2022

Public Health and Civic Engagement

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ABSTRACT

PUBLIC HEALTH AND CIVIC ENGAGEMENT

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Northern Illinois University, 2022
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The research seeks to answer the question does civic engagement affect public health outcomes. Scholars have been theorizing and testing various ideas in this field for some time. Yet, much of the work is general in nature and does not look into a specific argument regarding a causal relationship between civic engagement and public health. A Cost of Voting Index (COVI) with state specific values is used as a measure of civic engagement in this study. The thesis draws from individual-level survey data from the Center for Disease Control and Prevention (CDC) with respondents from all 50 American states. This is complimented by an aggregate-level analysis, which uses data supplied by the American Health Rankings (AHR) group who assign a public health score for each of the 50 American States. Each method is used to test the effect the COVI has on public health outcomes. The results of the research show that the COVI, a proxy for competent civic engagement, helps to explain variance in public health outcomes. Most specifically the easier it is to vote in a specific state the better the overall health is in that state. The results hold up using both the individual and aggregate levels of analyses.

NORTHERN ILLINOIS UNIVERSITY
DEKALB, ILLINOIS

AUGUST 2022

PUBLIC HEALTH AND CIVIC ENGAGEMENT

BY

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A THESIS SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

MASTER OF ARTS

DEPARTMENT OF POLITICAL SCIENCE

Thesis Director:
Scot Schraufnagel

ACKNOWLEDGEMENTS

Over the past few months there have many individuals who have helped me along the way with this project and other matters. First, I want to thank the chair of my committee, Dr Schraufnagel. He has been a big mentor to me over the past couple of years of graduate school and it has been a pleasure working on this research with him. His help has been invaluable to me. I also want to thank my other committee members, Dr Thurber and Dr. Swedlow. Dr. Thurber has also been a great mentor to me over the past few years here at NIU and I cannot thank him enough. Dr. Swedlow helped me at the beginning of my graduate school journey, and I learned so much from him. The whole department of Political Science has helped me in one way or another as well as did my various colleagues. The people I have met and learned from along the way have been incredible. Lifelong friendships and partnerships were formed which will help me continue on my life journey. The knowledge I learned through this research will be invaluable to me going forward and I just cannot thank everyone enough.

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CHAPTER 1

INTRODUCTION/THEORY

In the midst of a global pandemic, the study of public health is among the most common research topics in a variety of academic disciplines. Public health research is a salient topic in a variety of disciplines and there are often significant policy implications. Much of this research grapples with important questions and at a time when the need for answers is more obvious than ever. People want to know how to improve public health and the causes of poor public health outcomes. Figuring out what determines variation in public health outcomes has become a paramount objective of the scientific community. The social sciences are no strangers to studying policy driven topics and this research falls in that vein. I conduct this research in the spirit of trying to uncover systematic causes for variations in public health outcomes across the United States of America. This is political science research, which considers, specifically, whether democratic inclusion and civic participation can affect public health outcomes. I use the American states as my laboratory to seek to determine whether variation in the restrictive quality of state election laws affects public health. The premise of this research is that a more engaged citizenry will be a better informed and more conscious of public health risks, which is turn will lead to healthier communities, on average.

Previous conducted research has uncovered a connection between competent civic engagement and public health (Besley and Kudamatsu 2006; Franco et al. 2004; Hastings 1919; Krieger 1990; Nazari and Obydenkova 2021; Roessler and Schmitt 2021; Templin et al. 2021).

These works use a variety of different contexts, to uncover a relationship between the democratic process and healthy communities. There is often a debate about purported public health outcomes (Capshaw 2005; Ross 2006; Wang, Mechkova, and Andersson 2019; Wullert and Williamson 2016; Nazari and Anastassia 2021). Other researchers are concerned with the policy implications as well as impact on society (Besley and Kudamatsu 2006) and many others are concerned with measurement strategies (Ceka and Magalh˜aes 2020 385, 389-391; Persson and Povitkina 2017 837-38; Coppedge et al. 2011; Egorov, Guriev, and Sonin 2009, 655; Carnegie and Marinov 2017, 676). Still more, concerns focus on the plausibility of civic engagement's direct link to public health outcomes and how to operationalize "civic engagement" (Krieger 1990; Ortiz-Ospina 2019; Besley and Kudamatsu 2006; Capshaw 2005).

To capture democratic inclusion this research will make use of a newly developed measure of the relative cost of voting in the American states. Specifically, I use the Cost of Voting Index (COVI) created by Li, Pomante, and Schraufnagel (2018; see also Schraufnagel, Pomante, Li 2020) which taps what these authors refer to as the electoral-institutional climate of each American states (Li, Pomante, and Schraufnagel 2018). Most specifically, the COVI is an indicator of the relative ease, or difficulty, of voting in each of the states. Fortunately, there are values available going back to 1996, which creates a considerable amount of leverage as I tackle the question, can COVI values be used, effectively, to elucidate public health outcomes.

The purported connection is important to study as it provides a clear real-world opportunity to create a system of better public health outcomes. If we learn that a more engaged citizenry is a significant predictor of public health, there is something we can do to try to remedy the situation. If a substantial significant relationship is uncovered, this could go a long way toward helping societies develop public policies that will improve health systems. These

improvements maybe relevant in the United States, but also in countries around the world that need to improve their public health systems. The intention of the COVI values is to capture the level of electoral civic engagement or the inclusivity of each state's electoral climate. The COVI does a good job of capturing a myriad of different state laws and policies with the potential to dissuade or encourage citizen engagement in the political process. The voting process is a key component of competent civic engagement (Miller 2015; Doorenspleet 2015; Roos 1997; Lappin 2009). Scholars, argue that without inclusive and competent elections, a country is not a democracy (Becker 1998; Blank 2005; Przeworski 2005; Hyde and Marinov 2014).

This thesis uses data from multiple well-established sources to evaluate my theory using both an individual and a state-level analysis. I discuss the individual-level data in Chapter 2 while the aggregate-level data will be discussed in Chapter 3. The individual-level data relies on *The Behavioral Risk Factor Surveillance System* (BRFSS), which is a data set gathered by the Center for Disease Control and Prevention (CDC).[1] The aggregate data is gathered from the America's Health Rankings (AHR) group, which is a part of the United Health Foundation (UHF).[2]

Legislators in different countries, and subunits within countries, write laws and rule in a manner that results in various levels of democratic inclusion or civic engagement. Put another way, some political units are more likely to incorporate policies consistent with participatory civic engagement while others maintain a more restrictive political-institutional setting. This variation occurs when countries, or their subunits, institute laws and establish rules that either encourage or discourage political involvement. The reason some political units wish to restrict

[1] See https://www.cdc.gov/brfss/annual_data/annual_2020.html (last accessed 5/17/2022).
[2] See https://www.americashealthrankings.org/explore/annual (last accessed 5/22/2022).

public engagement is beyond the scope of this research. I simply recognize that variation exists and wish to learn more about the consequences of these disparities.

The health of the overall population is crucial to the effective operation of any society. There is a little more important than the health of the people. Throughout our history we have been witnesses to dangerous and threatening pandemics, thus it is vital to understand what policies can effectively address these situations. Without good public health many parts of society breakdown as was evident with the recent Covid-19 global pandemic. We witnessed societies almost grind to a standstill, in a matter of days, all around the world because of public health concerns. Countless numbers of people died in 2020-22, and death tolls continue to climb. If there is a way to better understand variations in public health outcomes this must be explored. If better quality civic engagement can improve our public health the vagaries of this must be understood.

It is important to discuss the unit of analysis as well. The American states are an incredible petri dish, creating opportunities for comparative study. The United States has 50 different electoral systems, yet all are contained within the same nation and basic institutional arrangements like separation of powers and multi-level policing, which are constant across the American states. Each state has the ability to adjust their own laws related to election administration, or the inclusiveness of the electoral process, which makes the COVI an excellent surrogate for civic engagement. The 50 American states also bring a big disparity in public health outcomes , which makes them an excellent unit of analysis for scientific study. Moreover, the nature of this analysis is likely applicable to other nations around the world, especially democracies.

This thesis will provide evidence that levels of democratic inclusion are affecting public health outcomes. This thesis represents a novel approach. Similar studies have touched upon civic engagement and the effect it has on health (Besley and Kudamatsu 2006; Franco et al. 2004; Hastings 1919; Krieger 1990; Nazarov and Obydenkova 2021; Roessler and Schmitt 2021; Templin et al. 2021) but not to the extent offered here. Moreover, the studies listed above do not have a sole focus on the connection between civic engagement and public health. My research is novel, also, because I am studying the modern period, with data from 2020 being used. The COVI values and the Public Health Outcome values change from year to year so putting the focus on the most recent period is crucial to getting accurate results for the contemporary era and for contemporaneous policy prescriptions.

Specifically, I want to assess whether American states that make elections more accessible through policies such as automatic and same day voter registration, non-strict voter ID requirements, felon re-enfranchisement and mail voting options enjoy higher levels of civic engagement and better public health outcomes. Note in the preceding sentence, I have made "civic engagement" a link in the causal chain between the COVI and public health. I see participation, including voter turnout, as evidence of civic engagement of the type that causes the public to be more informed, more active, and consequently healthier. Conversely, it may be said that communities, which face significant barriers to voting, higher costs in terms of time and energy required, will have lower voter turnout and experience worse overall health outcomes. My argument uses the premise that a lack of socio-political inclusion reduces a sense of belonging, the level of public engagement, and creates a less informed body politic. These factors, in turn, lead to greater isolation, more ignorance, and a failure to access health resources.

Besides these arguments, there are other possible links between civic engagement and health, both direct and indirect. Considering direct links, in the American states it is common for people to vote on ballot initiatives that affect public health, such as Medicaid expansion and clean air laws. Moreover, candidates for public office routinely make public health part of their campaign messaging because it is among the top issues voters care about. However, the link between civic engagement and public health outcomes can also be indirect. For instance, when we fill out our Census forms, we help determine how much funding our communities get for transportation, housing, and health services. Also, how many representatives we get in the national, state, and local legislatures. These direct and indirect factors complement my primary thesis that higher levels of civic participation promote community connections, improve neighborhood cohesion, and community resilience (see especially Nelson, Sloan, and Chandra 2019). Positive health outcomes should follow.

The introduction thus far has discussed various topics from the importance of public health to discussing the cost of voting index, yet it is important to describe where this project takes place in the greater scheme. There are three different areas that help explain public health. These three areas are cultural, demographic and political reasons.

First, it is important to discuss the cultural reasons. Daniel Elazar created a way of measuring state culture which labels each of the 50 American states a specific type of culture which are individualistic, moralistic, and traditionalistic (Johnson 1976). These variables will be discussed in depth in the aggregate level section as it is included as an antecedent variable in that level of analysis. The inclusion of those variables is discussed in depth there but in brief it is what is believed to be an explainer for the electoral institutional climate of the American states, and this helps explain public health.

Cultural reasons do have potential to help explain the electoral institutional climate. While it is including accurate level of analysis to help control for that it is still importance to describe why culture is another potential explanation for health. Culture might be an idea that explains everything ,for example, culture may explain how states operate in their electoral institutional climate thus would end up affecting health as well as the cost of voting index. Culture has a place as an alternate explanation for health and is discussed throughout this work.

Second, the demographic reasons also do help explain public health. This can include reasons such as area (National Civic League Staff 2019), race (Dressler, Oths, and Gravlee 2005; Hummer et al. 1999) and age (Kahana and Kahana 1982). The variables of race and age are elaborated on in both of the levels of analysis and shows real importance of predicting health while area is not discussed further in this research as it is baseline included with state information.

Demographics play a massive role in explaining health. The literature review sections of both levels of analysis go into detail on explaining how various different demographic variables help explain health. It is important to note that in this case it is being used as a control variable but very well could be an alternate explanation entirely when it comes to explaining health. For example, race comes up often as a major player in explanations for health thus it is important to describe that it has the potential of being a large alternate explanation for the results of this research.

Finally, there is the political reasons which is the focus of this research. The cost of voting is being used as a political explainer for public health. The cost of voting index (COVI) Is being used as an explainer here for public health as priorities have shown that the cost of voting is a viable measure for political explanation (Li, Pomante, and Schraufnagel 2018). this is the

center of this piece as this research will show that the COVI does have an effect on public health and is a good measure of political explanations.

While the COVI is intended to explain the political causes for public health it is important to describe how that process works. The cost of voting is meant to explain the electoral institutional climate. The electoral institutional climate is the word to explain the situation going on in the various states or the nation of elections. This encompasses the idea of what makes elections happen and the various different components that make up the entire system. The research here intends to show that the COVI is an explainer for the electoral institutional climate. That is the first step that this research intends to show by explaining what the COVI is and what it explains. It is important to note that the research shows that education and income are on a similar level when it comes to explaining electoral institutional climate thus was born to control for those variables.

The next step of the causal mechanic would be that the cost of voting index explains the quantity and quality of information received by an individual. For example, the information could take form in how much information on a specific candidate was received based on the voter laws or who is able to run in the election. This will be discussed in depth after the results of the research, and it will show why the COVI explains information. The final step is public health. Information leads to public health which the information was influenced by the COVI. to describe this is best as if an individual has more information about a certain topic which improves health thus the more available information from the lower cost of voting gave the individual a better lifestyle choice which in turn improves health. This analogy also works for the state level as if you combine various individuals, you will get an aggregate level of information which can lead to an accurate level increase or decrease in health.

The paper asks two simple questions. Does the COVI value affect public health at the individual as well as at an aggregate level of analysis? Chapter 2 will address whether state specific COVI values affect the health outcomes of individuals. The COVI values are used as a predictor of responses on the CDC survey regarding personnel perception of health. Specifically, I hypothesize the lower the COVI value the better the public health outcomes will be. The empirical analysis at the individual level will test this proposition.

Second, does the COVI value affect public health outcomes at the aggregate level. Now state COVI values will be used to predict values on the AHR provided by UHF. Specifically, I hypothesize the lower the state COVI value the higher the Z-Score of the AHR composite score will be. The individual (Chapter 2) and aggregate (Chapter 3) analyses are in their own chapter and both hypotheses and will be discussed at greater length there.

Moving forward in this project, I will provide the academic foundation this thesis builds on. There is quite a bit of literature that discusses the various variables related to variation in public health outcomes. The literature review will be divided into three different sections; the literature on public health and measurement, literature on civic engagement and its connections to public health, and research, which exposes the various alternative explanations for public health outcomes. This will be repeated for both Chapters 2 and 3, which have distinct levels of analysis to review. The other considerations uncovered in the review of literature, ostensibly, become the control variables I will incorporate in the modeling.

Following the discussion of the academic foundation, the thesis focuses on my own measurement strategies and will introduce the reader to the statistical methods I employ to conduct the tests. Included in these sections will be a discussion of precisely how each of the different variables being considered are measured. The default is to use multiple measures of the

same concept as a robustness check on the construct validity of my findings. The methods section in each chapter will also make clear the two different approaches I will take to testing the relationship between civic engagement and public health. The final chapter (Chapter 4) will present a summation of my results, discuss my findings, and point to avenues for further research. The thesis will also include a reference section and various appendices, which will include information on measurement as well as several extra model runs and graphs that will serve as robustness checks on the ones, which will be included in the thesis itself.

CHAPTER 2

INDIVIDUAL-LEVEL ANALYSIS

The past decades have seen an increase in the number of projects that focus on public health and its relationship to politics. This increase in public health research is a key part of the future of the discipline of political science. Public health is more salient, politically, than ever with the onset of the COVID-19 global pandemic. For much of the time, research on public health, in political science, was focused on variation in political bureaucracies and the impact this has on public health (Miller, Halverson, and Mays 1997; Franco et al. 2004; Hastings 1919). Unfortunately, in some of this work public health becomes almost a secondary consideration.

This chapter focuses on an individual level of analysis. I will go over the academic foundations and the research design for the analysis. The analysis uses individual surveys completed by people who lived in each of the 50 American states. This level of analysis is used to determine whether the cost of voting affects the people's own perceptions of their health and wellbeing. This level of analysis differs from the aggregate level of analysis in a few key areas. Among the biggest difference is the different control variables employed. For example, using an individual level of analysis I focus on whether the respondent is a college graduate at both levels of analysis. I theorize that a college education will affect health at both levels of analysis thus it is appropriate measure of state educational attainment and should better predict a state-level public health outcome.

Academic Foundations (Individual)

Public health research in political science has been growing but lacking in several vital areas. Interestingly, research has sometimes used public health as the explainer for various political outcomes (Burkle 2006; Hammer, Aiyar, and Samji 2007; Darrow 2015). That is, public health is found to influence how nations function as well as how political processes are conducted (Burkle 2006; Ghobarah, Huth, and Russett 2004). The intent with this research is to show that the causal arrow can go the other way. Here, I intend to explain what determines public health outcomes on the individual level with a specific focus on democratic inclusion as the key predictor variable.

Public health is not often measured the same way by everyone. It is widely understood that public health outcomes vary by political unit (Pacheco and Fletcher 2015; Burkle 2006; Hero and Tolbert 1996; Wullert and Williamson 2016). For instance, in the United States, some states have higher infant mortality rates than others (Hale 1990). Others find the overall health of citizens in the American states varies considerably (Blakely, Kennedy, and Kawachi. 2001; Zhu and Clark 2015; Mayer, Kenter, and Morris 2015). These studies all show that public health is commonly studied but all vary from one another in their findings. For instance, Mayer et al. (2015) find that partisan effects on public health do not affect policy choices while Zhu and Clark (2015) find that Democratic control of a state does affect how policy choices are made. This research intends to be more grounded, and generalizable.

Public health is one of the most essential aspects explaining the quality of life in any society. It is often one of the first items discussed when it comes to understanding how well a country is doing. In democratic political systems, political operatives should care about the needs of the overall public. Research on the topic on measurement strategies is extensive with a good portion of it focused on self-reporting health surveys (Boardman 2006; Garbarski 2016; Kind

and Gudex 1994; Klomp and de Haan 2010; Pacheco and Fletcher 2015; Palloni and Guend 2005). With this research, I will employ a similar tactic to learn whether democratic institutional inclusion associates with self-reported health.

The specific gap this research intends to fill deals with the role of civic engagement. Inclusive civic engagement has not been considered to the fullest extent possible, when explaining public health outcomes; however, various researchers continue to grapple with the question (Ross 2006; Wang, Mechkova, and Andersson 2019; Wullert and Williamson 2016; Nazarov and Anastassia 2021). civic engagement as a tool to measure public health outcomes is what is unique about this research. With the use of the COVI, the research is intending to show there is a case to be made that democratic principles, electoral participation in this case, can explain variation in public health outcomes. To be certain, there are studies that show connections between ample democratic processes and public health (Capshaw 2005), but these often lack a real explanation for how civic engagement affects public health outcomes.

Quite a few studies discuss civic engagement and public health at the individual level (Ross 2006; Wang, Mechkova, and Andersson 2019; Wullert and Williamson 2016; Nazarov and Anastassia 2021) without testing for a causal relationship. In this case, the research will show that civic engagement explains individual perception of their health and wellbeing. There is also issues left unsettled as it relates to the measurement of civic engagement and public health. Scoring countries on the quality of civic engagement, using various indices, is commonplace in the political science literature (Ceka and Magalh˜aes 2020; Persson and Povitkina 2017; Coppedge et al. 2011; Egorov, Guriev, and Sonin 2009; Carnegie and Marinov 2017). A few have kept score and assign values to the American states (Li, Pomante, Schraufnagel 2018). It has been well established, for instance, that the electoral-institutional climate of the 50 American

states varies both between states and within states over time. Some American states adopt a more inclusive posture while others are more restricting. This is the basis of the civic engagement being discussed in this work and has not been covered by anyone else in this manner other than Li, Pomante, and Schraufnagel (2018).

The studies that are out there on civic engagement and public health generally find that civic engagement promotes health (Krieger 1990; Ortiz-Ospina 2019; Capshaw 2005). While this is generally the case, there are studies that are also more inconclusive on the matter (Besley and Kudamatsu 2006). Specifically, I wish to learn whether when any political unit, or in my case an American state, embraces a more inclusive democratic posture, will this result in better public health outcomes? Others have discussed the theoretical link (Ross 2006; Wang, Mechkova, and Andersson 2019; Wullert and Williamson 2016; Nazarov and Anastassia 2021). For instance, scholars argue that when civic engagement is weak, social cohesion goes down, and public health suffers (Capshaw 2005). Still others argue that there is not copious amount of evidence that connects civic engagement and public health outcomes (Besley and Kudamatsu 2006). This research intends to extensively explore the possibility of a strong positive association between the quality of civic engagement and better public health outcomes.

I also investigate other matters that might help explain public health outcomes. Researchers are quick to recognize that disparities in state educational attainment and state wealth or income can explain considerable variation in public health outcomes. It is crucial to discusses these other purposed links and hold these considerations constant to ensure I am conducting a true test of the relationship between democratic inclusion and public health.

One of the most formidable aspects of research on public health has been its connections to income and education at an individual level of analysis. Income is often described as a major

contributor to health (Kifmann 2005; Ghobarah, Huth, and Russett 2004; Hoddie and Smith 2009; Torras 2005). Research, however, is not often consistent and the relationship tends to vary by geographical location and time. Large portions of the literature which compares cross-national differences in public health outcomes focuses on income inequality (Kifmann 2005; Ghobarah, Huth, and Russett 2004; Hoddie and Smith 2009; Torras 2005), which is commonly measured using the Gini Index. The Gini Index, specifically, taps income inequality in a simple straightforward way. The Gini Index is a summary measure of inequality that has been used to explain electoral turnout across income groups (Mahler, Jesuit, and Paradowski 2014).

Education is also a focal point of previous research and a connection to public health is routinely uncovered. Generally, it is shown that better educated individuals, and communities, are healthier (Hahn and Truman 2015; Ross and Wu 1995). In this research, I will need to control for education at both the aggregate and individual levels of analysis. The individual level of analysis uses a college graduate variable. The connection between education and health should not be underplayed here. The amount of research done on this is what makes this exploration possible especially the ones that show that there is a connection between the two considerations. The research between civic engagement and health would be nothing without the analysis that has been done on education and public health.

There are also numerous studies that show there is a connection between race and public health with the main findings showing that American states with higher Black populations have worse public health outcomes (Dressler, Oths, and Gravlee 2005; Hummer et al. 1999). It is essential that this research controls for race considerations at the individual level, as well.

Research Design (Individual)

The measure of health uses survey research from the Centers for Disease Control and Prevention (CDC), conducted in 2020, which measures a person's overall health and a host of other questions related to health. The data set is called The Behavioral Risk Factor Surveillance System (BRFSS) and is considered the premier health-related survey in the United States. It covers all 50 American States as well as three US territories (District of Colombia, Guam, and Puerto Rico). While it covers these territories I am just using the 50 American States in the testing which follows. The BRFSS is the largest survey conducted in the United States and regularly gets over 400,000 respondents. The 2020 version of the data, which is being used in the individual level of this project, has 401,958 recorded interviews, although some of the cases will be lost in the testing because of non-responses on key questions. All of the variables used in this project, besides state COVI values, are taken from this dataset.

The individual-level data uses two main dependent variables. The first being *Sick Days per Month* which is a measure from the BRFSS that asks the respondent: "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?" (CDC 2020). This measure shows how many days the respondent claims to be unhealthy in the last 30 days, and the summary results are reported in Table 1. This as a measure of health is a way of understanding how the respondent is doing health wise in the span of the last month. Learning how one feels at the moment is immensely helpful but looking at a person's health over a span of a month is perhaps more generalizable. The variable is measured in days from 0 to 30.

The other dependent variable used is a consideration of *Good Health*, which is based on the question, "Would you say that in general your health is . . ." and the respondent is asked to complete the sentence (CDC 2020). Specifically, I use the responses "Excellent" and "Very

Good" as a consideration of Good Health and score these respondents "1." Those who respond "Good," "Fair" and "Poor" I score "0." The "Don't know/Not Sure" and "Refused" were made blank and these cases are omitted from the analysis. This is another good measure of health as it asked the respondent how their health is currently using a scale of options. This is a more limited variable, than the sick days, but still an important way of looking at someone's health. If they are to be believed then this data is a clever way of looking at a large section of the population and seeing how they are doing health wise. It really helps that the survey asks and records the American state the respondent resides in, which provides an opportunity to compare the amount of people who are healthy in one state versus other states. Table 1. shows the displays the mean and standard deviation of this and all other variables used in the modeling.

The Key Explanatory variable in this work as discussed, in the introduction and the academic foundation, is the *Cost of Voting Index* (COVI) (Schraufnagel, Pomante, Li 2020). The COVI is a collection of 33 institutional arrangements, state laws, which potentially influence the cost of voting in the United States, which was first reported by Li, Pomante and Schraufnagel (2018). There are initially six main issue areas in the index, and this grows to nine issue areas by 2020, which help us understand state variance in democratic inclusion across the 50 states. The initial six issue areas are the Registration Deadline, Voter Registration Restrictions, Preregistration Laws, Voting Inconvenience Laws, Voter ID Laws, Poll Hours. The researchers then add Registration Drive Restrictions, in 2016, Early Voting Days, and Automatic Voter registration in 2020. These nine key issue areas cover the various different ways that voting laws can affect the time, hassle, and energy associated with voting in the American states.

The COVI has values, in 2020, ranging from -2.91 for Oregon to 1.44 in New Hampshire and the descriptive statistics are found in Table 1. The values are based on the nine issue areas

above and are combined to produce one singular index value. The COVI in this work is being used to measure the quality of democratic inclusion. Most directly, the index captures how easy it is to vote in a state and is a reasonable way of understanding how democratic each state's election laws are. Moreover, the measure is an important way of understanding the relative restrictiveness of the electoral-institutional climate in each state or how strict the state is when it comes to ease of voting.

Table 1.

Descriptive Statistics:
Variables Predicting Number of Days per Month Respondent Claims they are Unhealthy

Dependent Variable	Min. Value	Max. Value	Mean	Sand. Dev.
Sick Days per Month	0	30	3.52	8.12
Good Health	0	1	0.55	0.50
Key Explanatory Variable				
Cost of Voting Index	-2.91	1.44	-0.02	0.89
Control Variables				
College Graduate	0	1	0.39	0.49
High Income	0	1	0.35	0.48
Have Health Insurance	0	1	0.92	0.28
Age 65+	0	1	0.34	0.47
Sleep Hours	1	24	7.09	1.46
Unemployed	0	1	0.06	0.24
Black	0	1	0.07	0.26
Hispanic	0	1	0.08	0.27
Obese	0	1	0.68	0.47
n = 311,093				

In defense of the COVI as an indicator of civic engagement it is worth noting that voting is essential to democratic process. Free and fair elections is what makes democracy its own political system. While this paper talks about civic engagement to a great extent it usually means the cost of voting, which is being used as a proxy. The fact that this country has 50 different

electoral systems or ways of conducting elections makes this measure a really effective way of comparing different voting processes and learn how easy or difficult it is for people to vote in various American states. The manner that the COVI is put together represents a strong way of looking at civic engagement as it covers so many different laws and electoral processes throughout the American states. In the analysis that follows I hypothesize that higher COVI values (a higher cost of voting) will associate with poorer public health outcomes and a negative coefficient is expected in the analysis that makes use of survey data.

There are other variables that need to be considered in this project. These are the various variables that I will control for in the modeling. Table 1. can be effectively used as a reference point for all the variables I control for in the individual level of analysis. Perhaps the most important variables tap income and education. These two areas are commonly used as some of the best predictors of health (Kifmann 2005; Ghobarah, Huth, and Russett 2004; Hoddie and Smith 2009; Torras 2005; Hahn and Truman 2015; Ross and Wu 1995). Thus, it was important to control for them.

First up is the *College Graduate* variable. This taps whether the surveyed individual graduated college or not. This is being used to support the hypothesis that the better educated the individual is the more likely they are to be in good health. Various authors, cited above, discuss education and how better educated individuals are healthier (specifically see Kifmann 2005; Ghobarah, Huth, and Russett 2004; Hoddie and Smith 2009; Torras 2005; Hahn and Truman 2015; Ross and Wu 1995). Thus, on the individual level I want to put focus on college level graduates as this level of education should best tap the amount of education required to make better health choices. The specific question is: “What is the highest grade or year of school you completed?” The variable is measured with “1” being “College Graduate.” Other responses,

including “some college or technical school,” “high school graduate,” “some high school,” “elementary,” and “did not attend school” being scored “0.” People who “Refused” are omitted from the analysis.

The next variable being highlighted here is *High Income*. This measures whether or not the respondent has a high income or not with “high” being $75,000 a year or more. The idea is similar to the education variable as it is theorized the higher income individuals will possess the necessary resources to make their health a priority. Income is a key control variable because the connection between income and public health has been studied extensively. The question in the survey: “Is your annual household income from all sources:” “$75,000 or more” and these respondents are scored “1.” Other responses scored “0” include “Less than 10,000”, “Less than 15,000”, “Less than 20,000”, “Less than 25,000”, “Less than 35,000”, “Less than 50,000”, and “Less than 75,000”.

Other control variables are also considered for the models reported in this thesis. The ones I ended up landing on were some of the things that theoretically should affect public health overcomes. The first of these is *Have Health Insurance*. This variable should help explain why some people have better health outcomes than others. Health insurance data is readily available as the question is asked on the survey used for testing. The idea is that respondents with health insurance should be able to access needed health care resources. The survey question is: “Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare, or Indian Health Service?” I score those responding “yes” “1” and all others are scored “0.” I omit “Don’t know/Not sure” and “Refused” responses from the analysis.

The next major control variable I examine is age. The consideration I use is respondents who are *65+* in age. This also would be an effective way, theoretically, to look at what can affect health. Age plays an obvious role. Age is often an important consideration in health and health care studies (Kahana and Kahana 1982). Old age is included in this research as it is essential to note that individuals who are older generally have a greater chance of poor health. It is necessary to control for this as I need to make sure that age is not the confounding my test of the effect of the COVI. The reported age, on the survey used, is in five-year age categories. I score cases "1" if the respondent noted they were "Age 65 to 69", "Age 70 to 74", "Age 75 to 79", and "Age 80 or older." I use "0" for the categories "Age 18 to 24", "Age 25 to 29", "Age 30 to 34", "Age 35-39", "Age 40-44", "Age 45 to 49", "Age 50 to 54", "Age 55 to 59", and "Age 60 to 64". "Don't know/Refused/Missing" responses I omit from the analysis.

The next control variable is *Sleep Hours*. Sleep is a relevant part of health and here it fits with the theoretical arguments being made about healthier lifestyle choices. Those who have better sleep schedules and sleep more are shown to have less health issues thus it is important to control for this (Goosby et al. 2018). This data is also readily available in the BRFSS data set. I measure this variable using the number of hours the respondent sleeps on average every 24 hours. The survey question was "On average, how many hours of sleep do you get in a 24-hour period?" I omit "Don't know/Not sure" and "Refused" responses.

The next control variable captures whether the respondent is *Unemployed*. The face validity of this may not be as obvious, however, if one is unemployed it makes sense that they may struggle with accessing health care resources. This variable is potentially related to the health insurance question and their employment status might explain their lack of health

insurance. Moreover, unemployed persons might not be working because of health issues. Still more, unemployed persons might be in a bad state of mind, which might affect their overall perception of health. The employment status question is: "Are you currently…?" I score respondents "1" if they note "out of work for 1 year or more" and " out of work for less than 1 year." The value "0" captures responses "self-employed," "employed for wages," "a homemaker," "a student," retired," and "unable to work." "Refused" responses are omitted from the analysis.

The next two control variables go together. I have decided to control for race with *Black* and *Hispanic* being the focus in this research. Race often is considered crucial in health research, as was alluded to in the academic foundations, thus it is paramount to control for this. The academic foundation above does go into more detail about the importance of including some race options but having Black and Hispanic is crucial in this circumstance. Black and Hispanic people are the largest minority groups in the 50 American states and studies show that Black and potentially Hispanic individuals are less likely to be in good health (Dressler, Oths, and Gravlee 2005; Hummer et al. 1999).

The Black variable captured here can be found in the race section of the BRFSS survey. The question being used is the imputed "race/ethnicity value."[3] I score respondents "1" if they answer "Black.". The value "0" is used for "White," "Hispanic," "Asian," and "American Indian." The Hispanic variable is measured in a similar fashion. The question being the same as

[3] The BRFSS imputes race/ethnicity if the respondent refused to give a race/ethnicity response. The value of the imputed race/ethnicity is the most common race/ethnicity response for that region of the state.

the Black variable and 1 being scored as “Hispanic.” The value “0”being scored as “White,” “Black,” “Asian” and “American Indian.”

The final control variable being captured is a consideration of whether the respondent is *Obese*. Weight often plays a significant role in health and the BRFSS survey does include a variable for obesity. Obesity is a major factor in explaining health thus may be vital in explaining individuals’ health outcomes. The theory suggests that if an individual is overweight and fits the definition of obese that their overall health will be poorer. The data is readily available in the BRFSS dataset thus made the transition to my original dataset straightforward. The definition of obese in this case is whether or not the individual is over 25 in the Body Mass Index (BMI). The obesity question provides this definition and explains that “Adults who have a body mass index greater than 25.00 [are considered] Overweight or Obese.” Respondents who answered “yes” are scored “1.” Respondents who answered “no” are scored “0”. “Don’t know/Refused/Missing” are omitted from the analysis. Smoking and Alcohol variables were considered but substantial amounts of missing values did not allow me to test for this.

There were other variables that were considered throughout the modeling decision making process but they either were not precise in their measurement approach or had too many missing values. The individual-level analysis results and discussion will appear in Chapter 4, which will explain the key findings. The next section, chapter 3, will discuss the academic foundations and the measurement strategies of the aggregate analysis. Chapter 3 will follow a similar format to this chapter and will start off with an introductory section which will then lead into the academic foundations and the research design.

CHAPTER 3
AGGREGATE LEVEL OF ANALYSIS

The individual level of analysis does lay down a good groundwork for the academic foundations for the aggregate level as well. Many of the concepts crossover thus was the reason why two different levels of analysis were chosen for this project. A big portion of the literature review above does describe that research on health and its connection to civic engagement was mostly focused on the political bureaucracy and why it affected political movements rather than what parts of politics affect public health (Miller, Halverson, and Mays 1997; Franco et al. 2004; Hastings 1919). With public health outcomes more salient than ever it is important to note the literature that proceeds this research, but also what makes this research unique.

This chapter has its focus on the aggregate level of analysis. This chapter will go over the aggregate level for the academic foundations as well as the research design. The aggregate level of analysis puts its area of focus on the United Health foundation's (UHF) America's Health Rankings (AHR). It will be described in more detail in the research design but essentially the rankings use a Z-score created by the foundation to rank the states in order of health outcomes. This level of analysis differs from the individual-level analysis in a few key ways. Most notably, the biggest differences are the variables that are being used and the overall scope of the data. The aggregate level uses state-level, data, solely while the individual-level data used individuals' responses to survey questions. This chapter will start with the academic foundations and will finish off with the research design/measurement strategies at the aggregate level.

Academic Foundations (Aggregate)

Legislators in different countries, and subunits within countries, write laws and rule in a manner that results in various levels of democratic inclusion or civic engagement. Put another way, some political units are more likely to incorporate policies consistent with participatory civic engagement while others maintain a more restrictive political-institutional setting. This variation occurs when countries, or their subunits, institute laws and establish rules that either encourage or discourage political involvement. The reason some political units wish to restrict public engagement is beyond the scope of this research. I simply recognize that variation exists and wish to learn more about the consequences of these disparities. Scoring countries on the quality of civic engagement, using various indices, is commonplace in the political science literature (Ceka and Magalh˜aes. 2020; Persson and Povitkina 2017;Coppedge et al. 2011; Egorov, Guriev, and Sonin 2009; Carnegie and Marinov 2017). A few have kept score and assign values to the American states (Li, Pomante, Schraufnagel 2018). It has been well established, for instance, that the electoral-institutional climate of the 50 American states varies both between states and over time. Copious amounts of American states adopt a more inclusive posture while others are more restricting.

The American states will become my testing ground on the aggregate level, and this research seeks to determine if variation in the opportunity to participate in civic life leads to unequal public health outcomes. It is widely understood that public health outcomes vary by political unit (Pacheco and Fletcher 2015; Burkle 2006; Hero and Tolbert 1996; Wullert and Williamson 2016) For instance, in the United States various states have higher infant mortality rates than others (Hale 1990)Others find the overall health of citizens in the American states varies considerably (Blakely, Kennedy, and Kawachi. 2001; Zhu and Clark 2015; Mayer, Kenter, and Morris 2015).

Quite a few are quick to recognize that disparities in state educational attainment and state wealth or income can explain considerable variation in public health outcomes. Less studied is my hypothesized link between civic health and public health. I wish to learn whether when any political unit, or in my case an American state, embraces a more inclusive democratic posture does this result in better public health outcomes? Others have discussed the theoretical link (Ross 2006;Wang, Mechkova, and Andersson 2019; Wullert and Williamson 2016; Nazarov and Anastassia 2021). For instance, scholars argue that when civic engagement is weak, social cohesion goes down, and public health suffers (Capshaw 2005). Still others argue that there is not substantial evidence that connects civic engagement and public health outcomes (Besley and Kudamatsu 2006). This investigation intends to extensively explore the possibility of a strong positive association between the quality of civic engagement and better public health outcomes.

Overall health and infant mortality are the two dependent variables used. Many authors find that overall health is an important aspect of quality social settings and livable communities (Blakely, Kennedy, and Kawachi. 2001; Zhu and Clark 2015; Mayer, Kenter, and Morris 2015). The overall health measure it is arguably the best for this research as it has been something that has been used before such as the authors list above but as well as setting a standard that is easily replicable across all 50 American states. Measuring health outcomes has not been consistent across many different authors (Pacheco and Fletcher 2015; Burkle 2006; Hero and Tolbert 1996; Wullert and Williamson 2016) thus it is important to have the overall health measure from the United Health Foundation (UHF), which is a measure familiar to many who study public health outcomes.

Overall health is not the only dependent variable for the aggregate analysis. Infant mortality is also being used as a dependent variable as historically it has also been a good

measure of the overall health of communities and countries (Hale 1990; Hero and Tolbert 1996; Veal and Nichols 2017; Caughey and Warshaw 2016). Infant mortality is a good measure of health on a larger scale. Looking at variation in infant mortality rates, on a statewide level, will provide a better idea of what the health is like at the stat-level rather as compared to an individual level of analysis. The research listed above really only includes infant mortality as a secondary consideration. It has almost always been relegated to a smaller portion of the study and rarely a focus of political science research.

The analysis here considers both overall health and infant mortality on the same footing. It is crucial to understand what affects these two pieces of health. While overall health might be the best measure here as it is a newer way of looking at health between the states it is crucial to have a bona fide variable that has been studied at least some before. The research does have some varying ways of looking at infant mortality rates (Hale 1990; Hero and Tolbert 1996; Veal and Nichols 2017; Caughey and Warshaw 2016) it is not pertinent to understand all of these as there are some good sources of information on infant mortality rates (UHF). This is what makes this analysis unique versus the individual level and now I will briefly touch upon the cost of voting here again as not much is different between here and the approach discussed in the previous chapter, but it is important to discuss.

civic engagement and the connection to public health is the gap that this research intends to fill. Researchers have been grappling with the question of inclusive civic engagement when explaining public health outcomes (Ross 2006; Wang, Mechkova, and Andersson 2019; Wullert and Williamson 2016; Nazarov and Anastassia 2021). civic engagement is the tool here that is being used to measure public health outcomes and in this case it is infant mortality rates and overall health. Here, with the use of the COVI, the aggregate analysis will show that there is a

case that civic engagement with the focus on electoral participation can explain public health outcomes on the aggregate level. To be thorough, there are studies that show a simple connection between civic engagement and public health outcomes but lack a real explanation (Capshaw 2005).

There are a solid number of studies that describe the connection between civic engagement and public health (Ross 2006; Wang, Mechkova, and Andersson 2019; Wullert and Williamson 2016; Nazarov and Anastassia 2021) without testing for a causal relationship. There are studies that are out there on civic engagement and public health outcomes, but they generally find that civic engagement promotes better health outcomes (Krieger 1990; Ortiz-Ospina 2019; Capshaw 2005). While this is generally the case, there is research that are also more inconclusive on the matter (Besley and Kudamatsu 2006).

In this case, the research will show that civic engagement explains public health outcomes on the aggregate level. There is also issues left unsettled as it relates to the measurement of civic engagement and public health. As discussed in the individual level literature review there has been issues on measurement of quality of civic engagement. Using indices has been commonplace in the political science literature for quite some time (Ceka and Magalh˜aes. 2020; Persson and Povitkina 2017; Coppedge et al. 2011; Egorov, Guriev, and Sonin 2009; Carnegie and Marinov 2017). the biggest difference here is using the COVI which assigns values to American states using electoral-institutional climate of the 50 American states (Li, Pomante, Schraufnagel 2018).

I also investigate other matters that potentially will affect the aggregate analysis. The possible antecedent variables of culture are discussed. Variables such as education and income were also important on this level of analysis as it is on the individual level. Other things such as

states percentage of Republicans as well as insurance policyholders also all potentially affect overall health and infant mortality rates.

There is the consideration of Daniel Elazar's state culture variables (Johnson 1976). One can imagine that state culture helps to predict both the COVI values and public health outcomes. In other words that the state culture variables is antecedent to the COVI. Culture is one of the more important explainers in society generally. Culture is one of those abstract ideas that helps explain everything and Daniel Elazar does that with his work. He puts each of the 50 American states into a category which would help explain that states' culture. The three types of culture he uses our individualistic, moralistic, and traditionalist. all 50 states fit into one of these three categories, and it is important to include that in this work as it might explain both the COVI and health outcomes.

Similar to the discussion in the individual-level analysis, education and income are vastly important on the aggregate level as well. Income has opsin been described as a major contributor to public health (Kifmann 2005; Ghobarah, Huth, and Russett 2004; Hoddie and Smith 2009; Torras 2005) however, it is not often consistent, and the relationship tends to vary by location and time and period as discussed in chapter 2. Income inequality is often measured using the Gini index which is a summary measure of inequality and measures it in a straightforward way and it can be used when looking at electoral turn out (Mahler, Jesuit, and Paradowski 2014).

Education has often always been a focal point of previous research and has often been discussed when looking at health. The general consensus is that the better educated the individual and community the healthier they are (Hahn and Truman 2015; Ross and Wu 1995). in the aggregate level of analysis, I will be using college level graduates for both individual and aggregate level of analysis as it is a predictor for public health. The research has been done

before this has made this possible but could be expanded upon which is being done here with the connection of education to public health outcomes.

Other than education and income there are some smaller variables that were taken into account. Voter turnout has been one of the more interesting variables in this research as it has been touched upon before when it comes to health (Schur and Kruse 2000) it mostly has been discussed as a smaller portion to other issues (Reitan 2003; Pacheco and Fletcher 2015) thus I want to bring it to the forefront of health more.

Studies show that the political party in power can influence public health outcomes. In the context of the United States, it has been shown that the percentage of Republican Party control of public office in the American states, relates to public health outcomes (Gray, Lowery, Mornogan, and Godwin 2010; Weinstock 2016). Public health funding is another area that was crucial to touch upon. As mentioned in the introduction, civic participation can lead to changes in public health funding based off that civic participation in which in this case is voting (Darrow 2015). The same literature that discusses income inequality and health also discuss the effect of insurance on health as it is important to note that those who are uninsured do affect public health outcomes (Kifmann 2005; Ghobarah, Huth, and Russett 2004; Hoddie and Smith 2009; Torras 2005).

Perville Squire created a measure that would help determine how professional states' legislatures are or in other words the extent to which they are full time bodies (Squire 2007). While there are many works that use a Squire score (Parinandi 2020; Battista 2013) there are not many that touch upon it with the connection to public health and public health policy thus this research intends to contribute in this regard. An area that has not been touched upon has been the connection between electoral climate and health. Electoral climate has been discussed in various

works (Kahn and Kenney 1997; Hall 2001) but the gap that needs to be filled is the connection between the competitiveness of each state's electoral environment and public health. Race is another important factor with overall health and infant mortality and will be controlled for in the models that follow.

Previous scholarship on race show a connection between Black and Hispanic and health outcomes (Dressler, Oths, and Gravlee 2005; Hummer et al. 1999; Hale 1990; Rogers 1984; Frisbie 1994; Forbes et al. 2000) and it is important to bring those into the research here as it may play a role in overall health and infant mortality rates. This research has also noted that Black Americans, on average, experience more health problems than other Americans do. Coming up next is the research design and measurement strategies of these variables that have been discussed in the academic foundations discussion above.

Research Design (Aggregate)

As we learned from the prevailing literature there is not one agreed upon measure for concepts like educational attainment, economic well-being, or democratic inclusivity. Uncertainty surrounding measurement for the purpose of empirical testing is the bedevilment of abundant social science research. This concern is alleviated considerably when scholars assess multiple measures of the same concepts to see if they receive the same answer. I move forward in this vein and present results using more than one measure of each of my key concepts. I wish to make the case that after controlling for a whole host of rival explanations that the *Cost of Voting Index* (COVI) intended to capture the inclusivity of each American state's electoral-institutional climate can predict public health outcomes.

I begin by simply testing whether the COVI is correlated with *Overall Public Health* as defined by America's Health Rankings, a division of United Health Foundation.[4] The group has established scores for each state using factor analysis that includes a host of different indicators of public health. The measurement of Overall Public Health is as follows.

The state health rankings are a composite index of state-level population health measures. Values are the composite Z-score provided by the America's Health Ranking. Each measure is ranked by the states' values, with one being the healthiest value and 50 the least healthy value. If a value is tied they are assigned equal ranks. The states' values for each measure are then normalized into a z-score using the following formula:

$$\text{Z-score} = \frac{\text{State value} - \text{National value}}{\text{Standard deviation of all state values}}$$

The score indicates the number of standard deviations a state value is above or below the value of the entire United States. If a state has the score of zero that means that it has the same overall score of the entire nation. For measures positively associated with health, States with a higher score than 0 are healthier than the average of the nation, whiles states below zero are considered not healthy or negatively healthy compared to the average. To prevent an extreme value from having too much influence on the overall state score, the maximum score for a measure is capped at +/- 2.00.

The state health rankings are the order in which the states are scored based off the measure. A state's overall score is calculated by adding the products of the score for each ranked

[4] https://www.americashealthrankings.org/ Go to "explore data" and "edition year."

measure multiplied by its assigned weight and impact ,whether that is positive or negative, on health. If a state value is not available for a measure in an edition, the value from the prior version of the rankings are used. If no value is available for the prior year, the state's score for the measure is set to zero which is the national average. It is important to note that the rankings are a relative measure of health.

I also evaluate the relationship between the COVI and state *Infant Mortality* rates using the same organization's data.[5] The definition given by the AHR describes infant mortality as deaths of baby is younger than the age of 1. They describe those values as number of infant deaths (before age 1) per 1,000 live births. This will give a value for example the American average is 5.8. Mississippi is the least healthy state with 8.7 and Massachusetts is the healthiest with 3.8. There are various health issues that may lead to such things happening such as low birth weight and premature births.

Infant mortality is one of the best measures used when discussing health outcomes. Based off the examples above it is quite clear that these states also correlate with other health measures such as Mississippi generally being on the low end of various health lists and Massachusetts being towards the top of the list. A key point to make is that the United States is consistently one of the worst countries when it comes to infant mortality among developed countries. this might play a role into why it is such a good measure for the American states as seen in the large disparity between the low end and the high end of the list with the range being around 50,000 deaths. There have also been links to other issues such as race and socioeconomic issues (Singh and Yu 2019) thus makes since to have this be a major dependent variable

[5] https://www.americashealthrankings.org/ Go to "explore data" and "edition year."

Because I have seven different COVI values for each state, representing seven different presidential election years I will have a sample of 350 cases to conduct my tests (50 states * 7 years). The COVI values are for presidential elections years from 1996 to 2020. To honor the possibility of a causal relationship I measure the public health outcomes in the year following each election year. For example, I evaluate the correlation between 1996 COVI values and state Overall Public Health and Infant Mortality in 1997. Table 2. below provides descriptive statistics for all the variables that will be included in the aggregate or state-level models. The table provides the average value and the range of values by exhibiting the minimum and maximum values.

Table 2.

Descriptive Statistics:
Variables Predicting State Overall Health and Infant Mortality Rate

Dependent Variable	Min. Value	Max. Value	Mean	Stnd. Dev.
Overall Health	-1.12	1.20	0.09	0.53
Infant Mortality Rate	3.5	11.7	6.81	1.49
Key Explanatory Variable				
Cost of Voting Index	-2.91	1.77	0	0.75
Control Variables				
College Graduate	18.9	86.8	106.28	9.84
Per Capita Income	4188	78609	39293.26	12536.96
Voter Turnout	40.9	80	60.46	7.61
Percent GOP	7.89	85.56	51	16.74
Public Health Funding	0	50	24.75	14.43
Uninsured	3	24.9	12.79	4.36
Squire Scores	0.03	0.63	0.2	0.12
Contemporaneous	0.01	51.41	16.22	11.27
Black	0.3	37.8	10.22	9.47
Hispanic	0.5	49.3	9.18	9.59
n = 350				

Note in Table 3. below, the strong negative and statistically significant relationship between overall health and the cost of voting. This suggests that when the electoral institutional climate is more restrictive, overall public health suffers. The direction of the relationship changes when I consider infant death. Now, there is a strong, and statistically significant, positive relationship using the American states as my testing ground. As the cost of voting goes up so does infant mortality. These bivariate relationships are revealing, but this sort of analysis is incomplete. There are other factors to consider not the least of which are education and state wealth. Better educated (Hahn and Truman 2015; Ross and Wu 1995) and wealthier citizens (Flavin 2012; Starr 2011) do not get sick as often. If American states with a lower COVI value are the same states that are better educated and wealthier this could explain the bivariate relationships, I have uncovered. To evaluate the possibility that the bivariate associations between state COVI values and the two public health outcomes is spurious it will be necessary, at minimum, to control for state education and income levels.

Table 3.

Bivariate Relationship between the Cost of Voting and Two Public Health Outcomes: The American States from 1996 to 2020

	Overall Public Health	Infant Mortality
Cost of Voting Index	-.51; $p < .00$; $n = 350$	.38; $p < .00$; $n = 350$

Daniel Elazar's culture variables were important to put into this work. While not described in the descriptive statistics it is still important to discuss. Defining culture is a difficult task that Elazar put upon himself to achieve and came up with three different types of culture in The United States (See Johnson 1976 for definitions). In brief, traditionalist states fit in older social order in which the state does not want to move away from, Alabama for example.

Moralistic states seek to better society and promote general welfare, California for example. individualistic states tend to have ideas that lend to help the individual and their ideas, Illinois for example. In the regression run place individualistic and moralistic in the model and I expect positive coefficients because these considerations capture state culture that is, arguably, more progressive than traditionalistic state culture.

When controlling for other factors, believed to influence the dependent variable, in my case public health outcomes, it is wise to explore multiple measures of the same concept to ensure a particular measurement strategy is not causing the relationships I have uncovered. In this instance, I will assess multiple measures of state education and income. Again, I start with a bivariate look. Table 4. below shows the relationship between my two measures of state public health and two indicators of state educational attainment: percent of state residents that have graduated high school and the percent who have graduated college. I believe that college level graduates is, theoretically, the more relevant consideration here as it is a more unique statistic to each state. As seen above in the descriptive statistics the range of graduates goes from 86.8 to 18.9 which is a range of 67.9 thus the disparity and states creates a better measure of impact of education on health.

Table 4.
Bivariate Relationship between Education and Two Public Health Outcomes: The American States from 1996 to 2020

	Overall Public Health	Infant Mortality
% High School Graduates	.42; $p < .00$; $n = 350$	-.47; $p < .00$; $n = 350$
% College Graduates	.39; $p < .00$; $n = 350$	-.36; $p < .00$; $n = 350$

Table 5. below displays the same bivariate relationships I focused on, but now with five distinct measures of state economic well-being. In this instance, I hold that state per capita income is, theoretically, most relevant. This indicator encapsulates countless of the other considerations such as child poverty and median household income. Because unemployment can easily lead to lower health insurance rates and adverse public health outcomes, I also look at this consideration. Last, ample amounts of the literature which compares cross-national differences in public health outcomes focuses on income inequality (Kifmann 2005; Ghobarah, Huth, and Russett 2004; Hoddie and Smith 2009; Torras 2005), which is commonly measured using the GINI Index. The Index, specifically, taps inequality measures in the most simple and straightforward way and is easily companioned with other measures (Mahler, Jesuit, and Paradowski 2014).

Table 5.
Bivariate Relationship between Income Considerations and Two Public Health Outcomes: The American States from 1996 to 2020

	Overall Public Health	Infant Mortality
Per Capita Income	.22; $p < .00$; $n = 350$	-.63; $p < .00$; $n = 350$
% Children in Poverty	-.67; $p < .00$; $n = 350$	.36; $p < .00$; $n = 350$
Median Household Income	.56; $p < .00$; $n = 350$	-.55; $p < .00$; $n = 350$
Annual Unemployment Rate	-.30; $p < .00$; $n = 350$	.04; $p < .49$; $n = 350$
GINI Index (Income Inequality)	-.37; $p < .00$; $n = 350$	.00; $p < .99$; $n = 350$

With the five different income considerations I get my first evidence of why measurement choice is such an important aspect of all research. Considering infant mortality, I find there is no relationship with this public health outcome and either the annual unemployment

rate or the level of income inequality in the state. This does not necessarily mean that these two considerations are not related to infant mortality once other considerations are controlled for.

Note, the two considerations do relate to overall health is the manner expected. It is crucial to note that I will have to settle on a single measure of state educational attainment and a single measure of state economic well-being. The two measures of education are very highly correlated with each other as are the five measures of economic well-being. If multiple measures of the same relevant concept are included in a fully specified model, they tend to cancel each other out and I will obtain statistically insignificant relationships. But the model is simply overloaded in a manner which produces multicollinearity and inflated standard errors. But before I settle on the theoretically most sound measures of education and economic well-being to employ in the full models, I will first evaluate all the different measures with the COVI to determine the resiliency of the relationship between the cost of voting and two different public health outcomes.

There is a special focus on education and income because these two considerations are so central to most of all the previous scholarship that attempts to elucidate public health outcomes. In these tests, I utilize Generalized Least Squares (GLS) regression to account for the fact that I have data arrayed across sections (the 50 American states) and over time (seven presidential election cycles). This methodological strategy accounts for the possibility of autocorrelated errors or residuals. One never assumes, at least in the social sciences, that my models are perfectly complete. There is often residual variation in the dependent variable that your model does not account for, sometimes referred to as error. When data is arrayed across American states one can assume the error from one observation from a particular state will be related to the error for every observation from that state. The residuals are correlated. When these errors are

correlated it makes it seem that the model is more complete than it really is, which creates the possibility of Type I Error or a "false positive." GLS transform the residuals in a manner to cause them to be randomly distributed while preserving the relative value of all the component parts of the statistical model. This provides a more accurate picture of the true relationship between variables and creates a much more robust test of my hypotheses.[6]

I want to assess the role of voter turnout or the percentage of the state voting eligible population that goes to the polls (*% VEP Turnout*) and I check for a partisan effect. Here our expectations are not strong, but in the contemporary era, we know the Republican Party has been somewhat less enthusiastic about social welfare spending and I want to test if this might contribute to state public health outcomes. I simply assess the *% Republican* in each state legislature in the presidential election years I study which is the percentage of state legislators House and Senate combined that are identified as Republican. Data is from the National Council of State legislatures.[7]

In addition, Theory and previous scholarship suggest a whole host of economic, political and public policy considerations, which might easily determine aggregate public health outcomes. Affects that might bring light to this analysis in a manner that will expose the true cause of aggregate public health outcomes. Not the least of these considerations is each state's *Public Funding for Health* and state residents without health insurance (*% Uninsured*). In the first instance, I use United Health Foundation state ranking data to learn the relative level of

[6] The observations overtime is interrupted because I only use data corresponding from each four-year presidential election cycle. These gaps suggest that Generalized Least Squares (GLS) may be unnecessary. However, a visual inspection of residuals when using Ordinary Least Squares suggests there may be autocorrelation present. To provide the best chance of proving ourselves wrong I opt for the more robust tests of statistical significance provided by GLS.

[7] See https://www.ncsl.org/research/about-state-legislatures/partisan-composition.aspx

public health funding in each state. For voter turnout, I use the United States Election Project data.[8]

Up next, I control for legislative professionalism. Here I use the work of Pervill Squire who has devised an indicator that taps the extent to which each state has a fulltime legislative body. Legislators paid a living wage and provided adequate staff to perform their duties might have the time and resources to address public health concerns more completely. The expectation is that states with a higher *Squire Score*, indicating a more professional and fulltime legislature will have better public health outcomes.

Next, the competitiveness of each state's electoral climate (*Electoral Competitiveness*). The competitiveness of the state election climate is measure by looking at the difference in the presidential vote in the state for the candidates from the top two political parties (Democrat and Republican). Specifically, I use the difference in the 2020 presidential election. A larger number indicates that the state electoral climate is less competitive. For instance, Alabama has a value of 25.8 indicating that President Donald Trump won the state easily and there is a less competitive electoral climate. On the other hand, President Joe Biden wins Arizona by only 0.3 percent of the vote suggesting the state has a much more competitive electoral climate. If what I have been arguing about civic engagement is correct, a more competitive electoral climate should result in more engagement and better public health. In the regression analyses, I anticipate a negative association with overall health and a positive association with infant mortality.

Lastly, I discuss race with the aggregate level of analysis. For the aggregate level of analysis, Black and Hispanic it is being used as well. For this level of analysis, it is being

[8] See http://www.electproject.org/home/voter-turnout/voter-turnout-data (last accessed 19 May 2022).

measured as the percentage of each race in each of the 50 American states (*Percent Black* and *Percent Hispanic*). This variable is simply being measured as the percentage of Hispanic and Black individuals each of the 50 states ranging from 1996 to 2020 measured every four years

CHAPTER 4

RESULTS/DISCUSSION

To test for the effect that the COVI, my proxy for civic engagement, has on public health outcomes, I will start by using two diverse ways of testing at the individual level of analysis. The individual level of analysis uses an Ordinary Least Squares regression model for the physical sick days dependent variable because the dependent variable mimics an interval level measure. In the case of the "Good Health" dependent responses are dichotomous, either they have good health or not, and consequently I use Logistical Regression. The aggregate level of analysis uses Generalized Least Squares regression for both infant mortality and overall health. The two analysis using survey data will be discussed first with the focus on the COVI as the key explanatory variable. Later, I will briefly discuss results related to the control variables as well. Next, I will present results related to the aggregate-level of analysis and the two dependent variables. The chapter will end with a discussion of all results, including some discussion of the substantive significance of the COVI as it relates to public health. Last, a conclusion will wrap things up and point to avenues for future research.

Considering Table 6, I can note straightway that the COVI is strongly associated with the number of days per month that someone is sick. This is the case after controlling for indicators of education, income, and a host of other variables. Importantly, all of the control variables are also performing as hypothesized with the exception of the health insurance consideration and Hispanic consideration. It seems after accounting for state variance in democratic inclusivity,

education, and income; those without health insurance are not likely to report being sick more days per month. The same is the case for Hispanic respondents. On the other hand, I find college graduates, respondents with high income, and those that sleep more to be sick fewer days. Older respondents (65+), the unemployed, Black, and obese respondents are all likely to report being sick more days, on average, all else being equal.

Considering the COVI index values. The range equals 4.68 points, and the coefficient in Table 6. is equal to .07. Correspondingly, I can say that as one moves from the state that has the most inclusive electoral process to the state with the least inclusive electoral process there is an increase in .33 days (4.68 * .07) that the respondent will claim they are sick in the previous 30 days. This might seem like a small substantive effect, but one must remember this effect is occurring after controlling for a whole host of other considerations that more directly affect health outcomes. The statistical significance of the relationship is extraordinarily strong. Moreover, the average number of days that a respondent reported they were sick is only 3.52 (see Table 1.). Hence, .33 days (or eight hours) represents about one tenth of the average amount of days those respondents reported they were sick.

Turning to Table 7. and the measure of good health and the logistical regression used for my dichotomous consideration, again, I find the COVI is strongly associated with better health. Indeed, the coefficient is over 100 times the size of the standard error. Moreover, all of the control variables are performing precisely as hypothesized. College graduates, those with higher incomes, people with health insurance, and people who sleep more are all more likely to respond that they have either good or excellent health. It is important to note that all of these are also statistically significant. Respondents over 65 years of age, the unemployed, Black respondents,

Hispanic respondents, and people who note they are obese all report worse health. Each of these is very strongly tied to health in a statistically significant manner as well.

Table 6.

Regression Run:
Variables Predicting Number of Days per Month Respondent Claims they are Unhealthy

Model: Ordinary Least Squares Regression

Key Explanatory Variable	Coefficient (s.e.)
Cost of Voting Index	.07 (.02) ***
Control Variables	
College Graduate	-1.12 (0.03) ***
High Income	-2.11 (0.03) ***
Have Health Insurance	0.83 (0.05) [t]
Age 65+	0.89 (0.03) ***
Sleep Hours	-0.37 (0.01) ***
Unemployed	0.51 (0.06) ***
Black	0.18 (0.06) [t]
Hispanic	-0.52 (0.05) [t]
Obese	0.67 (0.09) ***
Constant	5.83 (09) ***
F-Statistic	1159. ***
Adjusted R^2	.04
Sample Size	305,922

*** P < .001; [t] Statistically significant in the hypothesized wrong direction

Next, up we have the aggregate-level data. Turning to table 8., which uses a Generalized Least Squares Regression and random effects, which test for both between state differences and overtime within state differences in public health outcomes. The Cost of Voting Index (COVI) matters. It gets a little tricky to explain the substantive significance of the COVI because it is an index value, and it is being used to predict another index value in Model A. What I can say is that the range of the COVI (can explain about one-half standard deviation in the Overall State Health index. Considering infant mortality, the explanation is somewhat clearer. The range of the

COVI (4.71) increases the infant mortality rate by more than a half of one percent (4.71 * .122). What is perhaps more remarkable is that these relationships exist and are statistically significant after controlling for a whole host of other considerations. Not the least of which is state political culture.

Table 7.

Regression Run:
Variables Predicting Whether the Respondent Claims to be in Good Health

Model: Logistical Regression

Key Explanatory Variable	Coefficient (s.e.)
Cost of Voting Index	-0.44 (0.004) ***
Control Variables	
College Graduate	0.52 (0.01) ***
High Income	0.76 (0.01) ***
Have Health Insurance	0.04 (0.01) ***
Age 65+	-0.50 (0.01) ***
Sleep Hours	0.08 (0.002) ***
Unemployed	-0.19 (0.02) ***
Black	-0.39 (0.01) ***
Hispanic	-0.21 (0.01) ***
Obese	-0.56 (0.02) ***
Constant	-0.22 (0.02) ***
Pseudo Adjusted R^2	.07
Sample Size	311,093

*** P < .001

Note, these indicators of state culture are performing largely as hypothesized. When compared to traditional state culture both moralistic states and individualistic states associate with overall better health. In the case of the moralistic states, I also learn there is less infant mortality when compared to the traditionalistic states, which are largely located in the Southern half of the country. Although the control variables in bivariate tests usually associate with public health outcomes as hypothesized. However, in these full-specified models many of them are

rendered statistically insignificant. Notably, this is not the case for the considerations of education and income. In both of these instances, obtain results exactly consistent with expectations.

More college educated state residents associate with over all better health and less infant mortality. The same can be said for higher income states. On the aggregate level, many of the control variables are not as significant as in the individual level. This will be debriefed further in the discussion section. It is also crucial to mention that, in general, the race variables were significant in both aggregate and individual cases. This will also be discussed further in the next section.

Discussion

This thesis has tested the effect of civic engagement, operationalized as the cost of voting, on public health. I have used both an individual and an aggregate level of analysis. I created multiple data sets with these multiple levels of analysis in mind. I had surfed through literature related to public health and civic engagement with the focus on civic engagement. I had also looked through the literature that involved the antecedent and control variables for each level of analysis. The research also took full advantage of the resources available to set up these datasets and literature reviews.

When compared to the other literature and other research it is not readily apparent that civic engagement and civic engagement would play any role with public health outcomes. This was one of those research opportunities that was almost a shot in the dark but there was some backing to it. The literature review sections both show that there is some substantial evidence in the past that there was a connection between government and health that was unique and not

Table 8.

Predicting Quadrennial State Public Health Outcomes (1996-2020)

Model: Generalized Least Squares Regression

Key Explanatory Variable	Expected Sign	**Model A. Overall State Health** Coefficient (s.e.)	Expected Sign	**Model B. State Infant Mortality** Coefficient (s.e.)
Cost of Voting Index	-	-.059 *** (.017)	+	.122 * (.061)
Antecedent Variables				
Moralistic State Culture	+	.709 *** (.099)	-	-.526 * (.249)
Individualistic State Culture	+	.524 *** (.084)	-	-.118 (.211)
Control Variables				
% College Graduates	+	.008 ** (.002)	-	-.024 ** (.007)
Per Capita Income (10K)	+	.056 *** (.013)	-	-.600 *** (.045)
% Republican State Legislators	-, +	-.001 (-.001)	-, +	-.005 (.003)
Public Health Funding	+	.018 (.013)	-	.005 (.047)
Less Electoral Competitiveness	-	-.0005 (.0012)	+	-.002 (.004)
% State Uninsured Residents	-	-.006 (.004)	+	-.020 (.014)
Part Time State Legislature	-	-.329 (.202)	+	.481 (.604)
% Black State Population	-	-.013 ** (.004)	+	.065 *** (.010)
% Hispanic State Population	-	.007 * (.003)	+	-.040 *** (.009)
Constant		-.225 (.157)		10.844 *** (.492)
R^2 (overall)		.68		.77
Chi^2		248.95 ***		821.76 ***
N		350		350

*** $P < .001$; ** $P < .01$; $P < .0$

affected by anything else. This is important to note as describing the results above is an incredibly unique outcome.

The COVI was surprisingly sturdy throughout the whole process. As seen in the results above in table 8. it is known that many different variables were essentially thrown at the index, and it held on strong. It is really important to emphasize the importance of it holding strong with all of the other variables thrown at it. The cost of voting index did not very wildly throughout the process of adjusting the variables and even when adding variables it would continue to stay strong. With all of this evidence, it is quite pertinent to say that the COVI is vastly important when it comes to explaining public health. While taking all the other variables into account it is still an important area to look at when discussing political connections to public health.

In the individual-level analysis, the COVI held on strong throughout. It held on strong throughout even when during all of the other survey question variables in there. The whole process it stayed extraordinarily strong and did not vary much value wise. The cost of voting index is still vastly important while discussing other considerations. On the individual level, the cost of voting index has to be included in future conversations when looking at other political or nonpolitical explainers or public health. It potentially could have an impact on some other explaining variables thus making this research wildly importance in looking at what effects health. Aggregate stays various statistically significant throughout the process and the results show that it is highly correlated with public health. In the aggregate level, while it did stay significant throughout the process the results do vary more than the individual level yet still stays highly correlated with public health. Thus, it is safe to say then that the lower the cost of voting (easier voting) the better the overall public health is.

The COVI in the aggregate level of analysis is slightly different. While some of the variables were remarkably similar in both levels it was not necessarily easy to translate them to the individual and the aggregate level of analysis. The results above show that when looking at an overall health variable then the COVI is highly statistically significant. This is with all the accounts of all the other variables as well which is particularly good news. The real area where it begins to flounder is when used up against infant mortality rates. The COVI it is still statistically significant but at a lower level. It is still safe to say that the cost of voting does affect public health outcomes at the state level especially when it comes to overall health.

It would be a remiss if we did not talk about the other variables in the results. The first ones I want to discuss are the antecedent variables in the aggregate level as they differ from the control variables that are used in both levels of analysis. The antecedent variables were put in as our theory show that it is possible that culture would help explain both public health outcomes and civic engagement. While there is no literature that would support this very specifically it was a theory brought up during the early process. When put up against the COVI, the culture variables which in this case being used are the moralistic states and the individualistic states it stays strong. It is pertinent to note that the culture variables were very statistically significant in the overall health model yet only moralistic states shown any significance in the infant mortality model. This is one of those areas where I believe there is plenty of room for future research and I do believe that there is something here worth of substance that should be expanded upon.

Next, I have the control variables. I will be discussing the results from the individual-level analysis first when it comes to the control variables. To no surprise the income and education variables were both highly statistically significant with both dependent variables. This is something that has been touched upon before in the review and as well as something that has

been studied extensively before so there is no surprise here. It is still important to discuss as this just continues to fortify the importance of income and education to public health.

Up next, is the insurance variable. The variable measured whether or not the respondents have health insurance, and the results were different than I expected. In the first dependent variable which is the physical sick days question, uninsured was highly significant but in the opposite way. This is not as was theorized but overall, not too important to the outcome of the COVI. it was statistically significant in the right way for the overall health question. There is a possibility that the physical sick days variable did not mesh with the information given with the insurance question but overall did not affect the results.

The next variable is the Age 65+ variable. This variable followed the theory that I had prescribed as it is statistically significant in both models. This is also another area that has been researched before as age does affect public health. In a similar vein, the sleep hours variable also followed remarkably similar results. This variable was highly statistically significant in both models, and this is also common sense as sleep does have research that shows it does affect health.

The variable that was a little more shocking to find the results being very statistically significant is the unemployed variable. This variable might not necessarily directly lead toward explaining health, but I thought it might help explain the insurance question. The results here are stronger than the insurance question and are highly statistically significant in both models. There is some area of research that needs to be discussed and expanded on with this variable.

The next area of focus was the race variables. This is where the research should be expanded upon and looked at with further analysis. Both Black and Hispanic were highly statistically significant in both models with the issue being that both variables were significant in

the wrong way in the physical sick days model. There is a possibility that the dependent variable and the way it is measured did not mesh with the control variables that is what explained why a couple of them were significant in the wrong direction but that is also for another piece of research.

Finally for the individual level of analysis, is the obese variable. This variable is in a similar vein as the sleep hours variable and the age variable. It is statistically significant in both models and has the research backing it showing that it does affect public health. Overall, the results of the individual-level analysis are amazing. The amount of statistical significance is overwhelming and really does help back up the cost of voting on individual level. I am incredibly happy with the results even though there are a couple of outliers that need to be explained but they do not alter the effects of the COVI on public health. Next, I will be discussing the aggregate-level control variables, and this is where things are a bit different.

First up for the aggregate level is the education and income variables. Similar to the individual level, college graduates are statistically significant at the 0.01 level which is not as much as in the individual level but still shows that there is significance in college graduates on public health outcomes. Income on the other hand is the same as in the individual level, highly statistically significant. This has no real surprise as both were theorized to be significant, and both follow the right direction. Previous studies also show that there is a relationship between education, income, and public health outcomes.

Up next is the republican led legislators variable. The percentage of GOP members in state legislators has no significance on the COVI and public health outcomes. While this does not follow the theory, I do believe that there is more room to expand upon this as there are studies that still show that republican led states have varying levels of public health (Gray, Lowery,

Mornogan, and Godwin 2010; Weinstock 2016). Another able that had no significance was the public health funding variables which showed that there was no significance on the COVI and public health outcomes. I do believe there also is room to expand here as there is not much research on public health funding and its relation to civic engagement.

The next three variables also have no significance whatsoever and they are electoral competitiveness variable, percentage state uninsured residents variable, and the Squire score which is the part time legislature variable. Because all played no role in the connection to the COVI and public health outcomes. While these variables showed no significance it also did not affect the relationship between COVI and public health outcomes which is the important thing.

Finally, I have the race variables in the aggregate. This is where we finally see some significance as theorized. Black was the most significant as it was significant to the 0.01 level in the overall health model and was fully statistically significant in the infant mortality model. Hispanic was similar as it was significant to the 0.05 level in the overall health model but was fully statistically significant in the infant mortality model. This may mean that race is more important in infant mortality than overall health. This is a massive area for expansion on this topic as it might be pertinent to see how Black and Hispanic relates to other measures of health. I will be discussing policy prescriptions in the next area right before we get to concluding statements.

In terms of the causal mechanism explained in the beginning it is crucial to show that this argument does support the results. The COVI does show an impact on health thus it must mean that the cost of voting does in fact affect the quantity and quality of information being received by individuals and on the aggregate level. This must show that there is a correlation between the COVI and information which in turn leads to better lifestyle choices and finally better health.

The types of information can include things like more availability on information for candidates and as far as health goes more information on specific vaccines as well as other health related information.

In terms of policy prescriptions, this research suggests that states concerned with the health of their citizens should make voting and civic engagement easier or to find new and better ways to keep citizens engaged and informed. The results of this research prove that there is a significant effect between civic engagement and the help of the citizens. The states where it is easier to vote have better public health and better public health outcomes. The effect is significant and states that have been slowly shifting overtime to easier civic engagement show that their health is improving.

Voting and civic engagement has been a hot topic in the political science world and in the real world in general. Many states are making it more difficult for people to vote in certain ways as the cost of voting index clearly shows. The change overtime shows that there are states that are making it more difficult to vote and the results show that their public health is worsening because of it. The policy prescription that I would recommend is that states should start lessening their grip on voting laws. While it would be difficult for states to change their voting laws all at once it is possible to slowly change it overtime. some states in particular like Texas and Alabama have repeatedly been towards the bottom of these index lists and they are continuingly making it more difficult to vote which will see health consequences because of it. Some federal laws could be put in place that would be able to control all the states which in turn would improve health everywhere according to our results. In the next section I will be saying some concluding marks as well as providing some future avenues of research on this area.

Conclusion

This research paper just analyzed and discussed public health from the point of civic engagement, but it is still important to describe the actual importance of public health. The introduction does discuss the importance of this research and the importance of public health, but it is still vastly important to really get the message across. Public health is arguably one of the most important things societies should be considering and with the COVID-19 pandemic still making its way through the world it is now more important than ever. Learning anyway we can improve public health is a must. In this case the research shows that civic engagement is highly correlated with public health. States where it is easier to vote have better public health and better public health outcomes. The results are statistically significant and if they are not listened to it is the fault of the government for continuing to make it difficult for people to get involved in politics and stay more informed about what is going on politically and in their communities.

The main contribution of this paper was to show that there is a relationship between civic engagement and public health which I do believe this research does show. The research shows that states where it is easier to vote have better public health outcomes. The research findings make this claim robustly using multiple levels of analysis. The individual-level analysis showed that there is very statistically significant results with the cost of voting and public health even with all the control variables in the models. The aggregate-level analysis gets a bit more complicated but in both overall health and infant mortality rates the cost of voting stays strong and shows statistical significance with public health.

In simple terms, this research opened up countless opportunities to measure public health. As the results show, the COVI can about a quarter of a day change in physical sick days which might not seem like that much but is actually quite significant. It can also help explain about a 6% change in a change in likeliness of reporting good health which is also quite significant.

These values do mean quite a bit and if there's other things that may help explain or change these values it is important to look at those possibilities.

The take away from this research Is that there are various other things that help explain health. As discussed in the introduction there are three different areas I may explain health which are cultural, demographic, and political. The political realm was explained by the cost of voting index but there are other opportunities there as other parts of the political spectrum may explain public health. The clear take away here is that public health can be affected through political means and the COVI here is just one of those ways to help explain that. This research shows that there are bountiful possibilities when looking at political explainers for health.

The research done here shows that there is a connection between a political explainer and public health. The way I measure the political side of the explanation was through the use of the cost of voting index. This research would not be pertinent if I did not discuss the alternate explanations. The cultural explanation has the potential to be antecedent to both civic engagement and the electoral institutional climate. This could still potentially be the case as more focused research on culture and health would warrant better results for this research as well. I do believe that since the COVI stayed strong even with the culture variables in there that the COVI is still significant even with potential culture explainers.

Demographic explainers should be the next area of focus when it comes to public health and the potential with the COVI. This will be touched on in the next section a bit more but seeing the relationship between race and health with the political component it is important that more research should be done in the future. It is possible that race or other demographic variables explain health and potentially explain it better than some political explainers such as the COVI.

This it is important to note going forward and there is much more room available in the future when it comes to research on demographic explainers on health.

Considering future research, it would be nice to develop additional indicators of civic engagement to test the veracity of my findings. There is always room for improvement in the research. The rules for civic engagement could be touched upon more with focus on some other independent variables as well as possibly updating the COVI. the use of the dependent variables could also be improved upon. The aggregate-level analysis showed that there is some differences between the different measures of health. My research used overall health and infant mortality rates, but the source is of the data do have other measures of health that potentially could be used for this research. A closer look on the effect of COVI and information is also a must. Research that shows that connection between COVI and information would dramatically improve the connection shown in this research. The research could just be added up on this one with the use of more independent variables and dependent variables with the same measures which would potentially add more robustness to the results.

The future research could touch more upon some of the control variables as well as some other variables that were not able to be contributed to this research. More research should be done on the antecedent culture variables which I do believe that theory would still possibly suggest that there is a significant relationship between that and public health. This analysis just added more completeness to a research paradigm that already covers education and income very thoroughly. In these two areas the research has reached academic consensus. The individual-level data does have potential to include more control variables in future research on this topic but based off of analyzing the data, I do not believe that they would make much of a difference to the results. The aggregate data is where things get a little more complicated in that vein. There

was not much significance in some of the government related control variables, but I do believe that there would be something that does show some significance. I do believe more variables or perhaps alternative measurement strategies should be tested to assure the relationship between the COVI and public health I have uncovered is true.

Another big finding in this research was the relationships between race and public health. Although previous research suggested this would be the case, there is still quite a bit of room to study more completely possible interactions between civic engagement, race, and public health. Race is the area which I believe has most potential and future research with the COVI and public health. Many of the studies that discuss race and health are getting antiquated and are in need of an update. Further research is always necessary, but I do believe that this analysis is a great base for future research as well as the results themselves are very promising with some major policy implications.

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APPENDIX A

INDIVIDUAL-LEVEL CODEBOOK

Thesis Codebook

The codebook described below provides all of the details regarding the measurement of the various variables employed using the individual level of analysis. Most specifically, I use survey responses from The Behavioral Risk Factor Surveillance System (BRFSS), which is a data set gathered by the Center for Disease Control and Prevention (CDC).[9] The information below was gathered through that data set and manipulated to fit my new data set. It was also configured in the best way for my research and the order does differ from the original source. This data also does not include all of the variables and questions from the BRFSS.

Dependent Variables

Good Health- "GENHLTH" The value is based on the question, "Would you say that in general your health is . . ." and the respondent is asked to complete the sentence (CDC 2020). Specifically, I use the responses "Excellent" and "Very Good" as a consideration of Good Health and score these respondents "1." Those who respond "Good," "Fair" and "Poor" I score "0." The "Don't know/Not Sure" and "Refused" were made blank and these cases are omitted from the analysis. Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max
GENHLTH	311,093	0.55	0.50	0	1

Sick Days per Month- "Physcialsickdaysinmonth" Sick Days per Month is a measure from the BRFSS that asks the respondent: "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?" (CDC 2020). This measure shows how many days the respondent claims to be unhealthy in the last 30 days. The variable is measured in days from 0 to 30. Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max
Physcialsickdaysinmonth	311,093	3.52	8.12	0	30

Key Explanatory Variable

[9] See https://www.cdc.gov/brfss/annual_data/annual_2020.html (last accessed 5/17/2022).

FINALCOVI: The value assigned to each surveyed based on which state they answered in the survey. The Cost of Voting Index (COVI) is an index to capture democratic inclusion. The COVI is a collection of 33 institutional arrangements, state laws, which potentially influence the cost of voting in the United States which was created by Li, Pomante and Schraufnagel (2018). Ranges from -2.91 to 1.44.

Variable	Obs	Mean	Std. Dev.	Min	Max
FINALCOVI	311,093	-0.02	0.89	-2.91	1.44

Control Variables

College Graduate- "College Grad" This taps whether the surveyed individual graduated college or not. The specific question is: "What is the highest grade or year of school you completed?" The variable is measured with "1" being "College Graduate." Other responses, including "some college or technical school," "high school graduate," "some high school," "elementary," and "did not attend school" being scored "0." People who "Refused" are omitted from the analysis. Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max
College Grad	311,093	0.39	0.49	0	1

High Income- "High Income" . This measures whether or not the respondent has a high income or not with "high" being $75,000 a year or more. The question in the survey: "Is your annual household income from all sources:" "$75,000 or more" and these respondents are scored "1." Other responses scored "0" include "Less than 10,000", "Less than 15,000", "Less than 20,000", "Less than 25,000", "Less than 35,000", "Less than 50,000", and "Less than 75,000". Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max
High Income	311,093	0.35	0.48	0	1

Have Health Insurance- "Havehealthinsurance" This variable measures the value of whether the respondent has health insurance or not and intends to help determine health. The survey question is: "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare, or Indian Health Service?" I score those responding "yes" "1" and all others are scored "0." I omit "Don't know/Not sure" and "Refused" responses from the analysis. Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max

Variable	Obs	Mean	Std. Dev.	Min	Max
Havehealthinsurance	311,093	0.92	0.28	0	1

Age 65+- "Old" Old age is included in this research as it is essential to note that individuals who are older generally have a greater chance of poor health. It is necessary to control for this as I need to make sure that age is not the confounding my test of the effect of the COVI. The reported age, on the survey used, is in five-year age categories. I score cases "1" if the respondent noted they were "Age 65 to 69", "Age 70 to 74", "Age 75 to 79", and "Age 80 or older." I use "0" for the categories "Age 18 to 24", "Age 25 to 29", "Age 30 to 34", "Age 35-39", "Age 40-44", "Age 45 to 49", "Age 50 to 54", "Age 55 to 59", and "Age 60 to 64". "Don't know/Refused/Missing" responses I omit from the analysis. Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max
Old	311,093	0.34	0.47	0	1

Sleep Hours- "SleepTime" Sleep is a relevant part of health and here it fits with the theoretical arguments being made about healthier lifestyle choices This data is also readily available in the BRFSS data set. I measure this variable using the number of hours the respondent sleeps on average every 24 hours. The survey question was "On average, how many hours of sleep do you get in a 24-hour period?" I omit "Don't know/Not sure" and "Refused" responses. Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max
SleepTime	311,093	7.09	1,46	0	24

Unemployed- "Unemployed" The face validity of this may not be as obvious, however, if one is unemployed it makes sense that they may struggle with accessing health care resources. Unemployed persons might be in a bad state of mind, which might affect their overall perception of health. The employment status question is: "Are you currently…?" I score respondents "1" if they note "out of work for 1 year or more" and " out of work for less than 1 year." The value "0" captures responses "self-employed," "employed for wages," "a homemaker," "a student," retired," and "unable to work." "Refused" responses are omitted from the analysis. Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max
Unemployed	311,093	0.06	0.24	0	1

Black- "Black" Race often is considered crucial in health research, as was alluded to in the academic foundations, thus it is paramount to control for this. The Black variable captured here can be found in the race section of the BRFSS survey. The question being used is the imputed "race/ethnicity value."[10] I score respondents "1" if they answer "Black.". The value "0" is used for "White," "Hispanic," "Asian," and "American Indian." Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max
Black	311,093	0.07	0.26	0	1

Hispanic- "Hispanic" Race often is considered crucial in health research, as was alluded to in the academic foundations, thus it is paramount to control for this. The Hispanic variable is measured in a similar fashion to the Black variable. The question being the same as the Black variable and 1 being scored as "Hispanic." The value "0"being scored as "White," "Black," "Asian" and "American Indian." Source: https://www.cdc.gov/brfss/annual_data/annual_2020.html

Variable	Obs	Mean	Std. Dev.	Min	Max
Hispanic	311,093	0.08	0.27	0	1

Obese- "Obese" Weight often plays a significant role in health and the BRFSS survey does include a variable for obesity. Obesity is a major factor in explaining health thus may be vital in explaining individuals' health outcomes. The theory suggests that if an individual is overweight and fits the definition of obese that their overall health will be poorer. The data is readily available in the BRFSS dataset thus made the transition to my original dataset straightforward. The definition of obese in this case is whether or not the individual is over 25 in the Body Mass Index (BMI). The obesity question provides this definition and explains that "Adults who have a body mass index greater than 25.00 [are considered] Overweight or Obese." Respondents who answered "yes" are scored "1." Respondents who answered "no" are scored "0". "Don't know/Refused/Missing" are omitted from the analysis. Smoking and Alcohol variables were considered but substantial amounts of missing values did not allow me to test for this.

Variable	Obs	Mean	Std. Dev.	Min	Max
Obese	311,093	0.68	0.47	0	1

[10] The BRFSS imputes race/ethnicity if the respondent refused to give a race/ethnicity response. The value of the imputed race/ethnicity is the most common race/ethnicity response for that region of the state.

APPENDIX B

AGGREGATE-LEVEL CODEBOOK

Replication Codebook for Aggregate-Level Analysis

Dependent Variables:

Overall State Health – "overallhealthyearaftercovi" Values are the composite Z-score provided by the America's Health Ranking https://www.americashealthrankings.org/ Go to "explore data" and "edition year." Use data for the year following the measurement of the Cost of Voting Index (COVI) value. For instance, use the 1996 COVI value as a predictor of state public health Z-score in 1997. The state health score is a composite weighted Z-score that takes into account multiple indicators of social and economic well-being, the physical environment, clinical care resources, aggregate individual behaviors, and state health outcomes.
Suggested Citation: America's Health Rankings analysis of America's Health Rankings composite measure, United Health Foundation, AmericasHealthRankings.org, accessed 2022.

Variable	Obs	Mean	Std. Dev.	Min	Max
overallhea~i	350	.0924686	.5334261	-1.116 (MS-2004)	1.196 (UT-1996)

Infant Mortality – "infantmortalityrate" Values are from the America's Health Ranking https://www.americashealthrankings.org/ Go to "explore data" and "edition year." Use data for the year following the measurement of the Cost of Voting Index (COVI) value. For instance, use the 1996 COVI value as a predictor of state infant mortality in 1997.

Variable	Obs	Mean	Std. Dev.	Min	Max
infantmort~e	350	6.805	1.487922	3.5 (NH-2020)	11.7 (MS-1996)

Key Explanatory Variable:

Cost of Voting Index Values – "costofvotingindexvalue" available at costofvotingindex.com. Use the "final" values as reported on the website.

Possible Antecedent Variables:

This is a consideration of Daniel Elazar's state culture variables. One can imagine that state culture helps to predict both the COVI values and public health outcomes. In other words that the state culture variables is antecedent to the COVI. In the regression run place individualistic and moralistic in the model and I expect positive coefficients because these considerations capture state culture that is, arguably, more progressive than traditionalistic state culture. Source: Johnson, C. A. (1976). Political Culture in American States: Elazar's Formulation Examined. *American Journal of Political Science*, *20*(3), 491–509. https://doi.org/10.2307/2110685. Measurement is static for the period 1996-2020.

Individualistic – "individualistic" AK, CT, DE, HI, IL, IN, MD, MA, MO, NE, NV, NJ, NY, OH, PA, RI, WY

Traditionalistic – "traditionalistic" AL, AZ, AR, FL, GA, KY, LA, MS, NM, NC, OK, SC, TN, TX, VA, WV

Moralistic – "moralistic" CA, CO, ID, IA, KS, ME, MI, MN, MT, NH, ND, OR, SD, UT, VT, WA, WI

Control Variables:

Per Capita Income – "percapitaincome" Values are from the America's Health Ranking https://www.americashealthrankings.org/ Go to "explore data" and "edition year." Use data for the year preceding measurement of the dependent variables. For instance, use the 1996 income value as a predictor of dependent variable values in 1997.

Variable	Obs	Mean	Std. Dev.	Min	Max
percapitai~e	350	39400.95	12395.63	18386 (MS-1996)	78609 (CT-2020)

% College Graduates – "collegegradrate" – The percentage of state residents with a college degree data is from the National Center for Education Statistics https://nces.ed.gov/ (last accessed May 26, 2022.

Use data for the year preceding measurement of the dependent variables. For instance, use the 1996 education value as a predictor of dependent variable values in 1997.

Variable	Obs	Mean	Std. Dev.	Min	Max
collegegra~e	350	53.14086	9.845108	18.9 (AK-1996)	86.8 (MA-2020)

% Republican State Legislators – "percgoptot2" – The percentage of state legislators House and Senate combined that are identified as Republican. Data is from the National Council of State legislatures https://www.ncsl.org/research/about-state-legislatures/partisan-composition.aspx

Use data for the year preceding measurement of the dependent variables. For instance, use the 1996 partisan value as a predictor of dependent variable values in 1997.

Variable	Obs	Mean	Std. Dev.	Min	Max
percgoptot2	350	50.99732	16.74151	7.894737 (HI-2020)	85.5556 (WY-2016)

Public Health Funding – "publichealthfundingcompositescor" - Values are the composite Z-score provided by the America's Health Ranking https://www.americashealthrankings.org/ Go to "explore data" and "edition year." Download data and search for "Public Health Funding." Use data for the year preceding measurement of the dependent variables. For instance, use the 1996 funding value as a predictor of dependent variable values in 1997.

Variable	Obs	Mean	Std. Dev.	Min	Max
publicheal~r	350	-.0585429	.8658619	-1.96 (WY-2000)	2 (AK&HI mult. yrs.)

State Electoral Competitiveness – "contemporaneouspresidentialelect" This is a measure of the competitiveness of each state's electoral climate. If what I have been arguing about the value of

civic engagement is true as it relates to public health than states with more electoral competition should have greater civic engagement and better public health. I measure the variable as the absolute value of the percentage difference between the Democratic and Republican presidential candidates in the contemporaneous election. For instance, I use the absolute value of the state difference between Bob Dole and Bill Clinton in 1996 to predict public health in 1997.

Variable	Obs	Mean	Std. Dev.	Min	Max
contempora~t	350	16.21594	11.2661	.0092188 (FL 2000)	51.41064 (WY 1996)

% Uninsured State Residents – "uninsuredahrdata" This is the percentage of state residents without health insurances as reported by the America's Health Ranking https://www.americashealthrankings.org/ Go to "explore data" and "edition year." Download data and search for "Uninsured." Use data for the year preceding measurement of the dependent variables. For instance, use the 1996 uninsured value as a predictor of dependent variable values in 1997.

Variable	Obs	Mean	Std. Dev.	Min	Max
uninsureda~a	350	12.79443	4.357754	3 (MA 2020)	24.9 (TX 2008)

Legislative Professionalism – "squirescores" These are scores developed by Peverill Squire that measure the professionalism or the full-time character of a state legislature. The theory is that a more fulltime legislative body will have the resources (time, staff, money) to produce better public health outcomes. Larger numbers indicate a more amateur or part-time legislative body. Consequently, I anticipate a negative association with overall health and a positive association with infant mortality. The data is from Squire, Peverill. 2017. "A Squire Index Update." *State Politics & Policy Quarterly* 17 (4): 361-71.

Variable	Obs	Mean	Std. Dev.	Min	Max
squirescores	350	.19628	.116236	.027 (NH 2004)	.629 (CA 2016)

Black – "percblack" – Minority population estimates were gathered from the United States Census Bureau. 1990 values are used for the 1996 election, 2000 values are used for the 2000 and 2004 elections, 2005 values (population estimates) are used for the 2008 election, 2010 values are used for the 2012 election, 2014 values (population estimates) are used for the 2016 election, and 2019 population estimates are used for 2020 (https://www.census.gov/quickfacts/fact/table/AK,US/PST045219 : last accessed May 26, 2022).

Variable	Obs	Mean	Std. Dev.	Min	Max
percblack	350	10.22371	9.467594	.3 (ID 1996)	37.8 (MS 2020)

Hispanic - "perchisp" - Minority population estimates were gathered from the United States Census Bureau. 1990 values are used for the 1996 election, 2000 values are used for the 2000

and 2004 elections, 2005 values (population estimates) are used for the 2008 election, 2010 values are used for the 2012 election, 2014 values (population estimates) are used for the 2016 election, and 2019 population estimates are used for 2020 (https://www.census.gov/quickfacts/fact/table/AK,US/PST045219 : last accessed May 26, 2022).

Variable	Obs	Mean	Std. Dev.	Min	Max
perchisp	350	9.180571	9.587941	.5 (WV 1996)	49.3 (NM 2020)

APPENDIX C

ADDITIONAL TABLES

The tables in Appendix C exhibit descriptive statistics, bivariate relationships, and the test of the effect the COVI has on public health using five different indicators of income and two unique indicators of education. This last display is intended to show that it does not matter how one measures education or income there is always a strong relationship between the COVI and public health outcomes.

Table 9.
Frequency and Percent of Black Respondents in Individual Level of Analysis

Black	*Freq.*	*Percent*	*Cum.*
0	371,568	92.44	92.44
1	30,390	7.56	100.00
Total	401,958	100.00	

Table 10.
Frequency and Percent of Hispanic Respondents in Individual Level of Analysis

Hispanic	*Freq.*	*Percent*	*Cum.*
0	364,550	90.94	90.94
1	36,408	9.06	100.00
Total	401,958	100.00	

Table 11.
Frequency and Percent of Black Respondents in Individual Level of Analysis if FINALCOVI !=

Black	*Freq.*	*Percent*	*Cum.*
0	362,400	92.59	92.59
1	29,003	7.41	100.00
Total	391,403	100.00	

Table 12.
Frequency and Percent of Hispanic Respondents in Individual Level of Analysis if FINALCOVI !=

Hispanic	*Freq.*	*Percent*	*Cum.*
0	360,238	92.04	92.04
1	31,165	7.96	100.00
Total	391,403	100.00	

Table 13.
Frequency and Percent Respondents with Health Insurance in Individual Level of Analysis if FINALCOVI !=

Have Health Insurance	*Freq.*	*Percent*	*Cum.*
0	33,257	8.54	8,54
1	356,109	91.46	100.00
Total	389,366	100.00	

Table 14.
Pairwise Correlation Coefficients between Dependent Variables and Education Variables in the Aggregate

	Overall Health	*Infant Mortality*	*High School Grad*	*College Grad*
Overall Health	1.0000			
	350			
Infant Mortality	-0.6049	1.0000		
	0.0000			
	350	350		
High School Grad	0.4153	-0.4735	1.0000	
	0.0000	0.0000		
	350	350	350	
College Grad	0.3938	-0.3618	0.3589	1.000
	0.0000	0.0000	0.000	
	350	350	350	350

Table 15.
Pairwise Correlation Coefficients between Dependent Variables and Income Variables in the Aggregate

	Overal~i	*Infant~e*	*Median~e*	*Percap~e*	*Unemply~l*	*Giniin~x*
Overal~i	1.000					
	350					
Infant~e	-0.6049	1.0000				
	0.0000					
	350	350				
Median~e	0.5635	-0.5544	1.0000			
	0.0000	0.0000				
	350	350	350			
Percap~e	0.2203	-0.6311	0.6493	1.0000		
	0.0000	0.0000	0.0000			
	350	350	350	350		
Unemply~l	-0.3020	0.0376	-0.3146	-0.0226	1.0000	
	0.0000	0.0000	0.0000	0.6730		
	350	350	350	350	350	
Giniin~x	-0.3698	-0.0005	-0.0966	0.3324	0.2862	1.0000
	0.0000	0.9918	0.0709	0.0000	0.0000	
	350	350	350	350	350	350

Table 16.
Random Effect models on Health, COVI, College Grad, and Per Capita Income

Overall Health	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
COVI	-0.441	0.085	-5.19	0.000	-0.612	-0.270
College Grad	0.005	0.006	0.87	0.389	-0.007	0.017
*Per Capita Income**	0.382	0.096	3.99	0.000	0.189	0.574
Constant	-1.686	0.360	-4.68	0.000	-2.411	-0.962

*Per Capita Income measured in 10,000s

Table 17.
Random Effect models on Health, COVI, College Grad, and Gini Index

Overall Health	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
COVI	-0.367	0.094	-3.90	0.000	-0.556	-0.177
College Grad	0.022	0.006	3.90	0.000	0.011	0.033
Gini Index	-9.539	2.699	-3.53	0.001	-14.971	-4.107
Constant	3.240	1.181	2.74	0.009	0.864	5.612

Table 18.
Random Effect models on Health, COVI, College Grad, and Unemployment

Overall Health	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
COVI	-0.426	0.0874	-4.88	0.000	-0.602	-0.250
College Grad	0.014	0.005	2.58	0.013	0.003	0.025
Unemployment	-0.202	0.540	-3.75	0.001	-0.311	-0.094
Constant	0.414	0.434	0.95	0.346	-0.461	1.288

Table 19.
Random Effect models on Health, COVI, College Grad, and Median Household Income

Overall Health	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
COVI	-0.375	0.074	-5.05	0.000	-0.524	-0.226
College Grad	0.004	0.005	0.90	0.374	-0.006	0.143
*Median Househo~e**	0.356	0.057	6.26	0.000	0.241	0.470
Constant	-2.156	0.324	-6.64	0.000	-2.810	-1.503

*Median Household Income measured in 10,000

Table 20.
Random Effect models on Infant Mortality, COVI, College Grad, and Per Capita Income

Infant Mortality	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
COVI	0.959	0.224	4.27	0.000	0.507	1.410
College Grad	0.005	0.159	0.30	0.768	-0.027	0.037
*Per Capita Income**	-0.851	0.252	-3.38	0.002	-1.359	-0.344
Constant	9.900	0.950	10.43	0.000	7.989	11.811

*Per Capita Income measured in 10,000s

Table 21.
Random Effect models on Infant Mortality, COVI, College Grad, and Gini Index

Infant Mortality	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
COVI	0.957	0.265	3.61	0.001	0.424	1.490
College Grad	-0.026	0.016	-1.66	0.103	-0.059	0.006
Gini Index	9.579	7.595	1.26	0.214	-5.709	24.867
Constant	3.870	3.322	1.16	0.250	-2.818	10.558

Table 22.
Random Effect models on Infant Mortality, COVI, College Grad, and Unemployment

Infant Mortality	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
COVI	1.047	0.252	4.16	0.000	0.540	1.553
College Grad	-0.019	0.016	-1.25	0.219	-0.051	0.012
Unemployment	0.120	0.156	0.77	0.444	-0.193	0.433
Constant	7.207	1.252	5.76	0.000	4.688	9.727

Table 23.
Random Effect models on Infant Mortality, COVI, College Grad, and Median Household Income

Infant Mortality	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
COVI	0.854	0.221	3.86	0.000	0.408	1.299
College Grad	0.002	0.015	0.16	0.876	-0.272	0.032
Median Househo~e	-0.671	0.170	-3.96	0.000	-1.013	-0.330
Constant	10.484	0.968	10.83	0.000	8.535	12.433

*Median Household Income measured in 10,000

Table 24.
Pairwise Correlation Coefficients between Dependent Variables and government related Variables in the Aggregate

	Overal~i	*Infant~e*	*Veptur~t*	*Percgop~2*	*Uninsured*	*PublicH~e*	*Squire~s*	*Contemp~t*
Overal~i	1.000 350							
Infant~e	-0.6049 0.0000 350	1.0000 350						
Veptur~t	0.3924 0.0000 350	-0.5290 0.0000 350	1.0000 350					
Percgop~2	-0.0371 0.4892 350	-0.0506 0.3451 350	0.1280 0.0166 350	1.0000 350				
Uninsured	-0.4185 0.0000 350	0.3571 0.0000 350	-0.4673 0.0000 350	0.0726 0.1753 350	1.0000 350			
PublicH~e	0.2521 0.0000 350	-0.1319 0.0135 350	-0.0691 0.1970 350	-0.1868 0.0004 350	-0.1486 0.0054 350	1.0000 350		
Squire~s	0.0868 0.1050 350	-0.1932 0.0003 350	0.0999 0.0619 350	-0.2234 0.0000 350	-0.1451 0.0065 350	0.1068 0.0459 350	1.0000 350	
Contemp~t	0.1499 0.0049 350	-0.1499 0.0049 350	-0.1294 0.0154 350	0.0181 0.7361 350	-0.1255 0.0188 350	0.3988 0.0000 350	-0.0357 0.5056 350	1.0000 350

Table 25.
Pairwise Correlation Coefficients between Dependent Variables and Race Variables in the Aggregate

	Overall Health	*Infant Mortality*	*Percblack*	*Perchisp*
Overall Health	1.0000			
	350			
Infant Mortality	-0.6049	1.0000		
	0.0000			
	350	350		
Percblack	-0.6180	0.5648	1.0000	
	0.0000	0.0000		
	350	350	350	
Perchisp	0.0225	-0.3746	-0.1201	1.0000
	0.6751	0.0000	0.0246	
	350	350	350	350

Table 26.
Pairwise Correlation Coefficients between Dependent Variables and Culture Variables in the Aggregate

	Overall Health	*Infant Mortality*	*Individualistic*	*Traditionalist*	*Moralistic*
Overall Health	1.0000				
	350				
Infant Mortality	-0.6049	1.0000			
	0.0000				
	350	350			
Individualistic	0.1374	-0.0687	1.0000		
	0.0101	0.2000			
	350	350	350		
Traditionalist	-0.7032	0.4604	-0.4924	1.0000	
	0.0000	0.0000	0.0000		
	350	350	350	350	
Moralistic	0.5530	-0.3847	-0.5152	-0.4924	1.0000
	0.0000	0.0000	0.0000	0.0000	
	350	350	350	350	350