44
Oregon	2,842,321	6	8	355290.13
Pennsylvania	11,881,643	26	28	424344.39
Rhode Island	1,003,464	2	4	250866.00
South Carolina	3,486,703	8	10	348670.30
South Dakota	696,004	2	4	174001.00
Tennesee	4,877,185	11	13	375168.08
Texas	16,986,510	37	39	435551.54
Utah	1,722,850	4	6	287141.67
Vermont	562,758	1	3	187586.00
Virginia	6,187,358	14	16	386709.88
Washington	4,866,692	11	13	374360.92
West Virginia	1,793,477	4	6	298912.83
Wisconsin	4,891,769	11	13	376289.92
Wyoming	453,588	1	3	151196.00
1990 Total Seats		545		Ratio Average
1960 Total Electoral College Votes			648	333274.16



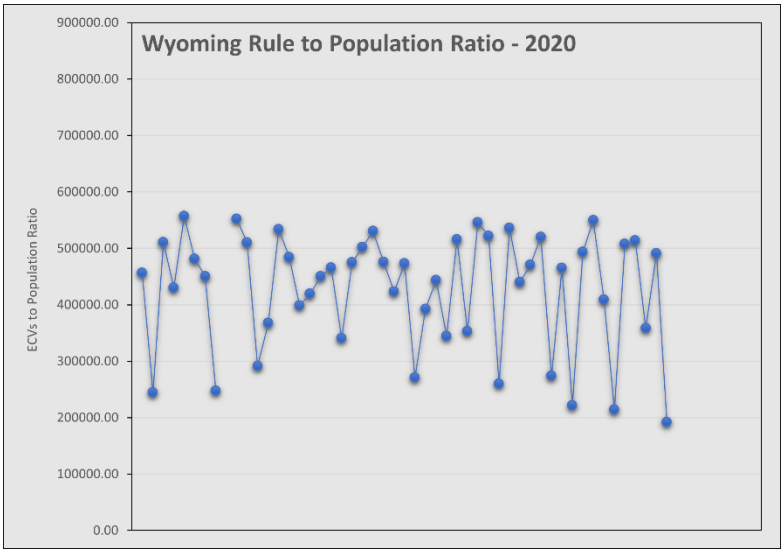
III. Apportionment, Distribution, and Electoral Data and Ratios under the Wyoming Rule – 2010

2010 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	4,779,736	9	11	434521.45
Alaska	710,231	1	3	236743.67
Arizona	6,392,017	11	13	491693.62
Arkansas	2,915,918	5	7	416559.71
California	37,253,956	66	68	547852.29
Colorado	5,029,196	9	11	457199.64
Conneticut	3,574,097	6	8	446762.13
Delaware	897,934	2	4	224483.50
Florida	18,801,310	33	35	537180.29
Georgia	9,687,653	17	19	509876.47
Hawaii	1,360,301	2	4	340075.25
Idaho	1,567,582	3	5	313516.40
Illinois	12,830,632	23	25	513225.28
Indiana	6,483,802	12	14	463128.71
Iowa	3,046,355	5	7	435193.57
Kansas	2,853,118	5	7	407588.29
Kentucky	4,339,367	8	10	433936.70
Louisiana	4,533,372	8	10	453337.20
Maine	1,328,361	2	4	332090.25
Maryland	5,773,552	10	12	481129.33
Massachusetts	6,547,629	12	14	467687.79
Michigan	9,883,640	18	20	494182.00
Minnesota	5,303,925	9	11	482175.00
Mississippi	2,967,297	5	7	423899.57
Missouri	5,988,927	11	13	460686.69
Montana	989,415	2	4	247353.75
Nebraska	1,826,341	3	5	365268.20
Nevada	2,700,551	5	7	385793.00
New Hampshire	1,316,470	2	4	329117.50
New Jersey	8,791,894	16	18	488438.56
New Mexico	2,059,179	4	6	343196.50
New York	19,378,102	34	36	538280.61
North Carolina	9,535,483	17	19	501867.53
NorthDakota	672,591	1	3	224197.00
Ohio	11,536,504	20	22	524386.55
Oklahoma	3,751,351	7	9	416816.78
Oregon	3,831,074	7	9	425674.89
Pennsylvania	12,702,379	23	25	508095.16
Rhode Island	1,052,567	2	4	263141.75
South Carolina	4,625,364	8	10	462536.40
South Dakota	814,180	2	4	203545.00
Tennesee	6,346,105	11	13	488161.92
Texas	25,145,561	45	47	535011.94
Utah	2,763,885	5	7	394840.71
Vermont	625,741	1	3	208580.33
Virginia	8,001,024	14	16	500064.00
Washington	6,724,540	12	14	480324.29
West Virginia	1,852,994	3	5	370598.80
Wisconsin	5,686,986	10	12	473915.50
Wyoming	563,626	1	3	187875.33
2010 Total Seats		547		Ratio Average
2010 Total Electoral College Votes			650	413436.14



IV. Apportionment, Distribution, and Electoral Data and Ratios under the Wyoming Rule – 2020

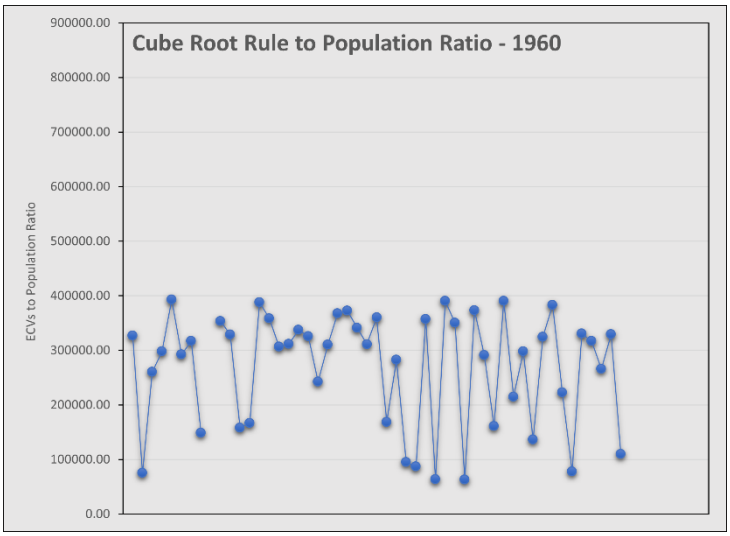
2020 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	5,024,279	9	11	456752.64
Alaska	733,391	1	3	244463.67
Arizona	7,151,502	12	14	510821.57
Arkansas	3,011,524	5	7	430217.71
California	39,538,223	69	71	556876.38
Colorado	5,773,714	10	12	481142.83
Conneticut	3,605,944	6	8	450743.00
Delaware	989,948	2	4	247487.00
Florida	21,538,187	37	39	552261.21
Georgia	10,711,908	19	21	510090.86
Hawaii	1,455,271	3	5	291054.20
Idaho	1,839,106	3	5	367821.20
Illinois	12,812,508	22	24	533854.50
Indiana	6,785,528	12	14	484680.57
Iowa	3,190,369	6	8	398796.13
Kansas	2,937,880	5	7	419697.14
Kentucky	4,505,836	8	10	450583.60
Louisiana	4,657,757	8	10	465775.70
Maine	1,362,359	2	4	340589.75
Maryland	6,177,224	11	13	475171.08
Massachusetts	7,029,917	12	14	502136.93
Michigan	10,077,331	17	19	530385.84
Minnesota	5,706,494	10	12	475541.17
Mississippi	2,961,279	5	7	423039.86
Missouri	6,154,913	11	13	473454.85
Montana	1,084,225	2	4	271056.25
Nebraska	1,961,504	3	5	392300.80
Nevada	3,104,614	5	7	443516.29
New Hampshire	1,377,529	2	4	344382.25
New Jersey	9,288,994	16	18	516055.22
New Mexico	2,117,522	4	6	352920.33
New York	20,201,249	35	37	545979.70
North Carolina	10,439,388	18	20	521969.40
NorthDakota	779,094	1	3	259698.00
Ohio	11,799,448	20	22	536338.55
Oklahoma	3,959,353	7	9	439928.11
Oregon	4,237,256	7	9	470806.22
Pennsylvania	13,002,700	23	25	520108.00
Rhode Island	1,097,379	2	4	274344.75
South Carolina	5,118,425	9	11	465311.36
South Dakota	886,667	2	4	221666.75
Tennesee	6,910,840	12	14	493631.43
Texas	29,145,505	51	53	549915.19
Utah	3,271,616	6	8	408952.00
Vermont	643,077	1	3	214359.00
Virginia	8,631,393	15	17	507729.00
Washington	7,705,281	13	15	513685.40
West Virginia	1,793,716	3	5	358743.20
Wisconsin	5,893,718	10	12	491143.17
Wyoming	576,851	1	3	192283.67
	2020 Total Seats	573		Ratio Average
2020 Total Electoral College Votes			676	427605.27



APPENDIX III – THE CUBE ROOT RULE

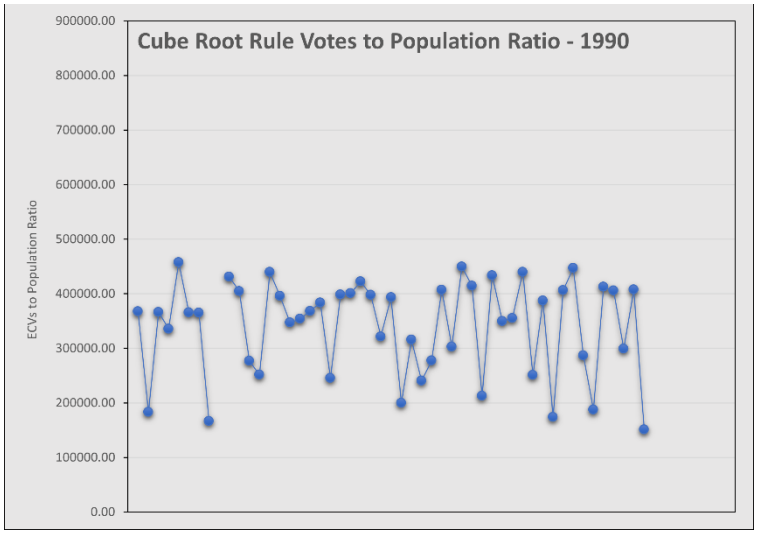
I. Apportionment, Distribution, and Electoral Data and Ratios under the Cube Root Rule – 1960

1960 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	3,266,740	8	10	326674.00
Alaska	226,167	1	3	75389.00
Arizona	1,302,161	3	5	260432.20
Arkansas	1,786,272	4	6	297712.00
California	15,717,204	38	40	392930.10
Colorado	1,753,947	4	6	292324.50
Conneticut	2,535,234	6	8	316904.25
Delaware	446,292	1	3	148764.00
Florida	4,951,560	12	14	353682.86
Georgia	3,943,116	10	12	328593.00
Hawaii	632,772	2	4	158193.00
Idaho	667,191	2	4	166797.75
Illinois	10,081,158	24	26	387736.85
Indiana	4,662,498	11	13	358653.69
Iowa	2,757,537	7	9	306393.00
Kansas	2,178,611	5	7	311230.14
Kentucky	3,038,156	7	9	337572.89
Louisiana	3,257,022	8	10	325702.20
Maine	969,265	2	4	242316.25
Maryland	3,100,689	8	10	310068.90
Massachusetts	5,148,578	12	14	367755.57
Michigan	7,823,194	19	21	372533.05
Minnesota	3,413,864	8	10	341386.40
Mississippi	2,178,141	5	7	311163.00
Missouri	4,319,813	10	12	359984.42
Montana	674,767	2	4	168691.75
Nebraska	1,411,330	3	5	282266.00
Nevada	285,278	1	3	95092.67
New Hampshire	606,921	5	7	86703.00
New Jersey	6,066,782	15	17	356869.53
New Mexico	951,023	13	15	63401.53
New York	16,782,304	41	43	390286.14
North Carolina	4,556,155	11	13	350473.46
NorthDakota	632,446	8	10	63244.60
Ohio	9,706,397	24	26	373322.96
Oklahoma	2,328,284	6	8	291035.50
Oregon	1,768,687	9	11	160789.73
Pennsylvania	11,319,366	27	29	390322.97
Rhode Island	859,488	2	4	214872.00
South Carolina	2,382,594	6	8	297824.25
South Dakota	680,514	3	5	136102.80
Tennesee	3,567,089	9	11	324280.82
Texas	9,579,677	23	25	383187.08
Utah	890,627	2	4	222656.75
Vermont	389,881	3	5	77976.20
Virginia	3,966,949	10	12	330579.08
Washington	2,853,214	7	9	317023.78
West Virginia	1,860,421	5	7	265774.43
Wisconsin	3,951,777	10	12	329314.75
Wyoming	330,066	1	3	110022.00
1960 Total Seats		463		Ratio Average
1960 Total Electoral College Votes			566	270660.14



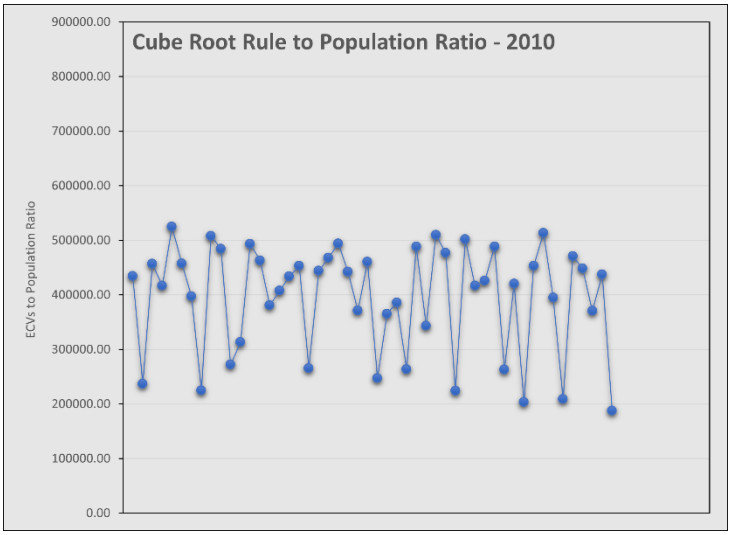
II. Apportionment, Distribution, and Electoral Data and Ratios under the Cube Root Rule – 1990

1990 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	4,040,587	9	11	367326.09
Alaska	550,043	1	3	183347.67
Arizona	3,665,228	8	10	366522.80
Arkansas	2,350,725	5	7	335817.86
California	29,760,021	63	65	457846.48
Colorado	3,294,394	7	9	366043.78
Conneticut	3,287,116	7	9	365235.11
Delaware	666,168	2	4	166542.00
Florida	12,937,926	28	30	431264.20
Georgia	6,478,216	14	16	404888.50
Hawaii	1,108,229	2	4	277057.25
Idaho	1,006,749	2	4	251687.25
Illinois	11,430,602	24	26	439638.54
Indiana	5,544,159	12	14	396011.36
Iowa	2,776,755	6	8	347094.38
Kansas	2,477,574	5	7	353939.14
Kentucky	3,685,296	8	10	368529.60
Louisiana	4,219,973	9	11	383633.91
Maine	1,227,928	3	5	245585.60
Maryland	4,781,468	10	12	398455.67
Massachusetts	6,016,425	13	15	401095.00
Michigan	9,295,297	20	22	422513.50
Minnesota	4,375,099	9	11	397736.27
Mississippi	2,573,216	6	8	321652.00
Missouri	5,117,073	11	13	393621.00
Montana	799,065	2	4	199766.25
Nebraska	1,578,385	3	5	315677.00
Nevada	1,201,833	3	5	240366.60
New Hampshire	1,109,252	2	4	277313.00
New Jersey	7,730,188	17	19	406852.00
New Mexico	1,515,069	3	5	303013.80
New York	17,990,455	38	40	449761.38
North Carolina	6,628,637	14	16	414289.81
NorthDakota	638,800	1	3	212933.33
Ohio	10,847,115	23	25	433884.60
Oklahoma	3,145,585	7	9	349509.44
Oregon	2,842,321	6	8	355290.13
Pennsylvania	11,881,643	25	27	440060.85
Rhode Island	1,003,464	2	4	250866.00
South Carolina	3,486,703	7	9	387411.44
South Dakota	696,004	2	4	174001.00
Tennesee	4,877,185	10	12	406432.08
Texas	16,986,510	36	38	447013.42
Utah	1,722,850	4	6	287141.67
Vermont	562,758	1	3	187586.00
Virginia	6,187,358	13	15	412490.53
Washington	4,866,692	10	12	405557.67
West Virginia	1,793,477	4	6	298912.83
Wisconsin	4,891,769	10	12	407647.42
Wyoming	453,588	1	3	151196.00
1990 Total Seats		528		Ratio Average
1960 Total Electoral College Votes			631	341161.18



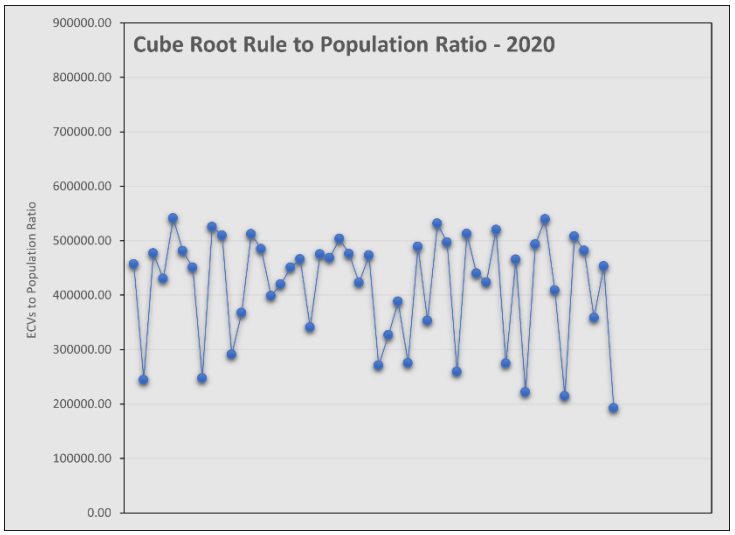
III. Apportionment, Distribution, and Electoral Data and Ratios under the Cube Root Rule – 2010

2010 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	4,779,736	9	11	434521.45
Alaska	710,231	1	3	236743.67
Arizona	6,392,017	12	14	456572.64
Arkansas	2,915,918	5	7	416559.71
California	37,253,956	69	71	524703.61
Colorado	5,029,196	9	11	457199.64
Conneticut	3,574,097	7	9	397121.89
Delaware	897,934	2	4	224483.50
Florida	18,801,310	35	37	508143.51
Georgia	9,687,653	18	20	484382.65
Hawaii	1,360,301	3	5	272060.20
Idaho	1,567,582	3	5	313516.40
Illinois	12,830,632	24	26	493485.85
Indiana	6,483,802	12	14	463128.71
Iowa	3,046,355	6	8	380794.38
Kansas	2,853,118	5	7	407588.29
Kentucky	4,339,367	8	10	433936.70
Louisiana	4,533,372	8	10	453337.20
Maine	1,328,361	3	5	265672.20
Maryland	5,773,552	11	13	444119.38
Massachusetts	6,547,629	12	14	467687.79
Michigan	9,883,640	18	20	494182.00
Minnesota	5,303,925	10	12	441993.75
Mississippi	2,967,297	6	8	370912.13
Missouri	5,988,927	11	13	460686.69
Montana	989,415	2	4	247353.75
Nebraska	1,826,341	3	5	365268.20
Nevada	2,700,551	5	7	385793.00
New Hampshire	1,316,470	3	5	263294.00
New Jersey	8,791,894	16	18	488438.56
New Mexico	2,059,179	4	6	343196.50
New York	19,378,102	36	38	509950.05
North Carolina	9,535,483	18	20	476774.15
NorthDakota	672,591	1	3	224197.00
Ohio	11,536,504	21	23	501587.13
Oklahoma	3,751,351	7	9	416816.78
Oregon	3,831,074	7	9	425674.89
Pennsylvania	12,702,379	24	26	488553.04
Rhode Island	1,052,567	2	4	263141.75
South Carolina	4,625,364	9	11	420487.64
South Dakota	814,180	2	4	203545.00
Tennesee	6,346,105	12	14	453293.21
Texas	25,145,561	47	49	513174.71
Utah	2,763,885	5	7	394840.71
Vermont	625,741	1	3	208580.33
Virginia	8,001,024	15	17	470648.47
Washington	6,724,540	13	15	448302.67
West Virginia	1,852,994	3	5	370598.80
Wisconsin	5,686,986	11	13	437460.46
Wyoming	563,626	1	3	187875.33
2010 Total Seats		575		Ratio Average
2010 Total Electoral College Votes			678	396247.60



IV. Apportionment, Distribution, and Electoral Data and Ratios under the Cube Root Rule – 2020

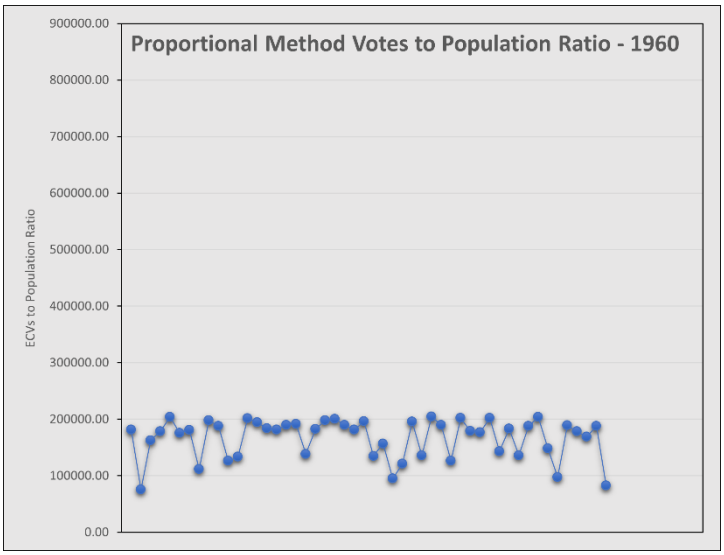
	2020 Census			
State	Population	Seats	EC Votes	Ratio
Alabama	5,024,279	9	11	456752.64
Alaska	733,391	1	3	244463.67
Arizona	7,151,502	13	15	476766.80
Arkansas	3,011,524	5	7	430217.71
California	39,538,223	71	73	541619.49
Colorado	5,773,714	10	12	481142.83
Conneticut	3,605,944	6	8	450743.00
Delaware	989,948	2	4	247487.00
Florida	21,538,187	39	41	525321.63
Georgia	10,711,908	19	21	510090.86
Hawaii	1,455,271	3	5	291054.20
Idaho	1,839,106	3	5	367821.20
Illinois	12,812,508	23	25	512500.32
Indiana	6,785,528	12	14	484680.57
Iowa	3,190,369	6	8	398796.13
Kansas	2,937,880	5	7	419697.14
Kentucky	4,505,836	8	10	450583.60
Louisiana	4,657,757	8	10	465775.70
Maine	1,362,359	2	4	340589.75
Maryland	6,177,224	11	13	475171.08
Massachusetts	7,029,917	13	15	468661.13
Michigan	10,077,331	18	20	503866.55
Minnesota	5,706,494	10	12	475541.17
Mississippi	2,961,279	5	7	423039.86
Missouri	6,154,913	11	13	473454.85
Montana	1,084,225	2	4	271056.25
Nebraska	1,961,504	4	6	326917.33
Nevada	3,104,614	6	8	388076.75
New Hampshire	1,377,529	3	5	275505.80
New Jersey	9,288,994	17	19	488894.42
New Mexico	2,117,522	4	6	352920.33
New York	20,201,249	36	38	531611.82
North Carolina	10,439,388	19	21	497113.71
NorthDakota	779,094	1	3	259698.00
Ohio	11,799,448	21	23	513019.48
Oklahoma	3,959,353	7	9	439928.11
Oregon	4,237,256	8	10	423725.60
Pennsylvania	13,002,700	23	25	520108.00
Rhode Island	1,097,379	2	4	274344.75
South Carolina	5,118,425	9	11	465311.36
South Dakota	886,667	2	4	221666.75
Tennesee	6,910,840	12	14	493631.43
Texas	29,145,505	52	54	539731.57
Utah	3,271,616	6	8	408952.00
Vermont	643,077	1	3	214359.00
Virginia	8,631,393	15	17	507729.00
Washington	7,705,281	14	16	481580.06
West Virginia	1,793,716	3	5	358743.20
Wisconsin	5,893,718	11	13	453362.92
Wyoming	576,851	1	3	192283.67
	2020 Total Seats	592		Ratio Average
2020 Total Electoral College Votes			695	416322.20



APPENDIX IV – THE 1910 PROPORTIONAL METHOD

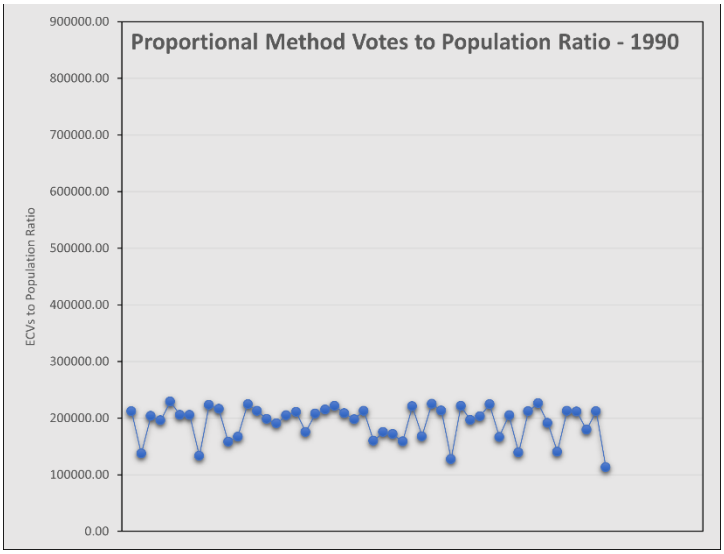
I. Apportionment, Distribution, and Electoral Data and Ratios under the 1910 Proportional Method – 1960

1960 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	3,266,740	16	18	181485.56
Alaska	226,167	1	3	75389.00
Arizona	1,302,161	6	8	162770.13
Arkansas	1,786,272	8	10	178627.20
California	15,717,204	75	77	204119.53
Colorado	1,753,947	8	10	175394.70
Conneticut	2,535,234	12	14	181088.14
Delaware	446,292	2	4	111573.00
Florida	4,951,560	23	25	198062.40
Georgia	3,943,116	19	21	187767.43
Hawaii	632,772	3	5	126554.40
Idaho	667,191	3	5	133438.20
Illinois	10,081,158	48	50	201623.16
Indiana	4,662,498	22	24	194270.75
Iowa	2,757,537	13	15	183835.80
Kansas	2,178,611	10	12	181550.92
Kentucky	3,038,156	14	16	189884.75
Louisiana	3,257,022	15	17	191589.53
Maine	969,265	5	7	138466.43
Maryland	3,100,689	15	17	182393.47
Massachusetts	5,148,578	24	26	198022.23
Michigan	7,823,194	37	39	200594.72
Minnesota	3,413,864	16	18	189659.11
Mississippi	2,178,141	10	12	181511.75
Missouri	4,319,813	20	22	196355.14
Montana	674,767	3	5	134953.40
Nebraska	1,411,330	7	9	156814.44
Nevada	285,278	1	3	95092.67
New Hampshire	606,921	3	5	121384.20
New Jersey	6,066,782	29	31	195702.65
New Mexico	951,023	5	7	135860.43
New York	16,782,304	80	82	204662.24
North Carolina	4,556,155	22	24	189839.79
NorthDakota	632,446	3	5	126489.20
Ohio	9,706,397	46	48	202216.60
Oklahoma	2,328,284	11	13	179098.77
Oregon	1,768,687	8	10	176868.70
Pennsylvania	11,319,366	54	56	202131.54
Rhode Island	859,488	4	6	143248.00
South Carolina	2,382,594	11	13	183276.46
South Dakota	680,514	3	5	136102.80
Tennesee	3,567,089	17	19	187741.53
Texas	9,579,677	45	47	203822.91
Utah	890,627	4	6	148437.83
Vermont	389,881	2	4	97470.25
Virginia	3,966,949	19	21	188902.33
Washington	2,853,214	14	16	178325.88
West Virginia	1,860,421	9	11	169129.18
Wisconsin	3,951,777	19	21	188179.86
Wyoming	330,066	2	4	82516.50
	1960 Total Seats	846		Ratio Average
1960 Total Electoral College			949	167485.91



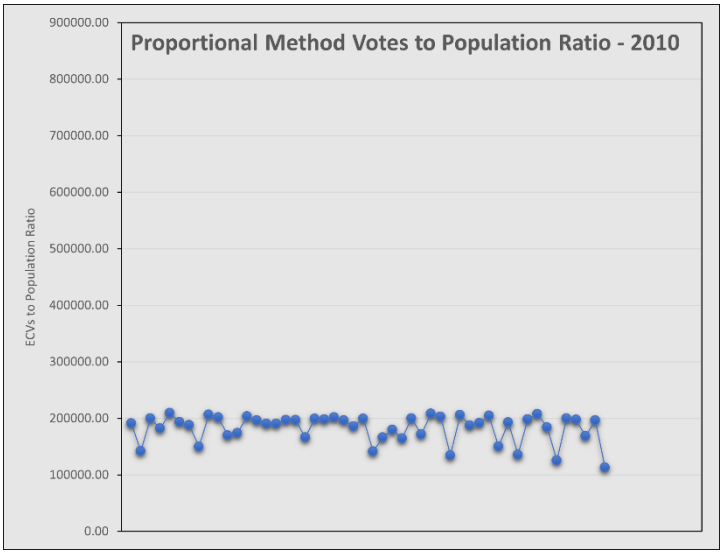
II. Apportionment, Distribution, and Electoral Data and Ratios under the 1910 Proportional Method – 1990

1990 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	4,040,587	17	19	212662.47
Alaska	550,043	2	4	137510.75
Arizona	3,665,228	16	18	203623.78
Arkansas	2,350,725	10	12	195893.75
California	29,760,021	128	130	228923.24
Colorado	3,294,394	14	16	205899.63
Conneticut	3,287,116	14	16	205444.75
Delaware	666,168	3	5	133233.60
Florida	12,937,926	56	58	223067.69
Georgia	6,478,216	28	30	215940.53
Hawaii	1,108,229	5	7	158318.43
Idaho	1,006,749	4	6	167791.50
Illinois	11,430,602	49	51	224129.45
Indiana	5,544,159	24	26	213236.88
Iowa	2,776,755	12	14	198339.64
Kansas	2,477,574	11	13	190582.62
Kentucky	3,685,296	16	18	204738.67
Louisiana	4,219,973	18	20	210998.65
Maine	1,227,928	5	7	175418.29
Maryland	4,781,468	21	23	207889.91
Massachusetts	6,016,425	26	28	214872.32
Michigan	9,295,297	40	42	221316.60
Minnesota	4,375,099	19	21	208338.05
Mississippi	2,573,216	11	13	197939.69
Missouri	5,117,073	22	24	213211.38
Montana	799,065	3	5	159813.00
Nebraska	1,578,385	7	9	175376.11
Nevada	1,201,833	5	7	171690.43
New Hampshire	1,109,252	5	7	158464.57
New Jersey	7,730,188	33	35	220862.51
New Mexico	1,515,069	7	9	168341.00
New York	17,990,455	78	80	224880.69
North Carolina	6,628,637	29	31	213827.00
NorthDakota	638,800	3	5	127760.00
Ohio	10,847,115	47	49	221369.69
Oklahoma	3,145,585	14	16	196599.06
Oregon	2,842,321	12	14	203022.93
Pennsylvania	11,881,643	51	53	224181.94
Rhode Island	1,003,464	4	6	167244.00
South Carolina	3,486,703	15	17	205100.18
South Dakota	696,004	3	5	139200.80
Tennesee	4,877,185	21	23	212051.52
Texas	16,986,510	73	75	226486.80
Utah	1,722,850	7	9	191427.78
Vermont	562,758	2	4	140689.50
Virginia	6,187,358	27	29	213357.17
Washington	4,866,692	21	23	211595.30
West Virginia	1,793,477	8	10	179347.70
Wisconsin	4,891,769	21	23	212685.61
Wyoming	453,588	2	4	113397.00
	1990 Total Seats	1069		Ratio Average
1990 Total Electoral College			1172	192961.89



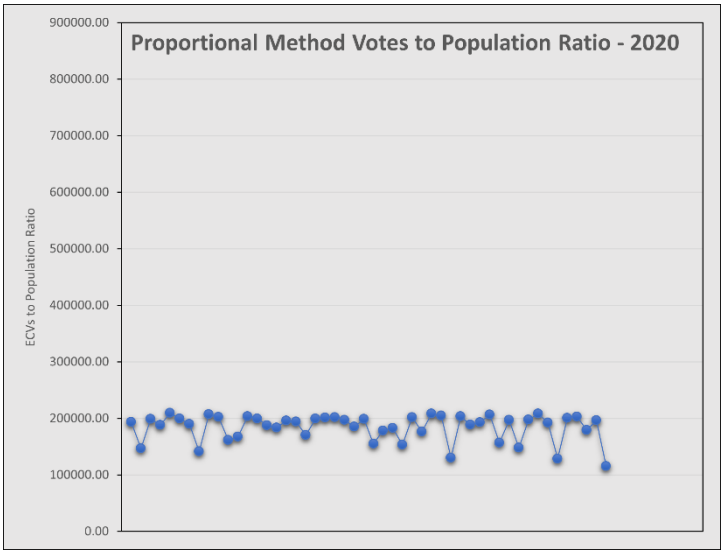
III. Apportionment, Distribution, and Electoral Data and Ratios under the 1910 Proportional Method – 2010

	2010 Census			
State	Population	Seats	EC Votes	Ratio
Alabama	4,779,736	23	25	191189.44
Alaska	710,231	3	5	142046.20
Arizona	6,392,017	30	32	199750.53
Arkansas	2,915,918	14	16	182244.88
California	37,253,956	176	178	209291.89
Colorado	5,029,196	24	26	193430.62
Conneticut	3,574,097	17	19	188110.37
Delaware	897,934	4	6	149655.67
Florida	18,801,310	89	91	206607.80
Georgia	9,687,653	46	48	201826.10
Hawaii	1,360,301	6	8	170037.63
Idaho	1,567,582	7	9	174175.78
Illinois	12,830,632	61	63	203660.83
Indiana	6,483,802	31	33	196478.85
Iowa	3,046,355	14	16	190397.19
Kansas	2,853,118	13	15	190207.87
Kentucky	4,339,367	20	22	197243.95
Louisiana	4,533,372	21	23	197103.13
Maine	1,328,361	6	8	166045.13
Maryland	5,773,552	27	29	199088.00
Massachusetts	6,547,629	31	33	198413.00
Michigan	9,883,640	47	49	201706.94
Minnesota	5,303,925	25	27	196441.67
Mississippi	2,967,297	14	16	185456.06
Missouri	5,988,927	28	30	199630.90
Montana	989,415	5	7	141345.00
Nebraska	1,826,341	9	11	166031.00
Nevada	2,700,551	13	15	180036.73
New Hampshire	1,316,470	6	8	164558.75
New Jersey	8,791,894	42	44	199815.77
New Mexico	2,059,179	10	12	171598.25
New York	19,378,102	91	93	208366.69
North Carolina	9,535,483	45	47	202882.62
NorthDakota	672,591	3	5	134518.20
Ohio	11,536,504	54	56	206009.00
Oklahoma	3,751,351	18	20	187567.55
Oregon	3,831,074	18	20	191553.70
Pennsylvania	12,702,379	60	62	204877.08
Rhode Island	1,052,567	5	7	150366.71
South Carolina	4,625,364	22	24	192723.50
South Dakota	814,180	4	6	135696.67
Tennesee	6,346,105	30	32	198315.78
Texas	25,145,561	119	121	207814.55
Utah	2,763,885	13	15	184259.00
Vermont	625,741	3	5	125148.20
Virginia	8,001,024	38	40	200025.60
Washington	6,724,540	32	34	197780.59
West Virginia	1,852,994	9	11	168454.00
Wisconsin	5,686,986	27	29	196102.97
Wyoming	563,626	3	5	112725.20
	2010 Total Seats	1456		Ratio Average
2010 Total Electoral College			1559	183176.27



IV. Apportionment, Distribution, and Electoral Data and Ratios under the 1910 Proportional Method – 2020

2020 Census				
State	Population	Seats	EC Votes	Ratio
Alabama	5,024,279	24	26	193241.50
Alaska	733,391	3	5	146678.20
Arizona	7,151,502	34	36	198652.83
Arkansas	3,011,524	14	16	188220.25
California	39,538,223	187	189	209196.95
Colorado	5,773,714	27	29	199093.59
Conneticut	3,605,944	17	19	189786.53
Delaware	989,948	5	7	141421.14
Florida	21,538,187	102	104	207097.95
Georgia	10,711,908	51	53	202111.47
Hawaii	1,455,271	7	9	161696.78
Idaho	1,839,106	9	11	167191.45
Illinois	12,812,508	61	63	203373.14
Indiana	6,785,528	32	34	199574.35
Iowa	3,190,369	15	17	187668.76
Kansas	2,937,880	14	16	183617.50
Kentucky	4,505,836	21	23	195905.91
Louisiana	4,657,757	22	24	194073.21
Maine	1,362,359	6	8	170294.88
Maryland	6,177,224	29	31	199265.29
Massachusetts	7,029,917	33	35	200854.77
Michigan	10,077,331	48	50	201546.62
Minnesota	5,706,494	27	29	196775.66
Mississippi	2,961,279	14	16	185079.94
Missouri	6,154,913	29	31	198545.58
Montana	1,084,225	5	7	154889.29
Nebraska	1,961,504	9	11	178318.55
Nevada	3,104,614	15	17	182624.35
New Hampshire	1,377,529	7	9	153058.78
New Jersey	9,288,994	44	46	201934.65
New Mexico	2,117,522	10	12	176460.17
New York	20,201,249	95	97	208260.30
North Carolina	10,439,388	49	51	204693.88
NorthDakota	779,094	4	6	129849.00
Ohio	11,799,448	56	58	203438.76
Oklahoma	3,959,353	19	21	188540.62
Oregon	4,237,256	20	22	192602.55
Pennsylvania	13,002,700	61	63	206392.06
Rhode Island	1,097,379	5	7	156768.43
South Carolina	5,118,425	24	26	196862.50
South Dakota	886,667	4	6	147777.83
Tennesee	6,910,840	33	35	197452.57
Texas	29,145,505	138	140	208182.18
Utah	3,271,616	15	17	192448.00
Vermont	643,077	3	5	128615.40
Virginia	8,631,393	41	43	200730.07
Washington	7,705,281	36	38	202770.55
West Virginia	1,793,716	8	10	179371.60
Wisconsin	5,893,718	28	30	196457.27
Wyoming	576,851	3	5	115370.20
	2020 Total Seats	1563		Ratio Average
2020 Total Electoral Votes			1666	184496.68



APPENDIX V – HISTORICAL ELECTIONS

I. Electoral Votes and Winner by States – Clinton v. Bush and Nixon v. Humphries v. Wallace
II. Electoral Votes and Winner by States – Obama v. Romney and Bush v. Gore

Obama v. Romney 2012		
State	EC Votes	Presidential Candidate
Alabama	9	0
Alaska	3	0
Arizona	11	0
Arkansas	6	0
California	55	1
Colorado	9	1
Conneticut	7	1
Delaware	3	1
DC	3	1
Florida	29	1
Georgia	16	0
Hawaii	4	1
Idaho	4	0
Illinois	20	1
Indiana	11	0
Iowa	6	1
Kansas	6	0
Kentucky	8	0
Louisiana	8	0
*Maine	4	1
Maryland	10	1
Massachusetts	11	1
Michigan	16	1
Minnesota	10	1
Mississippi	6	0
Missouri	10	0
Montana	3	0
*Nebraska	5	0
Nevada	6	1
New Hampshire	4	1
New Jersey	14	1
New Mexico	5	1
New York	29	1
North Carolina	15	0
NorthDakota	3	0
Ohio	18	1
Oklahoma	7	0
Oregon	7	1
Pennsylvania	20	1
Rhode Island	4	1
South Carolina	9	0
South Dakota	3	0
Tennesee	11	0
Texas	38	0
Utah	6	0
Vermont	3	1
Virginia	13	1
Washington	12	1
West Virginia	5	0
Wisconsin	10	1
Wyoming	3	0
Legend:	Obama = 1 - Romney = 0	
Total Obama Votes	1	332
Total Romney Votes	0	206

Bush v. Gore 2000		
State	EC Votes	Presidential Candidate
Alabama	9	1
Alaska	3	1
Arizona	8	1
Arkansas	6	1
California	54	0
Colorado	8	1
Conneticut	8	0
Delaware	3	0
DC	2	0
Florida	25	1
Georgia	13	1
Hawaii	4	0
Idaho	4	1
Illinois	22	0
Indiana	12	1
Iowa	7	0
Kansas	6	1
Kentucky	8	1
Louisiana	9	1
Maine	4	0
Maryland	10	0
Massachusetts	12	0
Michigan	18	0
Minnesota	10	0
Mississippi	7	1
Missouri	11	1
Montana	3	1
Nebraska	5	1
Nevada	4	1
New Hampshire	4	1
New Jersey	15	0
New Mexico	5	0
New York	33	0
North Carolina	14	1
NorthDakota	3	1
Ohio	21	1
Oklahoma	8	1
Oregon	7	0
Pennsylvania	23	0
Rhode Island	4	0
South Carolina	8	1
South Dakota	3	1
Tennesee	11	1
Texas	32	1
Utah	5	1
Vermont	3	0
Virginia	13	1
Washington	11	0
West Virginia	5	1
Wisconsin	11	0
Wyoming	3	1
Legend:	Bush = 1 - Gore = 0	
Total Bush Votes	1	271
Total Gore Votes	0	266

III. Electoral Votes and Winner by States – Biden v. Trump and Trump v. Clinton

Biden v. Trump 2020		
State	EC Votes	Presidential Candidate
Alabama	9	0
Alaska	3	0
Arizona	11	1
Arkansas	6	0
California	55	1
Colorado	9	1
Conneticut	7	1
Delaware	3	1
DC	3	1
Florida	29	0
Georgia	16	1
Hawaii	4	1
Idaho	4	0
Illinois	20	1
Indiana	11	0
Iowa	6	0
Kansas	6	0
Kentucky	8	0
Louisiana	8	0
*Maine	4	1
Maryland	10	1
Massachusetts	11	1
Michigan	16	1
Minnesota	10	1
Mississippi	6	0
Missouri	10	0
Montana	3	0
*Nebraska	5	0
Nevada	6	1
New Hampshire	4	1
New Jersey	14	1
New Mexico	5	1
New York	29	1
North Carolina	15	0
NorthDakota	3	0
Ohio	18	0
Oklahoma	7	0
Oregon	7	1
Pennsylvania	20	1
Rhode Island	4	1
South Carolina	9	0
South Dakota	3	0
Tennesee	11	0
Texas	38	0
Utah	6	0
Vermont	3	1
Virginia	13	1
Washington	12	1
West Virginia	5	0
Wisconsin	10	1
Wyoming	3	0
Legend:	Biden = 1 - Trump = 0	
Total Biden Votes	1	306
Total Trump Votes	0	232

Trump v. Clinton 2016*		
State	EC Votes	Presidential Candidate
Alabama	9	0
Alaska	3	0
Arizona	11	0
Arkansas	6	0
California	55	1
Colorado	9	1
Conneticut	7	1
Delaware	3	1
DC	3	1
Florida	29	0
Georgia	16	0
Hawaii	4	1
Idaho	4	0
Illinois	20	1
Indiana	11	0
Iowa	6	0
Kansas	6	0
Kentucky	8	0
Louisiana	8	0
*Maine	4	1
Maryland	10	1
Massachusetts	11	1
Michigan	16	0
Minnesota	10	1
Mississippi	6	0
Missouri	10	0
Montana	3	0
*Nebraska	5	0
Nevada	6	1
New Hampshire	4	1
New Jersey	14	1
New Mexico	5	1
New York	29	1
North Carolina	15	0
NorthDakota	3	0
Ohio	18	0
Oklahoma	7	0
Oregon	7	1
Pennsylvania	20	0
Rhode Island	4	1
South Carolina	9	0
South Dakota	3	0
Tennesee	11	0
Texas	38	0
Utah	6	0
Vermont	3	1
Virginia	13	1
Washington	12	1
West Virginia	5	0
Wisconsin	10	0
Wyoming	3	0
Legend:	Clinton = 1 - Trump = 0	
Total Clinton Votes	1	233
Total Trump Votes	0	305

APPENDIX V – HISTORICAL ELECTIONS UNDER THE WYOMING RULE

I. Electoral Votes and Winner by States under the Wyoming Rule – Clinton v. Bush and Nixon v. Humphries v. Wallace

Clinton v. Bush 1992		
State	EC Votes	Presidential Candidate
Alabama	11	0
Alaska	3	0
Arizona	10	0
Arkansas	7	1
California	67	1
Colorado	9	1
Conneticut	9	1
Delaware	4	1
DC	3	1
Florida	30	0
Georgia	16	1
Hawaii	4	1
Idaho	4	0
Illinois	27	1
Indiana	14	0
Iowa	8	1
Kansas	7	0
Kentucky	10	1
Louisiana	11	1
Maine	5	1
Maryland	13	1
Massachusetts	15	1
Michigan	22	1
Minnesota	12	1
Mississippi	8	0
Missouri	13	1
Montana	4	1
Nebraska	6	0
Nevada	5	1
New Hampshire	4	1
New Jersey	19	1
New Mexico	5	1
New York	42	1
North Carolina	17	0
NorthDakota	3	0
Ohio	26	1
Oklahoma	9	0
Oregon	8	1
Pennsylvania	28	1
Rhode Island	4	1
South Carolina	10	0
South Dakota	4	0
Tennesee	13	1
Texas	39	0
Utah	6	0
Vermont	3	1
Virginia	16	0
Washington	13	1
West Virginia	6	1
Wisconsin	13	1
Wyoming	3	0
Legend:	Clinton = 1 - Bush = 0	
Total Clinton Votes	1	448
Total Bush Votes	0	189

Nixon v. Humphries v. Wallace 1968		
State	EC Votes	Presidential Candidate
Alabama	16	-1
Alaska	3	1
Arizona	8	1
Arkansas	10	-1
California	71	1
Colorado	10	1
Conneticut	13	0
Delaware	4	1
DC	3	0
Florida	24	1
Georgia	19	-1
Hawaii	5	0
Idaho	5	1
Illinois	46	1
Indiana	23	1
Iowa	14	1
Kansas	12	1
Kentucky	15	1
Louisiana	16	-1
Maine	6	0
Maryland	16	0
Massachusetts	25	0
Michigan	37	0
Minnesota	17	0
Mississippi	12	-1
Missouri	21	1
Montana	5	1
Nebraska	8	1
Nevada	3	1
New Hampshire	5	1
New Jersey	29	1
New Mexico	6	1
New York	76	0
North Carolina	22	1
NorthDakota	5	1
Ohio	45	1
Oklahoma	12	1
Oregon	10	1
Pennsylvania	52	0
Rhode Island	6	0
South Carolina	13	1
South Dakota	5	1
Tennesee	18	1
Texas	44	0
Utah	6	1
Vermont	4	1
Virginia	20	1
Washington	15	0
West Virginia	10	0
Wisconsin	19	1
Wyoming	4	1
Legend:	Nixon = 1 - Humphries = 0 - Wallace	
Total Nixon Votes	1	495
Total Humphries Votes	0	325
Total Wallace Votes	-1	73

II. Electoral Votes and Winner by States under the Wyoming Rule – Obama v. Romney and Bush v. Gore

Obama v. Romney 2012		
State	EC Votes	Presidential Candidate
Alabama	11	0
Alaska	3	0
Arizona	13	0
Arkansas	7	0
California	68	1
Colorado	11	1
Conneticut	8	1
Delaware	4	1
DC	3	1
Florida	35	1
Georgia	19	0
Hawaii	4	1
Idaho	5	0
Illinois	25	1
Indiana	14	0
Iowa	7	1
Kansas	7	0
Kentucky	10	0
Louisiana	10	0
*Maine	4	1
Maryland	12	1
Massachusetts	14	1
Michigan	20	1
Minnesota	11	1
Mississippi	7	0
Missouri	13	0
Montana	4	0
*Nebraska	5	0
Nevada	7	1
New Hampshire	4	1
New Jersey	18	1
New Mexico	6	1
New York	36	1
North Carolina	19	0
NorthDakota	3	0
Ohio	22	1
Oklahoma	9	0
Oregon	9	1
Pennsylvania	25	1
Rhode Island	4	1
South Carolina	10	0
South Dakota	4	0
Tennesee	13	0
Texas	47	0
Utah	7	0
Vermont	3	1
Virginia	16	1
Washington	14	1
West Virginia	5	0
Wisconsin	12	1
Wyoming	3	0
Legend:	Obama = 1 - Romney = 0	
Total Obama Votes	1	402
Total Romney Votes	0	248

Bush v. Gore 2000		
State	EC Votes	Presidential Candidate
Alabama	11	1
Alaska	3	1
Arizona	10	1
Arkansas	7	1
California	67	0
Colorado	9	1
Conneticut	9	0
Delaware	4	0
DC	2	0
Florida	30	1
Georgia	16	1
Hawaii	4	0
Idaho	4	1
Illinois	27	0
Indiana	14	1
Iowa	8	0
Kansas	7	1
Kentucky	10	1
Louisiana	11	1
Maine	5	0
Maryland	13	0
Massachusetts	15	0
Michigan	22	0
Minnesota	12	0
Mississippi	8	1
Missouri	13	1
Montana	4	1
Nebraska	6	1
Nevada	5	1
New Hampshire	4	1
New Jersey	19	0
New Mexico	5	0
New York	42	0
North Carolina	17	1
NorthDakota	3	1
Ohio	26	1
Oklahoma	9	1
Oregon	8	0
Pennsylvania	28	0
Rhode Island	4	0
South Carolina	10	1
South Dakota	4	1
Tennesee	13	1
Texas	39	1
Utah	6	1
Vermont	3	0
Virginia	16	1
Washington	13	0
West Virginia	6	1
Wisconsin	13	0
Wyoming	3	1
Legend:	Bush = 1 - Gore = 0	
Total Bush Votes	1	324
Total Gore Votes	0	323

III. Electoral Votes and Winner by States under the Wyoming Rule – Biden v. Trump and Trump v. Clinton

Biden v. Trump 2020		
State	EC Votes	Presidential Candidate
Alabama	11	0
Alaska	3	0
Arizona	13	1
Arkansas	7	0
California	68	1
Colorado	11	1
Conneticut	8	1
Delaware	4	1
DC	3	1
Florida	35	0
Georgia	19	1
Hawaii	4	1
Idaho	5	0
Illinois	25	1
Indiana	14	0
Iowa	7	0
Kansas	7	0
Kentucky	10	0
Louisiana	10	0
*Maine	4	1
Maryland	12	1
Massachusetts	14	1
Michigan	20	1
Minnesota	11	1
Mississippi	7	0
Missouri	13	0
Montana	4	0
*Nebraska	5	0
Nevada	7	1
New Hampshire	4	1
New Jersey	18	1
New Mexico	6	1
New York	36	1
North Carolina	19	0
NorthDakota	3	0
Ohio	22	0
Oklahoma	9	0
Oregon	9	1
Pennsylvania	25	1
Rhode Island	4	1
South Carolina	10	0
South Dakota	4	0
Tennesee	13	0
Texas	47	0
Utah	7	0
Vermont	3	1
Virginia	16	1
Washington	14	1
West Virginia	5	0
Wisconsin	12	1
Wyoming	3	0
Legend:	Biden = 1 - Trump = 0	
Total Biden Votes	1	370
Total Trump Votes	0	280

Trump v. Clinton 2016		
State	EC Votes	Presidential Candidate
Alabama	11	0
Alaska	3	0
Arizona	13	0
Arkansas	7	0
California	68	1
Colorado	11	1
Conneticut	8	1
Delaware	4	1
DC	3	1
Florida	35	0
Georgia	19	0
Hawaii	4	1
Idaho	5	0
Illinois	25	1
Indiana	14	0
Iowa	7	0
Kansas	7	0
Kentucky	10	0
Louisiana	10	0
*Maine	4	1
Maryland	12	1
Massachusetts	14	1
Michigan	20	0
Minnesota	11	1
Mississippi	7	0
Missouri	13	0
Montana	4	0
*Nebraska	5	0
Nevada	7	1
New Hampshire	4	1
New Jersey	18	1
New Mexico	6	1
New York	36	1
North Carolina	19	0
NorthDakota	3	0
Ohio	22	0
Oklahoma	9	0
Oregon	9	1
Pennsylvania	25	0
Rhode Island	4	1
South Carolina	10	0
South Dakota	4	0
Tennesee	13	0
Texas	47	0
Utah	7	0
Vermont	3	1
Virginia	16	1
Washington	14	1
West Virginia	5	0
Wisconsin	12	0
Wyoming	3	0
Legend:	Clinton = 1 - Trump = 0	
Total Clinton Votes	1	281
Total Trump Votes	0	369

APPENDIX V – HISTORICAL ELECTIONS UNDER THE CUBE ROOT RULE

I. Electoral Votes and Winner by States under the Cube Root Rule – Clinton v. Bush and Nixon v. Humphries v. Wallace

Clinton v. Bush 1992		
State	EC Votes	Presidential Candidate
Alabama	11	0
Alaska	3	0
Arizona	10	0
Arkansas	7	1
California	65	1
Colorado	9	1
Conneticut	9	1
Delaware	4	1
DC	3	1
Florida	30	0
Georgia	16	1
Hawaii	4	1
Idaho	4	0
Illinois	26	1
Indiana	14	0
Iowa	8	1
Kansas	7	0
Kentucky	10	1
Louisiana	11	1
Maine	5	1
Maryland	12	1
Massachusetts	15	1
Michigan	22	1
Minnesota	11	1
Mississippi	8	0
Missouri	13	1
Montana	4	1
Nebraska	5	0
Nevada	5	1
New Hampshire	4	1
New Jersey	19	1
New Mexico	5	1
New York	40	1
North Carolina	16	0
NorthDakota	3	0
Ohio	25	1
Oklahoma	9	0
Oregon	8	1
Pennsylvania	27	1
Rhode Island	4	1
South Carolina	9	0
South Dakota	4	0
Tennesee	12	1
Texas	38	0
Utah	6	0
Vermont	3	1
Virginia	15	0
Washington	12	1
West Virginia	6	1
Wisconsin	12	1
Wyoming	3	0
Legend:	Clinton = 1 - Bush = 0	
Total Clinton Votes	1	436
Total Bush Votes	0	184

Nixon v. Humphries v. Wallace 1968		
State	EC Votes	Presidential Candidate
Alabama	10	-1
Alaska	3	1
Arizona	5	1
Arkansas	6	-1
California	40	1
Colorado	6	1
Conneticut	8	0
Delaware	3	1
DC	3	0
Florida	14	1
Georgia	12	-1
Hawaii	4	0
Idaho	4	1
Illinois	26	1
Indiana	13	1
Iowa	9	1
Kansas	7	1
Kentucky	9	1
Louisiana	10	-1
Maine	4	0
Maryland	10	0
Massachusetts	14	0
Michigan	21	0
Minnesota	10	0
Mississippi	7	-1
Missouri	12	1
Montana	4	1
Nebraska	5	1
Nevada	3	1
New Hampshire	7	1
New Jersey	17	1
New Mexico	15	1
New York	43	0
North Carolina	13	1
NorthDakota	10	1
Ohio	26	1
Oklahoma	8	1
Oregon	11	1
Pennsylvania	29	0
Rhode Island	4	0
South Carolina	8	1
South Dakota	5	1
Tennesee	11	1
Texas	25	0
Utah	4	1
Vermont	5	1
Virginia	12	1
Washington	9	0
West Virginia	7	0
Wisconsin	12	1
Wyoming	3	1
Legend:	Nixon = 1 - Humphries = 0 - Wallace	
Total Nixon Votes	1	330
Total Humphries Votes	0	191
Total Wallace Votes	-1	45

II. Electoral Votes and Winner by States under the Cube Root Rule – Obama v. Romney and Bush v. Gore

Obama v. Romney 2012		
State	EC Votes	Presidential Candidate
Alabama	11	0
Alaska	3	0
Arizona	15	0
Arkansas	7	0
California	73	1
Colorado	12	1
Conneticut	8	1
Delaware	4	1
DC	3	1
Florida	41	1
Georgia	21	0
Hawaii	5	1
Idaho	5	0
Illinois	25	1
Indiana	14	0
Iowa	8	1
Kansas	7	0
Kentucky	10	0
Louisiana	10	0
*Maine	4	1
Maryland	13	1
Massachusetts	15	1
Michigan	20	1
Minnesota	12	1
Mississippi	7	0
Missouri	13	0
Montana	4	0
*Nebraska	6	0
Nevada	8	1
New Hampshire	5	1
New Jersey	19	1
New Mexico	6	1
New York	38	1
North Carolina	21	0
NorthDakota	3	0
Ohio	23	1
Oklahoma	9	0
Oregon	10	1
Pennsylvania	25	1
Rhode Island	4	1
South Carolina	11	0
South Dakota	4	0
Tennesee	14	0
Texas	54	0
Utah	8	0
Vermont	3	1
Virginia	17	1
Washington	16	1
West Virginia	5	0
Wisconsin	13	1
Wyoming	3	0
Legend:	Obama = 1 - Romney = 0	
Total Obama Votes	1	430
Total Romney Votes	0	265

Bush v. Gore 2000		
State	EC Votes	Presidential Candidate
Alabama	11	1
Alaska	3	1
Arizona	10	1
Arkansas	7	1
California	65	0
Colorado	9	1
Conneticut	9	0
Delaware	4	0
DC	2	0
Florida	30	1
Georgia	16	1
Hawaii	4	0
Idaho	4	1
Illinois	26	0
Indiana	14	1
Iowa	8	0
Kansas	7	1
Kentucky	10	1
Louisiana	11	1
Maine	5	0
Maryland	12	0
Massachusetts	15	0
Michigan	22	0
Minnesota	11	0
Mississippi	8	1
Missouri	13	1
Montana	4	1
Nebraska	5	1
Nevada	5	1
New Hampshire	4	1
New Jersey	19	0
New Mexico	5	0
New York	40	0
North Carolina	16	1
NorthDakota	3	1
Ohio	25	1
Oklahoma	9	1
Oregon	8	0
Pennsylvania	27	0
Rhode Island	4	0
South Carolina	9	1
South Dakota	4	1
Tennesee	12	1
Texas	38	1
Utah	6	1
Vermont	3	0
Virginia	15	1
Washington	12	0
West Virginia	6	1
Wisconsin	12	0
Wyoming	3	1
Legend:	Bush = 1 - Gore = 0	
Total Bush Votes	1	317
Total Gore Votes	0	313

III. Electoral Votes and Winner by States under the Cube Root Rule – Biden v. Trump and Trump v. Clinton

Biden v. Trump 2020		
State	EC Votes	Presidential Candidate
Alabama	11	0
Alaska	3	0
Arizona	15	1
Arkansas	7	0
California	73	1
Colorado	12	1
Conneticut	8	1
Delaware	4	1
DC	3	1
Florida	41	0
Georgia	21	1
Hawaii	5	1
Idaho	5	0
Illinois	25	1
Indiana	14	0
Iowa	8	0
Kansas	7	0
Kentucky	10	0
Louisiana	10	0
*Maine	4	1
Maryland	13	1
Massachusetts	15	1
Michigan	20	1
Minnesota	12	1
Mississippi	7	0
Missouri	13	0
Montana	4	0
*Nebraska	6	0
Nevada	8	1
New Hampshire	5	1
New Jersey	19	1
New Mexico	6	1
New York	38	1
North Carolina	21	0
NorthDakota	3	0
Ohio	23	0
Oklahoma	9	0
Oregon	10	1
Pennsylvania	25	1
Rhode Island	4	1
South Carolina	11	0
South Dakota	4	0
Tennesee	14	0
Texas	54	0
Utah	8	0
Vermont	3	1
Virginia	17	1
Washington	16	1
West Virginia	5	0
Wisconsin	13	1
Wyoming	3	0
Legend:	Biden = 1 - Trump = 0	
Total Biden Votes	1	394
Total Trump Votes	0	301

Trump v. Clinton 2016		
State	EC Votes	Presidential Candidate
Alabama	11	0
Alaska	3	0
Arizona	15	0
Arkansas	7	0
California	73	1
Colorado	12	1
Conneticut	8	1
Delaware	4	1
DC	3	1
Florida	41	0
Georgia	21	0
Hawaii	5	1
Idaho	5	0
Illinois	25	1
Indiana	14	0
Iowa	8	0
Kansas	7	0
Kentucky	10	0
Louisiana	10	0
*Maine	4	1
Maryland	13	1
Massachusetts	15	1
Michigan	20	0
Minnesota	12	1
Mississippi	7	0
Missouri	13	0
Montana	4	0
*Nebraska	6	0
Nevada	8	1
New Hampshire	5	1
New Jersey	19	1
New Mexico	6	1
New York	38	1
North Carolina	21	0
NorthDakota	3	0
Ohio	23	0
Oklahoma	9	0
Oregon	10	1
Pennsylvania	25	0
Rhode Island	4	1
South Carolina	11	0
South Dakota	4	0
Tennesee	14	0
Texas	54	0
Utah	8	0
Vermont	3	1
Virginia	17	1
Washington	16	1
West Virginia	5	0
Wisconsin	13	0
Wyoming	3	0
Legend:	Clinton = 1 - Trump = 0	
Total Clinton Votes	1	300
Total Trump Votes	0	395

APPENDIX V – HISTORICAL ELECTIONS UNDER THE 1910 PROPORTIONAL METHOD

IV. Electoral Votes and Winner by States under the 1910 Proportional Method – Clinton v. Bush and Nixon v. Humphries v. Wallace

Clinton v. Bush 1992		
State	EC Votes	Presidential Candidate
Alabama	19	0
Alaska	4	0
Arizona	18	0
Arkansas	12	1
California	130	1
Colorado	16	1
Conneticut	16	1
Delaware	5	1
DC	3	1
Florida	58	0
Georgia	30	1
Hawaii	7	1
Idaho	6	0
Illinois	51	1
Indiana	26	0
Iowa	14	1
Kansas	13	0
Kentucky	18	1
Louisiana	20	1
Maine	7	1
Maryland	23	1
Massachusetts	28	1
Michigan	42	1
Minnesota	21	1
Mississippi	13	0
Missouri	24	1
Montana	5	1
Nebraska	9	0
Nevada	7	1
New Hampshire	7	1
New Jersey	35	1
New Mexico	9	1
New York	80	1
North Carolina	31	0
NorthDakota	5	0
Ohio	49	1
Oklahoma	16	0
Oregon	14	1
Pennsylvania	53	1
Rhode Island	6	1
South Carolina	17	0
South Dakota	5	0
Tennesee	23	1
Texas	75	0
Utah	9	0
Vermont	4	1
Virginia	29	0
Washington	23	1
West Virginia	10	1
Wisconsin	23	1
Wyoming	4	0
Legend:	Clinton = 1 - Bush = 0	
Total Clinton Votes	1	815
Total Bush Votes	0	338

Nixon v. Humphries v. Wallace 1968		
State	EC Votes	Presidential Candidate
Alabama	18	-1
Alaska	3	1
Arizona	8	1
Arkansas	10	-1
California	77	1
Colorado	10	1
Conneticut	14	0
Delaware	4	1
DC	3	0
Florida	25	1
Georgia	21	-1
Hawaii	5	0
Idaho	5	1
Illinois	50	1
Indiana	24	1
Iowa	15	1
Kansas	12	1
Kentucky	16	1
Louisiana	17	-1
Maine	7	0
Maryland	17	0
Massachusetts	26	0
Michigan	39	0
Minnesota	18	0
Mississippi	12	-1
Missouri	22	1
Montana	5	1
Nebraska	9	1
Nevada	3	1
New Hampshire	5	1
New Jersey	31	1
New Mexico	7	1
New York	82	0
North Carolina	24	1
NorthDakota	5	1
Ohio	48	1
Oklahoma	13	1
Oregon	10	1
Pennsylvania	56	0
Rhode Island	6	0
South Carolina	13	1
South Dakota	5	1
Tennesee	19	1
Texas	47	0
Utah	6	1
Vermont	4	1
Virginia	21	1
Washington	16	0
West Virginia	11	0
Wisconsin	21	1
Wyoming	4	1
Legend:	Nixon = 1 - Humphries = 0 - Wallace	
Total Nixon Votes	1	524
Total Humphries Votes	0	347
Total Wallace Votes	-1	78

V. Electoral Votes and Winner by States under the 1910 Proportional Method – Obama v. Romney and Bush v. Gore

Obama v. Romney 2012		
State	EC Votes	Presidential Candidate
Alabama	25	0
Alaska	5	0
Arizona	32	0
Arkansas	16	0
California	178	1
Colorado	26	1
Conneticut	19	1
Delaware	6	1
DC	3	1
Florida	91	1
Georgia	48	0
Hawaii	8	1
Idaho	9	0
Illinois	63	1
Indiana	33	0
Iowa	16	1
Kansas	15	0
Kentucky	22	0
Louisiana	23	0
*Maine	8	1
Maryland	29	1
Massachusetts	33	1
Michigan	49	1
Minnesota	27	1
Mississippi	16	0
Missouri	30	0
Montana	7	0
*Nebraska	11	0
Nevada	15	1
New Hampshire	8	1
New Jersey	44	1
New Mexico	12	1
New York	93	1
North Carolina	47	0
NorthDakota	5	0
Ohio	56	1
Oklahoma	20	0
Oregon	20	1
Pennsylvania	62	1
Rhode Island	7	1
South Carolina	24	0
South Dakota	6	0
Tennesee	32	0
Texas	121	0
Utah	15	0
Vermont	5	1
Virginia	40	1
Washington	34	1
West Virginia	11	0
Wisconsin	29	1
Wyoming	5	0
Legend:	Obama = 1 - Romney = 0	
Total Obama Votes	1	981
Total Romney Votes	0	578

Bush v. Gore 2000		
State	EC Votes	Presidential Candidate
Alabama	19	1
Alaska	4	1
Arizona	18	1
Arkansas	12	1
California	130	0
Colorado	16	1
Conneticut	16	0
Delaware	5	0
DC	2	0
Florida	58	1
Georgia	30	1
Hawaii	7	0
Idaho	6	1
Illinois	51	0
Indiana	26	1
Iowa	14	0
Kansas	13	1
Kentucky	18	1
Louisiana	20	1
Maine	7	0
Maryland	23	0
Massachusetts	28	0
Michigan	42	0
Minnesota	21	0
Mississippi	13	1
Missouri	24	1
Montana	5	1
Nebraska	9	1
Nevada	7	1
New Hampshire	7	1
New Jersey	35	0
New Mexico	9	0
New York	80	0
North Carolina	31	1
NorthDakota	5	1
Ohio	49	1
Oklahoma	16	1
Oregon	14	0
Pennsylvania	53	0
Rhode Island	6	0
South Carolina	17	1
South Dakota	5	1
Tennesee	23	1
Texas	75	1
Utah	9	1
Vermont	4	0
Virginia	29	1
Washington	23	0
West Virginia	10	1
Wisconsin	23	0
Wyoming	4	1
Legend:	Bush = 1 - Gore = 0	
Total Bush Votes	1	578
Total Gore Votes	0	593

VI. Electoral Votes and Winner by States under the 1910 Proportional Method – Biden v. Trump and Trump v. Clinton

Biden v. Trump 2020		
State	EC Votes	Presidential Candidate
Alabama	25	0
Alaska	5	0
Arizona	32	1
Arkansas	16	0
California	178	1
Colorado	26	1
Conneticut	19	1
Delaware	6	1
DC	3	1
Florida	91	0
Georgia	48	1
Hawaii	8	1
Idaho	9	0
Illinois	63	1
Indiana	33	0
Iowa	16	0
Kansas	15	0
Kentucky	22	0
Louisiana	23	0
*Maine	8	1
Maryland	29	1
Massachusetts	33	1
Michigan	49	1
Minnesota	27	1
Mississippi	16	0
Missouri	30	0
Montana	7	0
*Nebraska	11	0
Nevada	15	1
New Hampshire	8	1
New Jersey	44	1
New Mexico	12	1
New York	93	1
North Carolina	47	0
NorthDakota	5	0
Ohio	56	0
Oklahoma	20	0
Oregon	20	1
Pennsylvania	62	1
Rhode Island	7	1
South Carolina	24	0
South Dakota	6	0
Tennesee	32	0
Texas	121	0
Utah	15	0
Vermont	5	1
Virginia	40	1
Washington	34	1
West Virginia	11	0
Wisconsin	29	1
Wyoming	5	0
Legend:	Biden = 1 - Trump = 0	
Total Biden Votes	1	898
Total Trump Votes	0	661

Trump v. Clinton 2016		
State	EC Votes	Presidential Candidate
Alabama	25	0
Alaska	5	0
Arizona	32	0
Arkansas	16	0
California	178	1
Colorado	26	1
Conneticut	19	1
Delaware	6	1
DC	3	1
Florida	91	0
Georgia	48	0
Hawaii	8	1
Idaho	9	0
Illinois	63	1
Indiana	33	0
Iowa	16	0
Kansas	15	0
Kentucky	22	0
Louisiana	23	0
*Maine	8	1
Maryland	29	1
Massachusetts	33	1
Michigan	49	0
Minnesota	27	1
Mississippi	16	0
Missouri	30	0
Montana	7	0
*Nebraska	11	0
Nevada	15	1
New Hampshire	8	1
New Jersey	44	1
New Mexico	12	1
New York	93	1
North Carolina	47	0
NorthDakota	5	0
Ohio	56	0
Oklahoma	20	0
Oregon	20	1
Pennsylvania	62	0
Rhode Island	7	1
South Carolina	24	0
South Dakota	6	0
Tennesee	32	0
Texas	121	0
Utah	15	0
Vermont	5	1
Virginia	40	1
Washington	34	1
West Virginia	11	0
Wisconsin	29	0
Wyoming	5	0
Legend:	Clinton = 1 - Trump = 0	
Total Clinton Votes	1	678
Total Trump Votes	0	881

BIBLIOGRAPHY

"1968 Presidential Election." 270 to Win. https://www.270towin.com/1968_Election/

"1990 Census Apportionment Results." U.S. Census Bureau, December, 1990. https://www.census.gov/data/tables/1990/dec/1990-apportionment-data.html

"1992 Presidential Election." 270 to Win. https://www.270towin.com/1992_Election/

"2000 Presidential Election." 270 to Win. https://www.270towin.com/2000_Election/

"2010 Census Apportionment Results." U.S. Census Bureau, December, 2010. https://www.census.gov/data/tables/2010/dec/2010-apportionment-data.html

"2012 Presidential Election." 270 to Win. https://www.270towin.com/2012_Election/

"2016 Presidential Election." 270 to Win. https://www.270towin.com/2016_Election/

"2020 Census Apportionment Results." U.S. Census Bureau, April 26, 2021. *https://www.census.gov/data/tables/2020/dec/2020-apportionment-data.html*

"2020 Presidential Election." 270 to Win. https://www.270towin.com/2020_Election/

"Computing Apportionment." U.S. Census Bureau. Last Modified November 22, 2021. https://www.census.gov/topics/public-sector/Congressional-apportionment/about/computing.html

"Congressional Apportionment." *The New York Times.* April 12, 1926.

"Electoral College Reform." *The New York Times.* November 16, 1976.

"Faithless Electors." Fair Vote. https://www.fairvote.org/faithless_electors

"Frequently Asked Questions: What is the budget for most members of Congress?" United States House of Representatives. https://www.house.gov/the-house-explained/open-government/statement-of-disbursements/frequently-asked-questions

"Maine and Nebraska." Fair Vote. https://www.fairvote.org/maine_nebraska

"Party Divisions of the House of Representatives, 1789 to Present." History, Arts, and Archives of The United States House of Representatives. https://history.house.gov/Institution/Party-Divisions/Party-Divisions/

"Rethinking the Electoral College Debate: The Framers, Federalism, and One Person, One Vote." *Harvard Law Review* 114, no 8 (2001): 2526–49.

Baker v. Carr. 369 U.S. 186 (1962).

Baker, Peter. "Suit Seeks to Double Size of the House." *The New York Times.* July 12, 2010. https://thecaucus.blogs.nytimes.com/2010/07/12/suit-seeks-to-double-size-of-house/

Banzhaf III, John F. "One Man, 3.312 Votes: A Mathematical Analysis of the Electoral College." *Villanova University Law Review* 13, no 2 (1968): 304 - 332.

Barbosa, Quentin. "The (Im)Permanent Apportionment Act: Unequal Congressional Representation and Apportionment Reform." *University of the Pacific Law Review* 53, no 1. (2021).

Beth, Judith. *The Case Against Direct Election of the President.* (London, England: Cornell University Press, 1975).

Bokat-Lindell, Spencer. "Can Ranked-Choice Voting Cure American Politics?" *The New York Times.* June 24, 2021.

Cervas, Jonathan and Bernard Grofman. "Legal, Political Science, and Economics Approaches to Measuring Malapportionment: The U.S. House, Senate, and Electoral College 1790–2010." *Social Science Quarterly* 101, no 6 (October): 2238-2256.

Eder, Steve and Johnathan Mahler. "The Electoral College Is Hated by Many. So Why Does It Endure?" *The New York Times.* November 10, 2016.

Feerick, John D. “The Electoral College: Time for a Change?” *Fordham Law Review* 90, no 2 (2021).
Gray v. Sanders. 372 U.S. 368 (1963).
Liptak, Adam. “Supreme Court Rejects Challenge on ‘One Person One Vote.’” *The New York Times.* April 4, 2016. https://www.nytimes.com/2016/04/05/us/politics/supreme-court-one-person-one-vote.html
MacBride, Roger Lea. *The American Electoral College.* (Idaho: The Caxton Printers, 1953).
Morley, Michael. “The Framers' Inadvertent Gift: The Electoral College and the Constitutional Infirmities of the National Popular Vote Compact.” *Harvard Law and Policy Review* (2021).
Muller, Derek T. “Invisible Federalism and the Electoral College.” *Arizona State Law Journal* 44. (2012): 1237.
NCC Staff. “The Day the Senate Picked a U.S. Vice-President of its Own.” National Constitution Center. https://constitutioncenter.org/interactive-constitution/blog/the-day-the-senate-picked-a-u-s-vice-president-on-its-own
Small, Sam W. “Looking and Listening: The Congressional Apportionment Problem is Worrying Party Managers.” *The Atlanta Journal Constitution.* October 13, 1927.
U.S. Census Bureau. “1910 Census: Volume 1. Population, General Report and Analysis.” *United States Department of Commerce*. 1913.
U.S. Census Bureau. “1960 Census of Population, Supplementary Reports: Population of Congressional Districts.” *United States Department of Commerce.* April 11, 1961.
U.S. Congress, Senate. *The Permanent Apportionment Act of 1929*. Senate Bill 312. Seventy First Congress. First Session. Introduced to the Senate June 18, 1929.
United States Constitution. Amendment XXIII.
United States Constitution. Amendment XXVII.
United States Constitution. Article I § 2, Clause 3.
United States Constitution. Article II § 1, Clause 3.
Wesberry v. Sanders. 376 U.S. 1 (1964).

The Great War:
The Role of Economics and Total War in Female Advancement
By Lindsey Green
HIST 3500: World War I
Dr. Shirley
5 December 2023

By the turn of the twentieth century, the United States of America, still in its adolescence, had participated in many wars and conflicts. Being a nation birthed from the onslaught of the American Revolution, the phrase "give me liberty or give me death" set an early precedent in the United States about the power of war: it is a tool of political change. The nation would use such an instrument of change during the following century in many conflicts with the aims of gaining oppositional compliance, altering policy, ensuring national security, and protecting the expansion of national borders and economics. Despite this, the twentieth century inspired a new war policy in the face of international conflict: neutralism. Championed by Woodrow Wilson, a policy of neutralism ensured the United States could continue participating in international trade, preserve the lives of Americans, and focus on domestic concerns.[61] This doctrine was vastly popular with many political groups such as the pacifist women's suffragists. Many also hoped that, in not concerning itself with the affairs of other nations, the government would avoid a diversion of attention from issues on the home front like women's suffrage. However, in an analysis of America's involvement in World War I, the war, and the economics surrounding it, played a great role in facilitating the social change that so many suffragists worked towards.

This is distinctly illustrated with the Yeomen (F), the first female naval enlistees, as both a change in the demographics of the national workforce and the pressure of total warfare gave women the opportunity to defend the freedom that they, as non-voting citizens, had no chance to defend elsewhere. Following the Yeomen (F)'s service, the women of America were formally recognized as full citizens in their honor through the passage of the Nineteenth Amendment. Thus, while war and related economic components can be perceived as futilely disastrous and unpreferred, their role in moving the hand of social change toward a new national identity is irrefutable.

Before the country's entrance into World War I, women had played an often ignored role in American combat. As Godson mentions, "Twenty thousand females assisted the Continental army, [as] followers, spies, or nurses who provided rudimentary care" during the American Revolution [62] In consequence, the women who served alongside men in this war embedded into the national identity the notion that American women were capable of aiding in the fight for freedom. Throughout the nineteenth century, many women followed this model by finding roles within the Navy for the duration of the Civil War and the Spanish-American War as nurses on ships. As women flocked to aid the Navy, a sort of precedence was set for women in working with this branch of the military. Despite all of this, these women's services were never officially recognized by the United States. In the late nineteenth century, a naval focus on "revitalization" included the clause that women's services would no longer be needed.[63] Now, the very nation

---

[61] "U.S. Enters the War," *The National World War I Museum and Memorial*.

[62] Susan H. Godson, *Serving Proudly: A history of women in the U.S. Navy*, (Annapolis, MD: Naval Institute Press, 2001), 1.

[63] Godson, *Serving Proudly,* 22.

that thousands of women had fought to defend stated that it would no longer defend their value and capabilities.

Meanwhile, the home front was also facing drastic changes. In less than a century, the United States acquired the modern-day states of Louisiana, Florida, Texas, Oregon, Washington, Montana, Wyoming, California, and others through a series of negotiations and conflicts. Concurrently, the nation saw an increase in the availability of Bessemer process steel, which was the primary material used in building railroads, leading to the rapid expansion of transportation opportunities to these new regions.[64] Such an expansion of the means of transportation led to the opportunity for national economic growth and, consequently, the United States' Second Industrial Revolution.[65] Lasting from 1870 to 1914, this manufacturing boom resulted in extreme corporate, technological, and mechanical changes in American industries.

While the changes brought on by this boom had an obvious impact on finances and technology, the country also saw changes in workforce demographics as it faced rapid expansion to maintain pace with the increase in product output. Perhaps the greatest change in the workforce was that the desperate need for workers "frequently permitted the dilution of skills formerly needed to perform standard work processes, and women often gained employment in such redefined jobs." [66] Despite the gain of some professional independence, women still faced inequalities as many believed that women were taking jobs from able men and less skilled male counterparts were routinely paid double their salaries. Still, this did not deter many women as they found professional opportunities in new fields like agriculture, sales, telecommunications, and manufacturing.

Of all these new possibilities, women flocked to clerical work. As an analysis shows, "In 1870 women comprised only 2.6 percent of all clerical workers in the United States, but their presence in this white-collar employment grew to 37.7 percent by 1910." [67] In only four decades, the American female clerical population grew to almost fifteen times its original size. The rationale for such an increase in this field includes higher overall remuneration and social status despite pay inequalities.[68] Women became so successful in such positions that their male counterparts saw "women's introduction into their fields of employment as a threat to their customary work." [69] However, the consensus would sway over time to favor women in clerical positions due to their speed and nimbleness. So, while American women took advantage of clerical opportunities, the public became much more familiar and comfortable with their skills and capacities in these roles.

On the political front, as the United States sought to become a stronger economic power, it began to focus on one component of concern: the Navy. Many nations across the globe turned their focus toward naval affairs to follow the model set by the British Empire. At this time, the British Empire spanned the globe and encompassed the modern-day nations of Canada, Australia, India, South Africa, Egypt, and several others.[70] Its success in global economics and politics was widely attributed to the first-class status of the Royal Navy as "pre-World War I

---

[64] Kevin Forestell, "The Bessemer Process: What It Is and How It Changed History," *DOZR* (2021).

[65] Ryan Engelman, "The Second Industrial Revolution, 1870-1914," *U.S. History Scene.*

[66] Maurine Weiner Greenwald, *Women, War, and Work: the impact of World War I on women workers in the United States*, (Westport, N: Greenwood Press, 1980), XIX.

[67] Greenwald, *Women, War, and Work, 8*.

[68] Greenwald, *Women, War, and Work,* 8.

[69] Greenwald, *Women, War, and Work,* XX.

[70] "The Commonwealth and the First World War," *The National Army Museum.*

Britain… required a (capital-intensive) navy to protect its empire and home islands." [71] Naturally, as America looked to expand its economy, it sought to apply Britain's naval philosophy. As previously mentioned, many began campaigning for a revitalized Navy in 1881, and "two years later Congress appropriated $1.3 million for the first four ships of a new steel Navy." [72]

One of the most notable proponents of naval importance was Captain Alfred Thayer Mahan, the President of the United States Naval War College, who publicized his position in his 1890 publication of *The Influence of Sea Power upon History, 1660–1783*. Mahan argued "that the U.S. economy would soon be unable to absorb the massive amounts of industrial and commercial goods being produced domestically, and… should seek new markets abroad… ensuring that the U.S. Government could guarantee access to these new international markets" with a merchant navy, an American battleship navy, and a network of naval bases.[73] With his publication's rise in popularity, Mahan gained the support of several important officials, such as Theodore Roosevelt as well as the Secretary of the Navy. Thus, his argument would prove to become a staple thesis in American Naval History.

Twenty-six years after Mahan's argument was published, Congress met to discuss increasing the Navy's power through the passage of the Naval Act of 1916. This bill's timing was of great importance as the United States was attempting to remain neutral in the wake of the European war but desired to also enforce a policy of preparedness.[74] Senator Swanson illustrated this as he stated, "Our future safety, progress, and prosperity may be determined by the deliberations of this Congress... The history of the world teaches one sure lesson that naval supremacy ultimately means national preeminence and triumph." [75] Thus, the bill focused on two main measures: increasing both manpower and the fleet. Still, however important the bill was indicated to be, it was also pushed through legislation rather quickly. Senator Tillman displays this as he opened the floor with a plea to "let us not consume any more time in discussing it than is absolutely necessary to elucidate obscure points or make necessary explanations" as he was "tired out and [wanted] to go home and rest."[76] Perhaps the combination of time constraints and national security pressures is the reason why one major grammatical ambiguity slipped through the cracks of this legislation.

To make as many young men eligible for enlistment in the event of war as possible, the specific language of the bill made the Navy "open to 'all persons who may be capable of performing special useful service for coastal defense.'" [77] In other words, this bill intended to increase the enlistment of naval yeomen through broadening enlistment requirements. However, in March of 1917, several young women across the United States believed that the phrase "all person who may be capable" also included them. This was primarily because the economic and political changes of the Second Industrial Revolution had been further facilitated by the

---

[71] David M. Rowe, "World Economic Expansion and National Security in Pre-World War I Europe," *International Organization* 53, no. 2 (1999): 198.

[72] Godson, *Serving Proudly,* 22.

[73] "Mahan's The Influence of Sea Power upon History: Securing International Markets in the 1890s" *Office of the Historian*.

[74] "Preparedness Movement," *Britannica.*

[75]Congress, "53 Cong. Rec. (Bound)," *U.S. Government Publishing Office*, July 23, 1916.

[76] Congress, "53 Cong. Rec. (Bound)," *U.S. Government Publishing Office*, July 23, 1916.

[77] Jean Ebbert and Marie-Beth Hall, *The First, the Few, the Forgotten: Navy and Marine Corps women in World War I,* (Annapolis, MD: Naval Institute Press, 2001), 3.

impending war meant "working women took advantage of their new strength… [and] opportunities for changing jobs… Many women took literally the wartime propaganda which corresponded to their own experience and hopes, that the rhetoric of democracy and human dignity should have meaning in women's work." [78] At the time, recruiters believed their stance was ludicrous and had not yet received any orders to accept these women.

However, this would remain the case for much longer as they were soon permitted to enlist with the responsibilities of yeomen. The Secretary of the Navy, Josephus Daniels, boldly proclaimed, "'Enroll women in the naval service as yeomen and we will have the best clerical assistance the country can provide… Is there any regulation which specifies that a Navy yeoman be a man?'" [79] Initially, Daniels' decision was frowned upon by many, but Secretary Daniels recognized that the impending total war would not discriminate. For the United States to succeed, it must employ all its resources regardless of gender considerations. Daniels also recognized that America was, at the time, simply not able to field enough men to service all of the new ships commissioned by the Naval Act of 1916.[80] He believed that women could fill the clerical positions of men so that more of them would be freed to serve in combat roles. And with considerations of American women's increasing experience in clerical duties and an increase in general trust in their capabilities, this was an optimum solution.

Immediately following Daniel's orders, Loretta Perfectus Walsh enrolled as the first Yeoman (F), a phrase denoting her status as a female naval yeoman rather than male, on March 2, 1917.[81] Then, "by the time the United States had entered the Great War on April 6, 1917 - 200 eager young women had become Navy yeomen." [82] According to the National Park Service, over 10,000 women volunteered and served as Yeomen (F) throughout the United States' short-lived involvement in the war.[83] Thus, based on numbers alone, the operation was highly successful as it freed 10,000 more men to work at sea while 10,000 capable women provided refined clerical services. However, the challenges that these women and the government faced in this integration cannot be ignored.

The first obstacle many women faced was the Navy's entrance exams. While "female applicants could be rejected for the same reasons that would exclude men, such as weakness, defective vision, speech impediment, heart or lung disease, or possessing fewer than 20 teeth,"[84] Josephus Daniels advocated on behalf of Yeomen (F) because of their superb clerical skills. Thus, the women who were to be accepted must have superior skills. This is the reason why in the "over five thousand examined [by one recruiter]... of this number 1,192 were enrolled." [85] These women were truly the select of their sex as denoted by the difficulty level of the written portions of their entrance exams.

---

[78] Greenwald, *Women, War, and Work,* 45.

[79] Elizabeth Cobbs, "Fighting on Two Fronts: World War One, Women's Suffrage, and John Pershing's 'Hello Girls,'" *South Central Review* 34, no. 3 (2017): 33.

[80] Pamela D. Toler, "Not Every Woman Who Served With the U.S. Military During World War I Got the Same Treatment. Here's Why" *Time Magazine* (2019).

[81] Roy A. Mosteller, "Loretta Perfectus Walsh," *The United States Navy Memorial.*

[82] Lettie Gavin, *American Women in World War I: they also served,* (Niwot, CO: University Press of Colorado, 1997), 2.

[83] Jane Sciacca, "Yeomen (F) Register to Vote" *U.S. National Park Service*

[84] Ebbert and Hall, *The First, the Few, the Forgotten,* 9.

[85] Ebbert and Hall, *The First, the Few, the Forgotten,* 8.

For the women who were accepted following these examinations, the next challenge they faced was living arrangements. Because the Navy had never before considered women enlisting, it was not prepared to house them on its bases as there were no pre-existing structures built specifically for them. On the rare occasion when the Navy was able to provide housing, it was provided with only the bare necessities, and this was not an ideal solution. This left most women to find housing arrangements on their own. This task proved to be difficult for many young women "who had neither the experience nor the guidance to help them in their first encounters with a large city, [as] many of them were away from their families for the first time." [86] This naivety was clear as several of these women were also, unfortunately, left vulnerable in the face of landlords who routinely took advantage of them with overpriced rent.[87] Overall, housing was the biggest factor of enlistment for most Yeomen (F) due to financial and safety concerns.

Upon settling into their new positions, uniforms also became a matter of concern. This was a matter of great importance as they "identify those who wear them, they promote recruitment, and they project a favorable image to the tax-paying public." [88] Thus, the Navy recognized the significance that these uniforms would have in the public acceptance of female soldiers. However, problems arose as orders through typical suppliers could not be completed promptly as the Navy now required a new, female-centered design and a mass quantity.[89] Consequently, many Yeomen (F) were left with a gratuity from the Navy to buy the necessary fabrics to complete the job, which differed depending upon the location. For instance, the *East Oregonian* noted that "white from the hat to the shoes is the new summer suit for [Yeomen (F)]," while *The Wilmington Morning Star* proclaimed that "they were actually ankle-revealing!" [90] Structurally different depending upon location, they were just as different from person to person as women were able to pay for a seamstress to complete their design, and in other cases, women hand-stitched their own. Nevertheless, the women's beautiful uniforms, however different one may be from another, became undeniable signs of their pride in their country.

Looking beyond the surface of enlistment, the Yeomen (F)'s work was incredibly grueling. Because of the women's noted speed, dexterity, competence, and character, clerical responsibilities varied from being messengers to breaking codes for the Navy. However intense the pressure became, the Yeomen (F) continued diligently. In reminiscing about her enlistment, one woman recalled the following words from her superior: "'In short, UPON THE ACCURACY of your notes will depend the saving or LOSS OF LIVES… Do you think you can do it?'... Could I? I *had* to." [91] This exemplary determination yielded great clerical success for the Navy, and while openings in clerical positions opened the door for women in the Navy, many women soon claimed other military employment opportunities in the wake of the desperate manpower shortage.

As an example, while some women started working in factories during the war effort, the consensus was that women were incapable of working with the same weight volumes as their male counterparts. However, in one case of women tasked with filling torpedo primers, "Secretary Daniels, reported that, prior to the women's employment 175 men were producing

---

[86] Ebbert and Hall, *The First, the Few, the Forgotten,* 21.

[87] Gavin, *American Women in World War One,* 10.

[88] Ebbert and Hall, *The First, the Few, the Forgotten,* 28.

[89] Gavin, *American Women in World War One,* 4.

[90] "How local girls will look as Yeomenettes," *East Oregonian,* (Pendleton, OR), May 4, 1918; "Life had its problems for sailor girls back in 1917," *The Wilmington morning star*, (Wilmington, N.C.), Aug. 21, 1942.

[91] Ebbert and Hall, *The First, the Few, the Forgotten,* 45.

five thousand primers a week, but in July 1918, 340 women made fifty-five thousand a week." [92] Meanwhile, in Virginia, female truck drivers became a necessity in the local naval war effort. This was exciting to many as women in general society were believed to be incapable of driving motor vehicles of any kind – least of all large trucks. Yet, their services were so valuable the Navy would continue to advertise for female truck drivers until the end of the war. On occasion, there were also opportunities for women in pharmacy, recruitment, and other fields.

In working towards an Allied victory, these Yeomen (F) further demonstrated their commitment by working extreme hours – often up to six days per week with many women working night shifts.[93] This was an incredibly daunting task, but it did not deter them. Chief Yeomen (F) Margaret Thomas exemplified the courage of herself and her peers as "often she had to work past midnight at the recruiting office, then pass through an unsavory section of the city. 'She would then strap a revolver on under her cloak and go home alone.'" [94] Beyond those working in extreme conditions at home, over forty of these women aided in the fight abroad. Location placements included the Panama Canal Zone, Guam, England, the Territory of Hawaii, Puerto Rico, France, and the Virgin Islands.[95]

Despite their dedication and service, many women faced discriminatory issues regarding service policies and benefits such as an absence of survivor benefits, promotional opportunities, and maternity leave. The most alarming discriminatory challenge would arise in the wake of the Influenza pandemic. Like the housing situation, the Navy was simply not prepared to absorb these women in its hospitals as no spaces had been created for them. Unfortunately, pandemics, much like war, drag populations into their vortex without regard to gender. As a result of the Navy's unpreparedness, many women diagnosed with Influenza were referred to general hospitals. Because of the virus's rampancy in these locations, this was considered a death sentence, and many diagnosed Yeomen (F) were quarantined at home and refused to seek treatment. Overall, thirty-seven Yeomen (F) perished from health-related causes during their service.[96] And despite these uncertainties, women continued to aid in the war effort.

Overall, Josephus Daniel's Yeomen (F) trial run was successful in freeing men to the lines, and other branches of the military quickly began to take notice. Within five months of Daniels' claim that "'the part which our American women play in the successful prosecution of the war cannot be overestimated,'" the United States Marine Corps began its acceptance of female marines known as "Marinettes." [97] The Marine Corps proudly boasted its inclusion of women as its main recruitment poster for the war showed "men massed at the front and a cocky, uniformed woman towering above them saying with one hand on her Marine sword: 'If You Want to Fight! Join the Marines!'" [98] Similarly to the case of the Yeomen (F), the Marinettes' service was highly valuable.

The United States Army, on the other hand, was far more reluctant to enlist women. John Pershing, Commander of the American Expeditionary Forces, was not initially as impressed by the idea. However, the disastrous state of his telecommunications operations in Europe

---

[92] Ebbert and Hall, *The First, the Few, the Forgotten,* 47.

[93] Gavin, American Women in World War One, 5.

[94] Ebbert and Hall, *The First, the Few, the Forgotten,* 49.

[95] "Yeoman (F) and Marine Reservists (F)," *Naval History and Heritage Command.*

[96] Regina Akers, "Historical Overview of Yeomen (F)," *Naval History and Heritage Command.*

[97] Linda Hewitt, *Women Marines in World War I*, (Washington, DC: History and Museums Division Headquarters, 1974),1.

[98] Cobbs, "Fighting on Two Fronts: World War One," 35.

persuaded him to enlist the help of the "Hello Girls." These women were skilled teleoperators who were far more advanced in the speed and carefulness associated with telecommunications than their male counterparts. They served with Pershing from late 1917 to the war's conclusion. Following the war, Pershing commented that "'every man over there wanted to feel some woman was looking after him,'" and if for nothing else, the women's presence alone was of great value. [99] Thus, the women of World War I were treasured by even the most initially opposed by the end of the war. All of this was due to the initial success and drive of the Yeomen (F).

Unfortunately, these women's services were discontinued as the Navy stopped enrolling women on November 4, 1918, as the nation awaited the Armistice.[100] Meanwhile, the already enrolled Yeomen (F) prepared themselves to engage in the intense clerical demands of the paperwork associated with the demobilization of a nation. Following the completion of these duties, Secretary Daniels intended for all Yeomen (F) to be discharged by October 24, 1920, but the last woman would not be discharged until March of 1921. [101]

Overall, the servicewomen of World War I were invaluable in their physical contributions to the war, but the image and morale that they provided to the nation was perhaps even greater. Although they did face some criticism throughout the war, they were often publicized as some of the greatest symbols of American patriotism the press could offer. Popular Navy recruitment posters of the time often featured a young servicewoman with the phrase "Gee! I wish I were a man, I'd join the Navy" as this was (a modified version of) the phrase used by many of the first women enlistees pleading their cases to Naval recruiters.[102] Following the Armistice in November 1918, the women continued to display their pride in the shared effort of victory by joining in "victory parades" around the nation. As an example, "The Battalion took part in a Victory Loan drive in New York… [and] gave an exhibition drill at which they raised more than fifty thousand dollars." [103] Excitement filled these scenes as newspapers reported on the parades, and through this type of publicity, the Yeomen (F) became symbols of national pride and incidental advocates of the value of women.

Following the Armistice, women's movements began to pick up the momentum they lost to the war's diversion of political attention. However, at the hands of this war, women's suffragists now had another convincing argument to add to their carousel: America spent several years fighting for freedom through the combined military efforts of men and women. How then, could a freedom fought for and defended by both sexes be partial to only one? It was with this argument that the women's movement was able to gain immense political traction as even President Woodrow Wilson advocated on its behalf by stating, "Are we alone to ask and take the utmost women can give – services and sacrifice of every kind – and still say that we do not see what title that gives them.'" [104]

One by one, politicians came forth to advocate for the female vote – many by citing the services of women during the war and how this contributed to their legal fulfillment of citizenship. As an example, the Governor of Nevada proposed the following statement to the Senate on February 4, 1919:

---

[99] "Hello Girls: Topics in Chronicling America," *Library of Congress.*

[100] Patch, "The Story of the Female Yeomen during the First World War.".

[101] Nathaniel Patch, "The Story of the Female Yeomen during the First World War," *National Archives*, 2016.

[102] "Yeoman (F) and Marine Reservists (F)," *Naval History and Heritage Command.*

[103] Ebbert and Hall, *The First, the Few, the Forgotten,* 88.

[104] Cobbs, "Fighting on Two Fronts: World War One," 32.

> Whereas the world war laid its burdens and sacrifices with even hand upon men and women alike and demanded and received from both the fullest measure of patriotism and devotion, in order that the great purposes for which the war was successfully fought might be permanently secured for the benefit of mankind… That the Senators from Nevada be requested.. to energetically and actively support this resolution [in favor of women's suffrage]. [105]

On June 4, 1919, the United States passed the Nineteenth Amendment which guaranteed that "the right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex."[106] Finally, the women of the United States were granted all of the constitutional rights of a full citizen at the hands of the Yeomen (F)'s service and the advocacy that followed on their behalf.

However, there was, of course, more work to be done. In this period of peace and ensured democracy, questions spiraled about human equality. In the minds of all those concerned with the equality of military affairs, one topic gained popularity following the women's discharge: women's importance to the military. However, this topic lingered without definite answers for the next several decades until the Great Depression and the Second World War consumed the nation. As examined with World War I in this essay, the effects of war (and the economic factors influencing society and such war) would again prove to be highly influential in the progression of the women's movement. Most notably in the succession of the topic of the Yeomen (F), women would finally gain full status in the military at the hands of The Women's Armed Services Integration Act.[107]

Overall, the United States endured great change at the turn of the twentieth century as global tensions skyrocketed and domestic economic changes were rampant. Yet, it was in this period of uncertainty and change that the women of America found a means of supporting their country in World War I by seizing the opportunities presented in the legal ambiguity of the Naval Act of 1916. In this fight for freedom, these servicewomen provided the basis for the security of rights guaranteed in the Nineteenth Amendment of the United States Constitution, and a similar pattern would repeat itself with further advancement in World War II. Consequently, it is apparent that the horrors of war and the instability of economics are inadvertently intertwined with the hand of societal change and justice. The combined efforts of all three can be necessary to lead to the progression and advancement of humanity.

Bibliography

Reference Sources:

Cobbs, Elizabeth. "Fighting on Two Fronts: World War One, Women's Suffrage, and John Pershing's 'Hello Girls.'" *South Central Review* 34, no. 3 (November 22, 2017): 31–47. doi:10.1353/scr.2017.0024.

Dowling, Timothy C. *Personal perspectives: World War I*. Santa Barbara, CA: ABC-CLIO; 2006

Dunar, Andrew J. *America in the Teens*. Syracuse, NY: Syracuse University Press, 2016. https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=nlebk&AN=1234671&site=eds-live&scope=site.

[105] "57 Cong. Rec. (Bound) - Senate," *U.S. Government Publishing Office*, February 10, 1919.

[106] "Constitution of the United States - Nineteenth Amendment," *Congress*.

[107] "S. 1641, a Bill to Establish the Women's Army Corps (Women's Armed Services Integration Act), July 16, 1947," *Visit the Capitol*.

Engelman, Ryan. "The Second Industrial Revolution, 1870-1914." *U.S. History Scene*. https://ushistoryscene.com/article/second-industrial-revolution/.
Forestell, Kevin. "The Bessemer Process: What It Is and How It Changed History." *DOZR*. Last modified 2021. https://dozr.com/blog/bessemer-process.
Greenwald, Maurine W. *Women, War, and Work: the impact of World War I on women workers in the United States*. Westport, CN: Greenwood Press, 1980.
Hewitt, Linda L. *Women Marines in World War I*. Washington, DC: History and Museums Division Headquarters, U.S. Marine Corps, 1974.
Howes, Ruth. *Women and the Use of Military Force.* Boulder, CO: L. Rienner Publishers, 1993.
Kaufman, Joyce P. *Women and War: Gender identity and activism in times of conflict*. Sterling, VA: Kumarian Press, 2010.
Kirschbaum, Joseph W. "The 1916 Naval Expansion Act: Planning for a Navy Second to None." Order No. 3311364, The George Washington University, 2008. https://www.proquest.com/dissertations-theses/1916-naval-expansion-act-planning-navy-second/docview/194075947/se-2.
Larzelere, Alex. *The Coast Guard in World War I: an untold story.* Annapolis, MD: Naval Institute Press, 2006.
"Mahan's The Influence of Sea Power upon History: Securing International Markets in the 1890s," *Office of the Historian*, https://history.state.gov/milestones/1866-1898/mahan.
Miller, Kelly. "History of the World War for Human Rights." Washington, D.C, Austin Jenkins Co. Lib. of Congress.
"Nineteenth Amendment." *Constitution Annotated*. https://constitution.congress.gov/browse/amendment-19/.
"Preparedness Movement." *Britannica*. https://www.britannica.com/event/Preparedness-Movement.
"Research Guides: Hello Girls: Topics in Chronicling America: Introduction," *Library of Congress,* https://guides.loc.gov/chronicling-america-hello-girls.
Rowe, David M. "World Economic Expansion and National Security in Pre-World War I Europe." *International Organization* 53, no. 2 (1999): 195–231. http://www.jstor.org/stable/2601388.
"S. 1641, a Bill to Establish the Women's Army Corps (Women's Armed Services Integration Act), July 16, 1947," *Visit the Capitol*. https://www.visitthecapitol.gov/artifact/s-1641-bill-establish-womens-army-corps-and-authorize-enlistment-and-appointment-women.
Sherman, Janann. "'They Either Need These Women or They Do Not': Margaret Chase Smith and the Fight for Regular Status for Women in the Military." *The Journal of Military History* 54, no. 1 (1990): 47–78. https://doi.org/10.2307/1985840.
"The Commonwealth and the First World War." *The National Army Museum*. https://www.nam.ac.uk/explore/commonwealth-and-first-world-war.
Tucker, Spencer and Priscilla Mary Roberts. *World War I: encyclopedia*. Santa Barbara, CA: ABC-CLIO, 2006.
"U.S. Enters the War." *The National World War I Museum and Memorial*. https://www.theworldwar.org/learn/about-wwi/us-enters-war.

Primary Sources:

Government Documents:

Congress. "53 Cong. Rec. (Bound) - July 13, 1916". Government. U.S. Government Publishing Office, July 23, 1916. https://www.govinfo.gov/app/details/GPO-CRECB-1916-pt11-v53/GPO-CRECB-1916-pt11-v53-7

Congress. "56 Cong. Rec. (Bound) - Volume 56, Part 11 (September 21, 1918 to November 21, 1918)". Government. U.S. Government Publishing Office, November 20, 1918. https://www.govinfo.gov/app/details/GPO-CRECB-1918-pt11-v56

Congress. "57 Cong. Rec. (Bound) - Senate: February 10, 1919". Government. U.S. Government Publishing Office, February 10, 1919. https://www.govinfo.gov/app/details/GPO-CRECB-1919-pt3-v57/GPO-CRECB-1919-pt3-v57-15-1

Newspapers:

"Capital Yeomenettes in Farewell." Evening public ledger. [Volume 5] (Philadelphia, PA), August 1, 1919. *Chronicling America: Historic American Newspapers.* Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn83045211/1919-08-01/ed-1/seq-22/.

"How local girls will look as Yeomenettes." East Oregonian: E.O. [Volume 30] (Pendleton, OR), May 4, 1918. *Chronicling America: Historic American Newspapers*. Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn88086023/1918-05-04/ed-1/seq-9/.

"How our disabled veterans are being treated." The New York herald. [Volume 86] (New York, NY), Jan. 15, 1922. *Chronicling America: Historic American Newspapers*. Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn83045774/1922-01-15/ed-1/seq-76/.

"Life had its problems for sailor girls back in 1917" The Wilmington morning star. [Volume 75] (Wilmington, N.C.), Aug. 21, 1942. *Chronicling America: Historic American Newspapers*. Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn78002169/1942-08-21/ed-1/seq-6/.

"Navy's manpower near peak of World War No. 1." Imperial Valley press. [Volume 11] (El Centro, CA), April 1, 1942. *Chronicling America: Historic American Newspapers.* Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn92070146/1942-04-01/ed-1/seq-1/.

"Navy to enlist women." The Hartford herald. (Hartford, KY), Oct. 2, 1918. *Chronicling America: Historic American Newspapers*. Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn84037890/1918-10-02/ed-1/seq-1/.

"Urges hospital for ex-nurses." The Washington times. (Washington D.C.), Jan. 12, 1928. *Chronicling America: Historic American Newspapers*. Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn84026749/1928-01-12/ed-1/seq-11/.

"Yeomenettes honor Edith Cavell." The Challis messenger. (Challis, ID), July 2, 1919. *Chronicling America: Historic American Newspapers.* Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn88056159/1919-07-02/ed-1/seq-6/.

"Yeomenttes' flag for navy building." The Washington times. (Washington D.C.), Sept. 18, 1930. *Chronicling America: Historic American Newspapers*. Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn84026749/1930-09-18/ed-1/seq-3/.

"Yeomenettes to get out of Navy and pretty uniforms." Evening capital and Maryland gazette. (Annapolis, MD), June 2, 1919. *Chronicling America: Historic American Newspapers.* Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn88065726/1919-06-02/ed-1/seq-2/.

"Yeomen (F) to wear white." Evening star. (Washington, D.C.), April 24, 1919. *Chronicling America: Historic American Newspapers*. Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn83045462/1919-04-24/ed-1/seq-3/.

Roosevelt, Eleanor. "*My Day." The Indianapolis times.* [Volume 48] (Indianapolis, ID), March 13, 1936. *Chronicling America: Historic American Newspapers.* Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn82015313/1936-03-13/ed-1/seq-18/.

Stadler, Glen M. *"WAVES duties to be confined to U.S. limits."The Waterbury Democrat*. [volume] (Waterbury, Conn.), 17 Sept. 1942. *Chronicling America: Historic American Newspapers*. Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn82014085/1942-09-17/ed-1/seq-10/.

"30,000 persons welcome the President at Capital Station." The Richmond Virginian. [Volume 10] (Richmond, VA), July 9, 1919. *Chronicling America: Historic American Newspapers.* Lib. of Congress. https://chroniclingamerica.loc.gov/lccn/sn90052005/1919-07-09/ed-1/seq-1/.

Secondary Sources:

Books:

Ebbert, Jean and Marie-Beth Hall. *The First, the Few, the Forgotten: Navy and Marine Corps women in World War I.* Annapolis, MD: Naval Institute Press, 2001.

Emerald M. Archer. 2017. *Women, Warfare, and Representation: American Servicewomen in the Twentieth Century.* War, Culture, and Society. London, N.Y.: Bloomsbury Academic. https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=nlebk&AN=1544909&site=eds-live&scope=site.

Gavin, Lettie. *American Women in World War I: They also served*. Niwot, CO: Univesity Press of Colorado, 1997.

Godson, Susan H. *Serving Proudly: a history of women in the U.S. Navy.* Annapolis, MD: Naval Institute Press, 2001.

Juliette Pattinson. *Women of War: Gender, Modernity and the First Aid Nursing Yeomanry*. Manchester University Press, 2020.

Journal Articles:

Chadwick, Stephen F. "Honor Women's Sacrifice." *The National Legionnaire* [Volume 5] (Indianapolis, IN), April 1939. https://archive.legion.org/node/3990.

Jennifer, Davis McDaid. "'Our Share in the War is no Small One': Virginia Women and World War I." *Virginia Cavalcade* 50, no. 3 (Summer, 2001): 114-123. https://www.proquest.com/trade-journals/our-share-war-is-no-small-one-virginia-women/docview/217281877/se-2.

Miller, Richard E. "The Golden Fourteen, Plus: Black Navy Women in World War One." *Minerva XIII*, no. 3 (Dec 31, 1995): 7. https://www.proquest.com/scholarly-journals/golden-fourteen-plus-black-navy-women-world-war/docview/222784846/se-2.

Patch, Nathaniel. "The Story of the Female Yeomen during the First World War." *Prologue Magazine*, 2006.

"The Yeo-Lady." *The American Legion Weekly*, 1919. https://archive.legion.org/node/1371

"Women in World War I." *Military Women's Bulletin,* 2017. https://gateway.uncg.edu/islandora/object/wvhp%3A23679

Websites:

"A Historical Overview of the Yeomen (F)." *Naval History and Heritage Command,* https://www.history.navy.mil/content/history/nhhc/browse-by-topic/wars-conflicts-and-operations/world-war-i/people/historical-overview-of-yeomen-f.html

Akers, Regina. “Historical Overview of Yeomen (F).” *Naval History and Heritage Command*. www.history.navy.mil/content/history/nhhc/browse-by-topic/wars-conflicts-and-operations/world-war-i/people/historical-overview-of-yeomen-f.html.

Roy A. Mosteller. “Loretta Perfectus Walsh.” *The United States Navy Memorial*. https://navylog.navymemorial.org/walsh-loretta.

Sciacca, Jane. “Yeomen (F) Register to Vote.” *U.S. National Park Service* https://www.nps.gov/articles/000/yeomen-f-register-to-vote.htm#:~:text=During%20United%20States.

Toler, Pamela D. “Not Every Woman Who Served With the U.S. Military During World War I Got the Same Treatment. Here’s Why.” *Time Magazine* (2019). https://time.com/5537784/wwi-us-military-women/.

“Yeoman (F) and Marine Reservists (F).” *Naval History and Heritage Command*. https://www.history.navy.mil/content/history/museums/nmusn/explore/photography/diversity/women-in-the-navy/wwi-womeninthenavy/yeoman-marine-reservists.html.

The Social Construction of Ecstasy

By Nicole Morales
LaGrange College
SOCI 3550: Drugs and Society
Dr. Otto
November 23, 2021

The history of ecstasy dates to 1912. However, this was simply a procedure patent from Merck's scientific laboratory in Germany. Within these original German documents, ecstasy, also known as MDMA, was not referred to as MDMA. "In the patent specification, MDMA appeared only as a chemical formula and in the annual report it was referred to as 'Methylsafrylamin'." (Freudenmann, Öxler, & Bernschneider, 2006). MDMA stands for methylenedioxymethamphetamine and may act as a stimulant, hallucinogen, and/or entactogen (National Institute on Drug Abuse, 2021). When German scientists patented this drug, it was with the intent to perform as a hemostatic drug (Freudenmann, Öxler, & Bernschneider, 2006); that is to "shorten the clotting time of blood" (Miriam-Webster). In 1927, the first pharmacological tests with MDMA were performed at Merck's laboratory, and then in 1952, the first basic toxicological tests with MDMA were performed at Merck's laboratory (Freudenmann, Öxler, & Bernschneider, 2006). In the 1940s, "it was tested as a 'truth drug' by the US Central Intelligence Agency and has also been used to facilitate psychotherapy" (Mosher & Atkins, p. 28, 2021). Mosher and Atkins explain that "in the 1950s and 1960s, treatment with hallucinogenic drugs such as ecstasy was seen to be cutting edge of psychotherapy" (p. 28, 2021). It was not until 1970 that the first detection of MDMA in tablets was seized in the streets of Chicago. Then, it was not until 1984 that MDMA's street name, ecstasy, was coined in California (Freudenmann, Öxler, & Bernschneider, 2006).

Reporters and the government chose to present ecstasy to society in the way of emphasizing how dangerous the drug is and exaggerating its use. John Cloud quotes a Virginia police officer in the 1990s that stated, "It appears that the ecstasy problem will eclipse the crack cocaine problem we experienced in the 1980s" (2000). Ecstasy use was relatively low in the United States before the 1990s. Between 1995 and 2000, the percentage of teenagers using ecstasy doubled from 5% to 10% (Mosher & Atkins, p. 28, 2021). To invoke fear in citizens, the government chose the emphasize the statistics of seizures of ecstasy were increasing; this indicated that ecstasy was no longer a drug used and sold in nightclubs, but more "at high schools, on the street, and even at coffee shops in some cities," (Moshers & Atkins, p. 29, 2021). The US Customs Service claimed that the agency's reports of ecstasy seizures "had increased from 350,000 in 1997 to 3.5 million in 1999, then to 2.9 million in just the first two months of 2000" (Mosher & Atkins, p. 28-29, 2021).

At this point, ecstasy/MDMA was already classified as a Schedule I Drug in the United States Legal Drug Schedules (Drug Enforcement Agency, 2019). This schedule was created through the "Controlled Substances Act, passed as part of the Comprehensive Drug Abuse Prevention and Control Act of 1970" (Mosher & Atkins, p. 92, 2021). However, Ecstasy/MDMA was not added to the schedule until 1985. Within this classification, Schedule I indicates that a "substance has a high potential for abuse, has no medical use in the United States, and has a lack of accepted safety for use under medical supervision" (Mosher & Atkins, p. 92, 2021). By classifying ecstasy/MDMA as a Schedule I drug, despite the fact it was previously used in psychotherapy, it appears to the public that the substance is extremely dangerous.

The mental health community believes that MDMA should still be considered a substance used in psychotherapy as it has the "ability to help mental patients to access painful and heavily guarded emotions" (Mosher & Atkins, p. 112, 2021). Through limited research due to MDMA being a Schedule I drug, the substance has "been found useful in treating depression, addiction, anxiety, eating disorders, and other mental problems" (Mosher & Atkins, p. 112-113, 2021). Research is also believed to reveal MDMA relieving anxiety and pain in end-stage cancer patients, as well as dramatic progress in patients suffering from PTSD. Again, classifying ecstasy as a Schedule I drug implies it has no medical use. This inhibits potentially beneficial research of using MDMA medically, although it could benefit mental health patients in society.

President Nixon coined the term the "War on Drugs" during his presidencies from 1969-1974 and began the war on marijuana and crack cocaine, mainly by invoking fear in citizens of the crime associated with drugs. With any of Nixon's actions to emphasize drug use in the United States, he targeted ethnic groups. When marijuana and crack cocaine were being criminalized, Nixon's advisor, John Ehrlichman, later admitted that by targeting marginalized groups, the government could "arrest their leaders, raid their homes, break up their meetings, and vilify them on the evening news" (13th, DuVernay, 2016). Presidents George Bush, Bill Clinton, and George W. Bush followed this "war" in the 1990s and early 2000s by demonizing ecstasy. Media sources at the time attributed the distribution of ecstasy to some Israelis. For example, a news article from 2000, "In New Battle, Use of Ecstasy Among Young Soars", claims that "for the most part, Israeli organized-crime syndicates have been implicated as the main source of the distribution of the drugs in the United States" (Hernandez). This same article elaborates to say that ecstasy had been "largely manufactured in laboratories in Belgium and the Netherlands, where it is sold for as little as 50 cents, and then smuggled into the United States" (Hernandez, 2000).

Another misconception of ecstasy/MDMA that has altered how society views it is incorrect research of how the drug causes permanent brain damage. One research project conducted by George Ricaurte at John Hopkins University explored the effects of ecstasy and claimed that "Nonhuman Primates exposed to several sequential doses of MDMA, a regimen modeled after one used by humans, developed severe brain dopaminergic neurotoxicity, in addition to less pronounced serotonergic neurotoxicity" (Ricaurte, et. al, 2002). During this experiment, the researchers accidentally injected the primates with methamphetamine, and later retracted their original research that was published in *Science*. However, other well-known journals such as the *European Journal of Pharmacology* and *Experimental Therapeutics,* that published this research never retracted this "evidence". The fear invoked into citizens of the permanent brain damage that "ecstasy" can cause lingered.

The threat of death that also surrounds ecstasy/MDMA is less than the media presents to society. Research shows that the causal relationship between ecstasy use, and death is not well established. Studies conducted in New York, the United States, Canada, and Britain revealed that deaths originally attributed to ecstasy use exposed the use of other drugs in the corpses' systems; few deaths were only due to ecstasy use (Mosher & Atkins, p. 29, 2021). Furthermore, ecstasy pills typically contain more dangerous drugs, such as methamphetamine, ketamine, PCP, caffeine, cocaine, over-the-counter drugs, and dextromethorphan (DXM). The presence and potency of these other substances attribute ecstasy to deaths that were not due to pure ecstasy/MDMA (Mosher & Atkins, p. 32, 2021). The incorrect death statistics attributed to ecstasy/MDMA influence society's construction of this substance.

Within society, ecstasy became common at raves (dance parties) in the late 1990s and early 2000s (Mosher &Atkins, p. 28, 2021). A journal article, "Targeting Ecstasy Use at Raves"

published in *Virginia Law Review*, focuses on how law enforcement has been able to arrest property managers or operators of raves have been arrested due to knowing that people are engaging in drug activity, known as the "Crack House Statute" (Dore, p. 1583-1584, 2002). This statute was passed in October 1986 in response to the crack cocaine epidemic in the 1980s. Raves are viewed as the heart of the electronic music scene. Pacifiers are commonly worn around the necks of people attending raves. Rave attendees claim that pacifiers "express a desire to not let go of childhood and to remain young and carefree" (Dore, p. 1583, 2002). On the contrary, law enforcement emphasized that the pacifiers are paraphernalia because they "heighten ecstasy's psychedelic effects or make its side effects, like teeth-grinding, less bothersome" (Dore, p. 1584, 2002). Law enforcement even goes as far as to claim that glowsticks are paraphernalia because they "enhance the visual stimulation brought on by ecstasy" (Dore, p. 1584, 2002). Rave attendees claim that glowsticks are a performance element. Government officials also employ civil asset forfeiture to have a property owner forfeit their property if they know of drug use on the property. These legal weapons of prosecutors could eliminate raves, rather than eliminate drugs from raves. However, targeting raves in this way appears to the public as ecstasy being a club and party drug, creating a negative stigma and perception.

In conclusion, the social construction of ecstasy has been influenced throughout the drug's 109-year history. This has been done through the government's presentation of statistics related to the prevalence of ecstasy in the United States and attributing ecstasy smuggling to a minority group, as well as classifying the drug as a Schedule I drug, despite its potential beneficial use within the mental health community. The misconceptions in research attributing ecstasy/MDMA to permanent brain damage and death have also caused the substance to appear more dangerous to society. The criminalization through lawmakers of ecstasy/MDMA at raves promotes the idea to society that the drug is simply a party drug. The media's presentation that ecstasy is a dangerous drug targeted for use by young people also causes the drug to appear more dangerous to society, especially parents. These presentations and misconceptions of ecstasy/MDMA have subsequently caused a negative impression on society of the substance, ignoring the medicinal use and purpose that the substance could have.

References

Cloud, J. (2000). *The Lure of Ecstasy*. TIME.com. https://content.time.com/time/magazine/article/0,9171,46162-1,00.html

Dore, M. H. (2002). "Targeting ecstasy use at raves." *Virginia Law Review*, *88* (7), 1583-1623. https://doi.org/10.2307/1073992

Drug Enforcement Agency. (2019). *Controlled Substances- Alphabetical Order*. https://www.deadiversion.usdoj.gov/schedules/orangebook/c_cs_alpha.pdf

DuVernay, A. (Director). (2016). *13th*.

Freudenmann, R. W., Öxler, F., & Bernschneider-Reif, S. (2006). "The origin of MDMA (ecstasy) revisited: The true story reconstructed from the original documents." *Addiction*, *101*(9), 1241-1245. https://doi.org/10.1111/j.1360-0443.2006.01511.x

Hernandez, R. (2000, August 2). "*In new drug battle, use of ecstasy among young soars." The New York Times*. https://archive.nytimes.com/www.nytimes.com/library/national/080200drug-seizure.html

Merriam-Webster Dictionary (n.d.) Definition of Hemostatic. https://www.merriam-webster.com/dictionary/hemostatic

Mosher, C. J., & Akins, S. (2021). *Drugs and drug policy: The control of consciousness alteration* (3rd ed.). Sage Publications.

National Institute on Drug Abuse. (2021). *What is MDMA?* April 13. https://www.drugabuse.gov/publications/research-reports/mdma-ecstasy-abuse/what-mdma

Ricaurte, G. A., Yuan, J., Hatzidimitriou, G., Cord, B. J., & McCann, U. D. (2002). "Severe Dopaminergic neurotoxicity in primates after a common recreational dose regimen of MDMA ("Ecstasy")." *Science*, *297*(5590), 2260-2263. https://doi.org/10.1126/science.1074501