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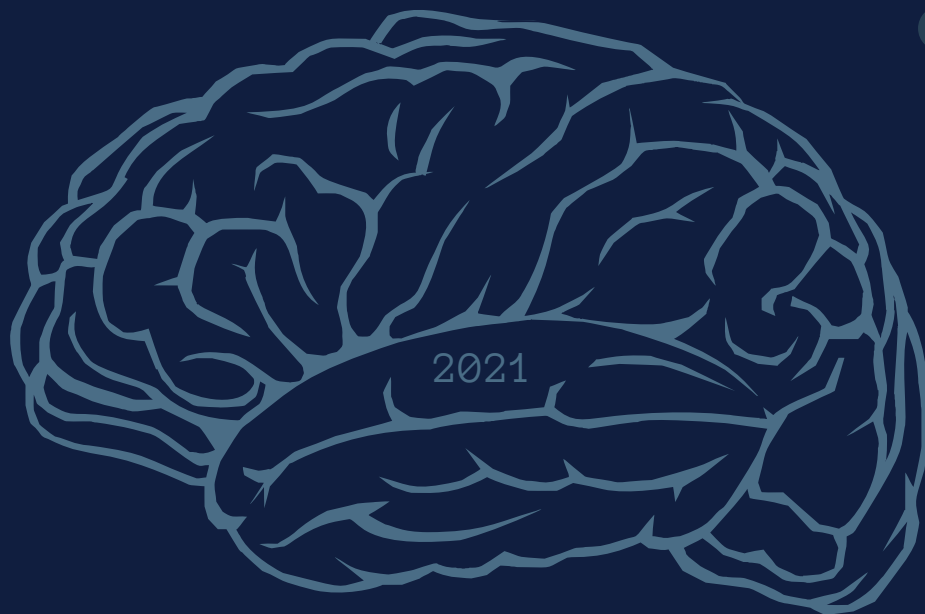# Table of Contents.

Staff.

Letter from the Editor.

Dear Readers,

The editorial board of the *Journal of Secondary Psychological Studies* is excited to present our third edition of our publication. I feel extremely lucky to have worked with our remarkable staff and authors who have adapted to unusual circumstances at every stage of the editorial process.

Given the challenges of the past year and a half – from distance learning to virtual science fairs - our goal as a journal for this edition was to provide our authors with even more support and feedback than usual. Consequently, we were thrilled to receive more submissions from a greater number of high schools than ever before. With our new knowledge of remote work, the journal took feedback to the next level. We even did some experimenting ourselves, with our editors trying out new methods of coaching our authors through platforms like Zoom.

As always, we hope that this edition of the journal will inspire further research on the topics published as well as a greater passion for psychology in our authors and readers alike. This edition sheds light on a variety of relevant issues from climate change to COVID-19. As a journal, it is truly exciting to get to share research from such passionate students; in times of change, after all, it is through research that we are able to come to understand our new circumstances.

Kate Weseley-Jones

Editor-in-Chief

You Are What You (M)eat

The Effect of Omnivore, Vegetarian, and Vegan diets on Perceptions of Masculinity and Greenness and the Likelihood of Each Gender Considering Changing Diet

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Abstract

Research has established that men who eat meat are seen as more masculine than non-meat eaters. This experiment investigated the effect of vegetarianism and veganism (diet) on perceptions of masculinity and how environmentally friendly or "green" someone is. In addition, the experiment investigated which gender is more likely to consider becoming vegetarian or vegan. Students were randomly assigned to view one of three different descriptions, designed to look like a dating profile, of a male. Each profile was identical except for the diet mentioned (omnivore, vegetarian, vegan) and various favorite foods mentioned. Participants were then asked to rate the profile in terms of masculinity and "greenness." Then, participants provided their gender and indicated whether they would consider becoming vegetarian and vegan. Vegans were seen as significantly less masculine compared to omnivores, but all groups were rated equivalently "green." In addition, as hypothesized, women were more likely to consider going vegetarian and vegan than men. Together, the results of this study raise the question of whether men's reluctance to consider a vegetarian or vegan diet may be due to concerns of being perceived as feminine. Vegetarian and vegan diets, according to research, are healthier and better for the environment, and identifying these biases is the first step to strive for change.

Keywords: vegetarian, vegan, diets, masculinity, gender, greenness

Introduction

Meat consumption, especially the consumption of red meat, is unhealthy and has negative impacts on the environment. The ingestion of red meat is linked to an increase in prostate cancer (Vennard, 2016), and according to Montague (2020), meat consumption is linked with cancer and heart disease. In addition, the digestive process in animals, especially cows and sheep, causes the emission of methane (Dunne, n.d.). Methane is a greenhouse gas and is 28-34 times more harmful than CO2 over a 100 year time period (Dunne, n.d.). To make matters worse, meat production has tripled, compared to 50 years ago. In 2018, 340 million tonnes of meat were produced (Ritchie & Rosner, 2019) even though vegetarianism and veganism are becoming more common (Darlin, 2017; Montague, 2020). According to Fox (2012), one reason vegetarians and vegans may follow their diets is because they are better for the environment. A vegetarian is someone who does not eat meat, and a vegan is someone who doesn't eat any animal products. The purpose of this study is to determine whether vegetarians and vegans are perceived differently than omnivores in terms of masculinity and

greenness and to determine which gender is more likely to become vegetarian and vegan.

Previous research suggests that men are often harsher than women toward animals. Additionally, According to Fox (2012), men tend to conceptualize animals as being lower in a hierarchy than humans. In addition, Fox also concludes that men often deny animal cruelty and abuse, and men are also ten times more likely to kill animals for sport (Murphy, 2020).

In addition, previous studies found a link between meat consumption and masculinity. Meat consumption makes men feel like real men, and men that eat red meat are often seen as real men (Fox, 2012; Vennard, 2016). According to Vennard (2016), men and women both associate red meat with strength and masculinity. Additionally, Garrel (2019) concluded that vegetarians are considered to be less masculine than omnivores according to a study conducted by Dr. Hank Rothgerber. Another study demonstrated that men would rather be considered masculine than go vegan and be perceived as feminine (Murphy, 2020), indicating that men care about how others view their image, especially concerning masculinity.

Previous research also shows that men have negative sentiments toward plant-based diets and are less likely to stop eating meat compared to women. Men are more likely than women to believe that humans are designed to eat a lot of meat and that meals without meat are not complete or fully satisfying (Vennard, 2016). As a result, men are less likely than women to view plant-based diets as nutritious or tasty (Vennard, 2016), and according to Murphy (2020), men are half as likely to stop eating meat. Additionally, men tend to view eating meat as a more favorable trait in humans as compared with women (Fox, 2012). Because of this difference, twice as many women are vegan than men (Frost, 2020). Women also have weaker pro-meat attitudes (Bennet, 2020),

and according to Vennard (2016), men eat 57% more meat than women.

While previous studies found that meat is associated with masculinity, they did not directly compare the perceived masculinity of omnivores, vegetarians, and vegans. Most of the other studies also had outdated data from over five years ago. Vegetarian and veganism are rapidly changing in modern society (Montague, 2020), and current data is vital. Previous studies looked at older generations, but not people part of younger generations. Also, previous studies expressed that vegetarians and vegans are better for the environment (Fox, 2012), but they have not addressed whether they are "perceived" as better for the environment or more green. People, especially men, may be deterred from becoming vegetarians and vegans due to the lack of positive perceptions. Also, previous studies demonstrate that men eat more meat than women, but this doesn't differentiate which gender is more likely to go vegetarian and vegan. The idea of eliminating meat does not differentiate between vegetarian and vegan diets, for both diets exclude meat.

In order to determine differences in perceptions of the different diets and the consideration of changing diet, four hypotheses were tested: [1] omnivores will be perceived as more masculine than vegetarians and vegans; [2] omnivores will be perceived as worse for the environment (less green) than vegetarians and vegans; [3] women will be more likely to consider going vegetarian than men; [4] women will be more likely to consider going vegan than men.

Method

Design and Procedure

The study used a between subjects design with three groups. Participants were presented with a consent form and then a dating profile of an imaginary male character, Robert. Participants were assigned to one of the three conditions:

omnivore, vegetarian, or vegan and then were asked to complete a survey about their perceptions of Robert's masculinity and greenness (environmental friendliness). Next, participants reported their demographics and also expressed their willingness in becoming vegetarian and/or vegan if they were not already vegetarian or vegan. Lastly, participants answered a manipulation check to ensure they remembered the diet that Robert followed.

Participants

Participants were recruited from a mid-sized, suburban high school. Emails were sent out to social studies teachers asking them to share a survey link with their students. Of the 128 participants, 54% were male, 45% were female, and 1% of people responded with "prefer not to answer." The sample had a mean age of 14.7 years old, and the youngest participant was 13, and the oldest participant was 17. The majority of the sample followed omnivore diets (93%), 2% percent of the participants identified as vegetarian, and 1% of the sample identified as vegan (the participant that identified as vegan also identified as vegetarian; however, they were only considered vegan to avoid duplication).

Experimental Stimuli

Three versions of a dating profile of a hypothetical person were created for this study (see appendix). The name Robert was chosen from a site that included popular baby names ("Most popular baby names of 1989," n.d.) from the year Robert was supposedly born. Robert's favorite activities were designed to be gender neutral, such as hiking and traveling, and watching movies. The company that Robert was said to work was taken from a list of actual accounting firms. To manipulate Robert's diet, the profile said that Robert was either an omnivore, vegetarian, or vegan. The profile also mentioned three favorite foods for each diet: chicken, ribs and rice for the omnivore diet, pizza, string beans, and walnuts for

the vegetarian diet, and tofu, carrots, and apples for the vegan diet. The actual profile used can be seen in the appendix.

Dependent Measures

The Perceived Masculinity Scale (Wong, Horn, & Chen, 2013) was adapted for this study. This scale was chosen because it was recent and the most relevant to the study. The scale consisted of three items that asked participants to indicate their agreement with various statements concerning Robert's masculinity (see appendix) and used a Likert-type rating system (1 = *Strongly Disagree* to 6 = *Strongly Agree*). For example, one item on the scale read, "When I think of Robert, I have a feeling that he is quite masculine." A "prefer not to answer" choice was also included, and participants who recorded this for at least one scale item were excluded for statistical testing concerning perceptions of masculinity. Participants' responses to all three items were averaged to compute their perceptions of masculinity, with a high score being very masculine.

The Green Activity Scale (Han, Hwang, Kim, & Jung, 2015) was adapted for this study. This was the only scale pertaining to this topic and also the most recent. The scale used consisted of four items that asked participants to rate their agreement with various statements about Robert's perceived greenness (see appendix) and used a Likert-type rating system (1 = *Strongly Disagree* to 6 = *Strongly Agree*). One item on the scale read, "Robert engages in daily green activities (e.g., recycling, water/energy conservation)," and a "prefer not to answer" choice was also included, and participants who recorded this for at least one scale item were excluded for statistical testing concerning this scale. Participants' responses to all four items were averaged to compute perceptions of greenness. In this scale, a high score indicates that Robert is very green.

Finally, participants indicated if they would consider going vegetarian and vegan (yes or no). There was also a choice to indicate whether they were already vegetarian/vegan, and there was also a "prefer not to answer" choice. People that selected "prefer not to answer" and people that indicated they were vegetarian and/or vegan were excluded for the statistical testing in this section. Participants also indicated their gender, which allowed for comparison between males and females.

Data Analysis

A one-way ANOVA was conducted to investigate the effect of diet on perceptions of masculinity, and a separate one-way ANOVA was conducted to investigate the effect of diet on perceptions of greenness. Tukey-Kramer post-hoc tests were used to determine exactly where the statistically significant differences were located. Chi-Square tests were conducted to investigate which gender is more likely to consider going vegetarian as well as vegan.

Results

Masculinity Perceptions

The one-way ANOVA concerning the effect of diet of perceived masculinity revealed a statistically significant difference amongst the diets, $F(2, 116) = 5.34$, $p = .02$, as the p-value was less than .05. A Tukey-Kramer post-hoc test was also conducted, and the only significant difference existed between the omnivore (masculinity score of 4.20) condition and the vegan (masculinity score of 3.47) condition ($p = .01$). No significant difference existed between vegetarians and omnivores ($p = .19$) or vegetarians and vegans ($p = .62$) Therefore, partly aligning with the hypothesis, omnivores were perceived as more masculine than vegans. The perceived masculinity means, with a higher score representing a more masculine individual, are depicted in Figure 1.

Figure 1. Effect of Diet on Perceived Masculinity
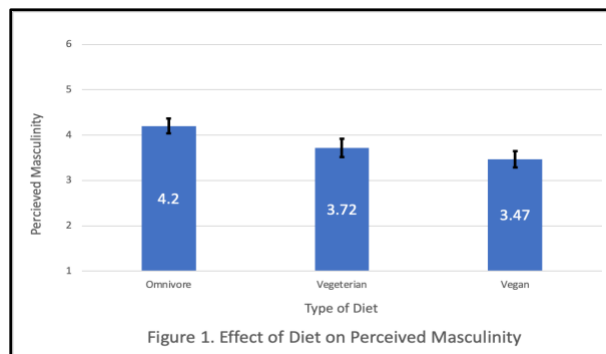
Perceptions of Greenness

The one-way ANOVA concerning the effect of diet on perceptions of greenness did not reveal a significant difference, $F(2, 119) = 0.95$, $p = .42$, for the p-value was greater than .05. The hypothesis was not supported because vegetarians (greenness score of 4.20) and vegans (greenness score of 4.46) were not perceived as better for the environment than omnivores (greenness score of 4.13). The perceived greenness means, with a higher score representing a greener individual, are depicted in Figure 2.

Figure 2. Effect of Diet on Perceived Greenness
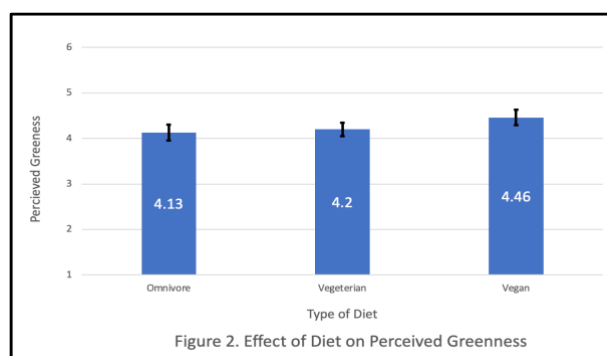
Considerations of Changing Diet

The chi square test concerning whether males or females are more likely to consider going vegetarian was statistically significant, $x^2 = (1, N = 84) = 13.97$, $p < .01$. For this statistical test, the already vegetarians and vegans data were excluded. Therefore, as hypothesized, women are more likely to consider going vegetarian than men. In this study, 31% more females considered going vegetarian as compared to males. The percent of

4

males and females who considered going vegetarian is depicted in Figure 3.

Figure 3. Percent of Each Gender Who Would Consider Going Vegetarian
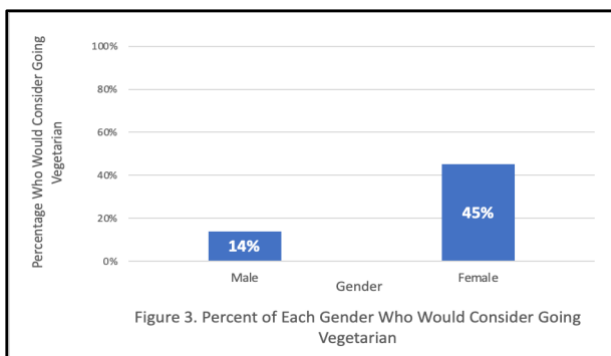
Another Chi Square test showed that, as hypothesized, women are more likely to go vegan than men, $x^2 = (1, N = 104) = 13.47, p < .01$. For this Chi-Square test, the data for the people who were already vegan was excluded. The percent of males and females who considered going vegan is depicted in Figure 4, and in this study, 23% more females considered going vegan compared to males.

Figure 4. Percent of Each Gender Who Would Consider Going Vegan
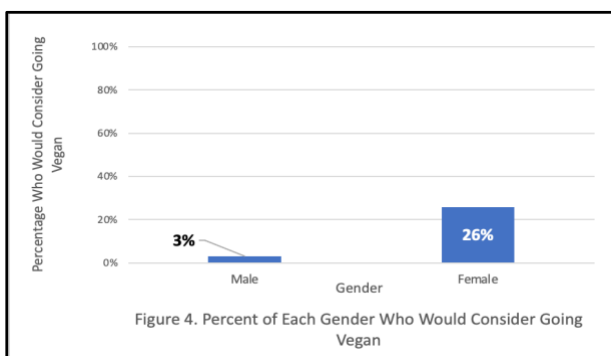
Discussion

Perceptions

In partial support of hypothesis one, vegans were perceived as less masculine than omnivores. This finding was expected, because studies show that men who eat more meat are seen as "real men" (Murti, 2020), and according to Vennard (2016), men who eat meat are seen as more masculine. However, even though vegetarians do not eat meat, they were not perceived as less masculine than omnivores. It is possible that with a larger sample

size, there could have been a significant difference between omnivores and vegetarians.

In contrast to hypothesis two, vegans and vegetarians were not perceived as better for the environment than omnivores. This finding was not predicted, for research suggests that vegans and vegetarians are better for the environment than omnivores (Dunne, n.d.), and this suggested that vegetarians and vegans would also be perceived this way. A possible explanation is that it may not be common knowledge that vegetarians and vegans are better for the environment. Therefore, it is possible that people perceive vegetarian and vegan diets as health benefits and fail to consider the environmental benefits.

Considerations of Changing Diet

As stated in hypotheses three and four, women are more likely to consider going vegetarian and vegan than men. This finding was expected because men are less likely than women to perceive plant-based diets as nutrition or healthy or tasty (Vennard, 2016). In addition, perceptions of masculinity may be preventing men from following a plant-based diet. According to Vennard (2016), men who want to be seen as "real men" should eat more meat, and therefore, men eat meat instead of following plant-based diets. Men are also ten times more likely to kill animals for sport than women (Murphy, 2020), and vegan/vegetarian men are less socially acceptable than vegan/vegetarian women (Murphy, 2020). Lastly, men see animals as of less importance (Fox, 2012). Therefore, men may not care as much about animals and therefore, are not compelled to become vegetarian or vegan.

Limitations and Further Study

First, the sampling in our study was not completely representative of the high school population. In our research, emails were sent out to various teachers, and these teachers distributed the surveys to their students. It would have been better

to use a completely random sampling technique such as choosing random students out of the school population while also encouraging these students to fill out the survey. In addition, people may have chosen the manipulation check correctly by chance instead of reading Robert's profile, and the independent variable would then have no effect on these people. Therefore, to eliminate these responses, attention checks throughout the survey would have been helpful. In addition, adding survey elements that require participants to spend a certain amount of time on a page could also be useful to encourage people to take their time and to read and answer the questions thoughtfully. It would also be interesting to test whether it is common knowledge that vegetarians and vegans are better for the environment. Another possible limitation was that many teenagers are not as concerned about the environment or their health compared to adults and, therefore, may not be as willing to go vegetarian or vegan. As a result, it is hard to generalize this research to an adult population. Further research could investigate whether adults are more likely to consider going vegetarian/vegan compared to teenagers.

Implications

Identifying differences in perceptions of omnivores, vegetarians, and vegans is the first step in eliminating negative perceptions that may be hindering men from becoming vegetarian or vegan, and by identifying these differences, the various stereotypes concerning vegetarians and vegans can possibly be eliminated. Previous research has found that men eat more meat than women (Vennard, 2016), and this study found that men are less likely to consider going vegetarian and vegan. Meat production is bad for the environment (Olson-Sawyer, 2013), and, therefore, it is important that more people, especially men, become vegetarian and vegan, and perceptions may be discouraging men from doing so.

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Who Gains the Most from Going to School?

An Analysis of Student Growth Outcomes Based on Parents' Work Status, Free-or-Reduced Price Lunch, and Student Engagement in Kindergarteners

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Abstract

The COVID-19 pandemic has disrupted the U.S. public education system in an unprecedented way, raising new questions for policymakers and educators who are in need of research to inform their practice and decisions moving forward. At the same time, the system is changing rapidly in response to the public health crisis and many standardized tests have been cancelled, creating a lack of current data on student achievement. This study adds to the pool of research based on data from before the pandemic and examines student outcomes in a regular school setting to measure the relationship between schooling and academic growth for different types of students. Data for the study was pulled from a nationally representative ECLS-K:2011 study to measure the relationship between three key predictor variables and their effect on student growth in both reading and math: 1) having all resident parents work full time, 2) a child's approach to learning, and 3) eligibility for free or reduced-price lunch (FRPL), with a focus on the first variable. All these factors could potentially exacerbate any effects of online learning. To test the relationships between these variables, t-tests, simple regressions, and nested regressions were run. Ultimately, children whose parents worked full time and children whose parents did not work full time gained comparably in math and reading during the school year. However, higher levels of child engagement were associated with smaller gains in both math and reading. Children who received FRPL had slightly higher math gains compared to non-FRPL students. These findings can help educators understand how disruptions in schooling may have differential impacts on student populations and how to more effectively target resources and support.

Keywords: education, schooling, students

Introduction

With the COVID-19 pandemic entirely redefining education, educators are in need of data to guide their decision-making. This includes data not just on how to keep students safe as they return to school but also data surrounding the consequences of online learning. It is of utmost importance that teachers and policymakers understand what works and what does not. Teachers need to know what types of students are more at risk during a period of online education, so that they can target interventions to the neediest students. Because of the lack of widespread standardized testing in the spring of 2020, there is very little data on student outcomes during COVID-19. Therefore, the next best option for educators to follow is existing data taken during a regular school year that can reasonably be projected to have a greater impact in a period of distance learning.

COVID-19 has introduced new considerations for factors that may influence

student growth, as it has created such an unprecedented situation. The purpose of this study was to identify the factors that may have an increased effect on student growth due to online learning. As students partaking in online learning are doing so mostly at home, parental support could be more vital than ever. Therefore, having all resident parents work full time could impact student achievement. This also means that self-motivation and student engagement could become even more important for individual success. As students who receive free or reduced-price lunch may have had their meal program and food security disrupted, these students may also become increasingly at risk for lower student achievement. By examining these factors and looking at various combinations of them, this study will be able to help identify students that are educationally at risk during the coronavirus. Doing so could aid educators in determining which types of students are more in need of support and additional resources during online learning. Knowing how to distribute such resources could potentially be critical in keeping students from falling behind during this time of crisis and even from dropping out of school entirely.

The Achievement Gap

One of the most important issues in education research today is the achievement gap, and experts worry that a disruption as significant as switching to online learning could disproportionately affect certain students and widen the gap (Haeck & Lefebvre, 2020). The achievement gap, famously studied in the Coleman Report of the 1960s, is a gap in student achievement between students of different backgrounds. Two of the most prominent gaps occur between students of high and low socioeconomic backgrounds and between students of different racial and ethnic groups. The reason for this gap in educational outcomes, discussed in Berliner (2009), can be attributed mainly to out-of-school factors that are more prominent in populations affected by poverty. Some of these factors even occur before birth, including drug use during pregnancy, having diabetes during pregnancy, and having influenza in the first half of

pregnancy, all of which can lead to a lower IQ or mental health issues in children. Other factors, such as low birth weight, inadequate medical care, low food security, harmful pollutants in the blood and in the air, family violence, and dysfunctional neighborhoods, also play a large role in furthering the achievement gap. Because out-of-school factors play a large role in student outcomes, it would make sense that their effect is amplified during extended periods of time out of school.

The achievement gap is not only important to the individual students and populations that it affects, but also is crucial to the American economy as a whole. As people are considered resources in a market economy such as that of the United States, the failure to have people operate at their highest potential can cost the economy dearly. In a study done by the Social Sector Office of McKinsey & Company, a management consulting firm that works to address complex societal challenges, it was estimated that if the United States had closed the racial achievement gap by 1998, its GDP a decade later in 2008 would have been $310 billion to $525 billion higher, which would constitute two to four percent of GDP. The study also estimated that is the United States had closed the income achievement gap—or raised the achievement of students will a household income of less than $25,000 a year to the same level of achievement of students with a household income of over $25,000 a year—over the same time period, its GDP would be $400 billion to $670 billion higher, constituting three to five percent of GDP (2009).

Few studies have examined the achievement gap outside the context of racial, ethnic, or socioeconomic groups. Additionally, since the COVID-19 pandemic cancelled disrupted opportunities for standardized testing and data collection, experts can only speculate as to how it will affect different student populations. This study hopes to dive deeper into disparities between various types of students by focusing on a few specific factors. Hopefully, if disparities are identified, the definition of "at-risk" students can be expanded, and educational resources can be allocated more effectively.

Online Learning for At-Risk Students

A study conducted by Hanover research (2020) is one of the select few that examines online learning in the context of at-risk students but does so at the undergraduate level rather than the elementary level. This study defines at-risk as first-generation college students, academically low achieving students, and students from low-income or minority backgrounds. It also added rural students into this definition, as students in more remote locations may have a harder time participating in online learning due to a lack of access to the internet and computing devices, and therefore they were achieving at lower levels during online instruction (Hanover, 2020). Such a study demonstrates exactly how online learning can further the achievement gap and can affect different student populations in different ways.

Free or Reduced-Price Lunch Program

The National School Lunch Program (NSLP) is a federally funded program that provides free or reduced-price lunches to millions of students from low-income backgrounds. It aims to provide these students with nutritious meals so that they can focus on their education, rather than food insecurity (National School Lunch Program). This program has been widely successful in providing food to underprivileged children, but gaps persist between students who receive these meals and those who do not.

A study done at the Gerald R. Ford School of Public Policy of the University of Michigan found that students who are eligible for free or reduced-price lunch perform at nearly a full standard deviation below non-eligible students on standardized math tests (Dynarski & Michelmore, 2016). The study also discusses how qualifying for the NSLP is often used as a measure of socioeconomic status when more specific data are not available. However, it then points out that using this measure can be flawed, as the NSLP provides the children with a service as well as indicating their poverty level. Additionally, the students categorized as receiving free or reduced-price lunch are only those whose parents have filled out the necessary paperwork—a child may be eligible for free or reduced-price lunch, but unless they have filled out the paperwork, they would not be included in this measure.

Because the coronavirus pandemic temporarily stopped in-person learning, it may have been more difficult for certain families to gain access to these needed meals, even though many schools provided the option for students to pick up their free lunch from the campus. Although the free or reduced-price meals themselves have not been shown to impact student achievement that drastically, the added food insecurity if one was not able to get one of these meals could potentially affect student outcomes during COVID-19. In addition, receipt of FRPL may be an indicator of reliance on other social safety net programs that are also experiencing disruption during the pandemic.

Student Engagement

Studies have shown a positive correlation between student engagement and achievement. The first such study to do so was conducted by Henriette Lahaderne with the *Journal of Educational Psychology* in 1968, which focused on student attentiveness and examined data from sixth-grade classrooms (Lahaderne, 1968). Ratings of attentiveness correlated significantly with scores on a standardized test. Many studies that have followed have shown similar results, such as Samuels & Turnure (1972), which studied attentiveness in first graders, and Skinner et. al. (1990), which added a student's self-control into its definition of a child's approach to learning. However, few have looked at student engagement in conjunction with other factors, as this study does.

Working Parents

Educators everywhere have recognized the impact of parental involvement on academic outcomes. A study published in the *Educational Review* by S. Wilder synthesized the results of multiple meta-analyses to make some tentative conclusions about the effect of such involvement.

The study was able to make the generalization that this relationship is positive and

significant, but that this relationship is strongest when parental involvement includes expectations for academic achievement (Wilder, 2013). Because this relationship between parental involvement and achievement exists, it would make sense to infer that having parents that spend more time with their children may lead to higher achievement.

To focus more on the relationship between time spent around one's parents and student outcomes, a 1983 study led by Cheryl Hayes and Sheila Kamerman from the Panel on Work, Family, and Community looked at the outcomes of children with working parents (Kamerman & Hayes, 1983). The study drew inconclusive results, largely because of the loose definition it held of what a working parent constituted. However, it did see children of working parents watching more hours of television on average, which was associated with lower student achievement. Because this study is now almost four decades old, and better data have become available, this present study hopes to present a more recent interpretation of the effect of working parents on child academic achievement.

Hypotheses

The objective of this study is to examine the relationship between these aforementioned factors and student growth over the school year. The main factor that this study will focus on is if all of a child's resident parents work full time. The variables of receipt of free-or-reduced-price lunch and student engagement will be added to examine how they affect the relationship between this main variable and the outcome variable. To fulfill this main objective, this research aims to assess the validity the hypotheses below:

1. Students who have all their resident parents working full time will experience less growth in mathematics over a regular school year than students who do not.
2. Students who have all their resident parents working full time will experience less growth in reading over a regular school year than students who do not.

3. Students who have all their resident parents working full time will experience less growth in both reading and mathematics than students who do not, even when taking into account variables for receipt of free-or-reduced-price lunch and levels of student engagement.
4. When controlling for race, class, and gender, these three variables will still have just as great an impact on student growth in both reading and mathematics.

This study seeks to aid educators in identifying which students benefit from attending school the most, and what variables that may put certain students at risk for falling behind. In periods away from school, such as during the coronavirus pandemic, this data could be vital in policy making decisions. All three predictor variables chosen are ones that may have an exacerbated effect during periods of online learning, making them even more relevant to a pandemic situation. By looking at student growth, we can better isolate the influence of school itself, and make predictions about what may happen to certain learners in a situation when that influence is lessened.

Method

Acquisition of Data

The data used in this study were taken from the Early Childhood Longitudinal Study, Kindergarten Class of 2010-11 (ECLS-K:2011). Sponsored by the National Center for Education Statistics (NCES), located within the United States Department of Education, this large-scale study followed a nationally representative sample of 18,174 students from 968 schools who attended kindergarten during the 2010–2011 school year. In addition to assessing the students directly, the ESLC-K:2011 also surveyed teachers, parents, and school administrators about the students and their environments. This data collection study employed a stratified design structure, in which the Primary Sampling Units (PSUs) were counties or groups of counties. Researchers then selected both private and public schools from these PSUs and chose a target number of about 24 students from each

school (Tourangeau et. al., 2019). These selected students all attended kindergarten in the 2010 to 2011 school year. Once all the students were selected, the study employed sampling weights to ensure that the data sample was nationally representative in race, class, and gender. Researchers collected data in nine waves, with collections in the fall and spring of kindergarten through second grade, and collections in the spring for third through fifth grade.

This study draws data from the first two waves of the ECLS-K:2011, which were taken in the fall and spring of kindergarten. The reason for this is that after these initial rounds of data collection, the number of observations declines substantially. Because these two waves included the greatest number of observations, they were chosen to make this study as accurate and relevant as possible.

Measures

Outcome Variables. To create an outcome variable representative of student outcomes, this study focused on cognitive assessments in both math and reading that were administered in the fall of kindergarten and the spring of kindergarten. The Mathematics Test was developed according to the standards set by the National Assessment of Educational Progress, National Council of Teachers of Mathematics, American Association of the Advancement of Science, and the National Academy of Science. Some of the items tested were conceptual and procedural knowledge, problem solving skills, addition and subtraction, and other basic operations. The Reading Test followed standards set by the National Assessment of Educational Progress. Parts of the assessment were taken from preexisting ones, such as the Peabody Picture Vocabulary Test – Revised, the Woodcock Johnson Tests of Achievement – Revised (Tourangeau et. al., 2019). Some of the skills tested include vocabulary, phonetics, letter and word recognition, as well as listening and reading comprehension.

These assessments were given in two stages, and the assessments adapted as they went

to fit each child's demonstrated ability level, based on trends of right and wrong responses. Because this resulted in children receiving different tests, item response theory procedures were used to calculate broad-based scores, which made the scores comparable. The ECLS-K:2011 researchers then turned these scores into theta scores to create a normally distributed curve (Tourangeau et. al., 2019). For this study, to transform these existing scores into one measure that quantifies growth over the kindergarten school year, the scores from the fall of kindergarten were subtracted from the scores in the spring of kindergarten. The differences that were calculated were then z-scored so that they could be better compared and understood (*M=0, SD=1*). These two variables, growth in math and growth in reading are the outcomes of interest for the study.

Predictor Variables. Three separate predictor variables were then chosen for this study, all of which were in some way relevant to online learning during the COVID-19 pandemic. The first of these variables is resident parents' full-time work status. Children whose parent(s) worked full-time were assigned a 1 on this variable; all other children whose resident parent(s) worked part-time or did not work were assigned a 0. Full time was classified as 35 or more hours per week (Tourangeau et. al., 2019). Children who have two working parents, or only one parent who works full time, may not receive as much support when learning from home as children who have a parent available during the school day. The effect of this variable is one that could considerably multiply during online learning, if found to influence student achievement. For purposes of simplicity, this variable will be referred to as "parent work status" going forward.

The second predictor variable is a child's approach to learning as rated by the child's teacher. This measure represents student engagement. This variable was a combination of the teacher's perception of each child's levels of organization, eagerness to learn, adaptability, determination, ability to pay attention, and obedience. The teachers scored each of these factors on a four-option scale ranging from

"never" to "very often," then the average of the scores for all the factors was calculated to determine a numerical value for each child's overall approach to learning (Tourangeau et. al., 2019). Before this variable could be utilized in the study, it had to be z-scored, as it was a continuous measure (*M=0, SD=1*). This variable was thought to be especially significant during a period of virtual learning as it would make sense for students who are self-motivated to succeed online.

The third and final predictor variable chosen for this study was students' receipt of the federal free or reduced-price lunch program. To qualify for this program, families have to meet certain eligibility requirements related to poverty and income. For the purposes of this study, students were categorized as either qualifying for one of these options or receiving no aid, splitting the variable into only two groups. Since during the spring of 2020 students that were learning virtually may have not had access to these meals as easily, this variable was thought to be another that could have a greater impact during online learning. For simplicity, this variable will be referred to as FRPL going forward.

Analytic Approach

To examine the relationship between the selected predictor variables and gains in both reading and math over the school year, t-tests and multiple regression analyses were conducted in a series of four rounds. These tests were run in Stata, version 15, using a 95 percent confidence interval. Relationships between the outcome and the predictor variables were analyzed in the first round, using t-tests. For the second round, the significance of each predictor variable was tested on its own in either a t-test or simple regression, depending on whether the variable was dummy or continuous. In the third round, they were all then tested again in this way but with race, gender, and class having been controlled for. Class was represented by a socioeconomic status variable, and each race variable was in comparison to white students, which were the majority group. The final regression that included all the predictor variables also controlled for these factors. Each regression

only included non-missing values, meaning that the final regression only included 6,360 observations out of the 18,174 students included in the study.

Results

In Model 1 of Table 1, the main predictor of parent work status was used to predict students' math gains. In Model 1 of Table 2, this variable was used to predict reading gains. This first round of analyses addressed hypotheses 1 and 2. From these initial analyses, it was found that students who have all resident parents working full time gain .047 *SD* (standard deviations) less in math over the school year (*p<.05*), and .079 standard deviations less in reading (*p<.001*).

Table 1: Math Gains by Parent Work Status, Approach to Learning, Receipt of Free or Reduced-Price Lunch (FRPL), Class, Race, and Gender (n=7,877)

	Model 1	Model 2	Model 3
All Resident Parents Work Full Time[2]	-0.047 *	-0.031	-0.018
Approach to Learning[1]		-0.027 **	-0.026 **
Eligible for Free or Reduced-Price Lunch[2]		0.128 ***	0.055 *
Socio-Economic Status[1]			-0.047 ***
Black[2]			-0.062
Hispanic[2]			0.094 ***
Asian[2]			0.009
Native Hawaiian/Pacific Islander[2]			-0.039
American Indian/Alaska Native[2]			-0.063
Multiracial[2]			-0.027
Female[2]			0.013
Constant	-0.034 **	-0.082 ***	-0.072 ***
R[2]	0.001	0.008	0.014
ΔR		0.007	0.006

SIGNIFICANCE KEY: *** p<0.001; ** p<0.01; * p<0.05
[1] outcomes are z-scored (coefficients are in SD units)
[2] Measure is dichotomous (yes=1; no=0)

The influences of the other two predictor variables, FRPL and approach to learning, were added in Model 2 of both tables. After these variables were accounted for, no significant relationship was found between the parent work status variable and math gains (*p>.05*). For reading gains, students with all resident parents working full time gained .052 *SD* less over the school year than students who do not have all of their resident parents working full time (*p<.05*). It is also apparent that while controlling for parent work status and FRPL, for every 1 *SD* increase in approaches to learning, students gain .027 *SD* less in math and .043 *SD* less in reading (*p<.01* and *p<.001* respectively). Finally, we learn from Model 2 that on average, when controlling for the other two predictor variables, students who receive FRPL gain .128 *SD* more in math and .219 *SD* more in reading than students who do not

(p<.001). These results were all before controlling for race, class, and gender.

Table 2: Reading Gains by Parent Work Status, Approach to Learning, Receipt of Free or Reduced-Price Lunch (FRPL), Class, Race, and Gender (n=7,877)

	Model 1	Model 2	Model 3
All Resident Parents Work Full Time[2]	-0.079 ***	-0.052 *	-0.025
Approach to Learning[1]		-0.043 ***	-0.036 ***
Eligible for Free or Reduced-Price Lunch[2]		0.291 ***	0.044
Socio-Economic Status[1]			-0.130 ***
Black[2]			0.117 **
Hispanic[2]			0.100 ***
Asian[2]			-0.080
Native Hawaiian/Pacific Islander[2]			0.251
American Indian/Alaska Native[2]			-0.117
Multiracial[2]			-0.072
Female[2]			0.016
Constant	-0.015	-0.097 ***	-0.037
R[2]	0.002	0.016	0.035
ΔR		0.014	0.019

SIGNIFICANCE KEY: *** p<0.001; ** p<0.01; * p<0.05
[1] outcomes are z-scored (coefficients are in SD units)
[2] Measure is dichotomous (yes=1; no=0)

In Model 3 in both tables, the study controlled for race, class, and gender by adding those variables into the final regression. In this model, there was no relationship found between parent work status and either math or reading gains. Therefore, when controlling for all these other factors, students whose resident parents work full time gain comparably to students whose resident parents do not all work full time. However, the approach to learning variable retained its significance—a 1 *SD* increase in approach to learning was associated with .026 *SD* less gains in math and .036 *SD* less gains in reading. Once these control variables were added there was no longer a significant relationship between these two variables for reading gains, but students who receive FRPL gain slightly more in math than students who do not receive FRPL (ES=.055, *p*<.01). Some of the variables added as controls displayed significant results as well. On average, with each *SD* farther *below* the mean value for socioeconomic status students are, they gain .047 *SD* more in math and .130 *SD* more in reading over the school year (*p*<.001). Hispanic students gain .094 *SD* more in math and .100 more in reading than white students, as well. The relationship between math gains and being of black background was not significant, but black students did gain .117 *SD* more than white students in reading. The R-squared value on both tables demonstrates that all of the variables in the final regression combined, including control variables, account for 1.4% of the variation in gains in math

over the school year and 3.5% of the gains in reading.

Discussion

Interpretation

When receiving free-or-reduced-price lunch and student engagement are accounted for, and the influence of gender, class, and race are taken out of the equation, having all of the parents that a child lives with work full time will *not* put them at a disadvantage to succeed in a regular school setting. Yet, when this variable was considered only in the context of one of the groups—either the two secondary predictor variables or only the control variables—it still had an impact on student growth. This suggests that the combination of all of these variables is what explains the impact of the parent work status variable, and that this alone probably does not drive much of the variability in student growth outcomes.

This does not mean that in a situation such as the coronavirus pandemic, the influence of this factor might change. It could be that going to school every week is what prevents this variable from having a significant impact on student growth, and with this removed, students with working parents may experience more struggles. However, in a regular school setting, this paper finds no evidence that parents should feel guilty over leaving their child to go to work on the basis of it harming their educational achievement.

Student engagement, on the other hand, impacted both math and reading gains. In a normal school year, students with higher levels of engagement were found to experience less growth over the school year than students with lower levels of engagement. While this may seem counterintuitive at first, based on the previous research cited in the literature review of this study, it is likely that the students who were more engaged performed better overall, but just experienced less growth than their less-engaged peers. Together, these results support the idea that school has a positive impact on less academically enthusiastic learners and brings them closer to the

level of achievement at which students who are academically engaged perform. Without the influence of school—or in a case when the influence of school is diminished, such as a pandemic—students who are less engaged in class may experience less growth than usual, leading to them falling farther behind.

After all other variables were accounted for, receipt of free-or-reduced-price lunch only impacted gains in math, not gains in reading. On average, students who received FRPL gained slightly more than students who did not. Because FRPL is closely related to socioeconomic status – as supported by research cited in the literature review of this study - it seems probable that these students performed worse overall, but just experienced greater gains in their performance. Similar to the approaches to learning variable, it seems that the influence of school may potentially help close the gap between receivers of FRPL and students who do not receive FRPL in math. Without the influence of in-person school five days a week, these students may very likely gain less in math than usual, maintaining the gap between them and non-receivers of FRPL. Reading is not that strongly related to FRPL when other variables are accounted for, so these students are not as at risk to fall behind in reading, only in math.

Two of the variables used to control for race, class, and gender also proved to be related to academic gains, and these were socioeconomic status and students of Hispanic background. Similarly to FRPL, a higher socioeconomic status was strongly associated with lower gains, this time in both math and reading. The disparity in gains was greater in reading than in math. This variable has been well-documented, so this result was not a surprise ("Education and socioeconomic status factsheet," 2017). School is very likely an equalizing factor for students of low socioeconomic status. As for Hispanic students, on average, they gain more than the comparison group, white students, in both math and reading. Black students only gain at a higher level than white students in reading. These two statistics make sense as they are the two groups most affected by the achievement gap, and school likely aids in closing that gap.

Application

It appears from these results that, for the most part, more disadvantaged learners actually gain more over the school year than their peers. If this is in fact because of the equalizing influence of school, this raises real concerns for these students during periods of disrupted schooling such as the distance learning many students are participating in during the coronavirus pandemic. Students who have low levels of academic engagement, receive free-or-reduced-price lunch, or are of a low socioeconomic status may be at risk to fall behind during the pandemic. They all experience higher than average gains during the school year but have lower achievement outcomes overall. The gap between these students and their higher achieving peers may widen during such times.

With this knowledge, educators could help prevent this from happening. They could use these identifying factors to pinpoint at-risk students and target them with additional resources and programs to help them succeed. Teachers should be mindful of this information so that they could treat these at-risk students with more understanding in the classroom and perhaps devote more of their attention to them. Doing so could prevent such students from failing classes, failing to graduate on time, or dropping out of school entirely.

As mentioned previously, the variables chosen for this study are ones that could perhaps have a more profound impact in the specific situation of a pandemic. They were thought to possibly add to the effect of being out of school for an extended period of time. This should be taken into consideration by educators as well. Having parents work full time while students learn from home could cause issues especially for younger learners, possibly making this variable more significant during a situation such as a widespread lockdown. However, parents can take comfort in the fact that this variable is not that significant during a regular school year. Having low levels of academic engagement could become even more

problematic during online learning as it is easier to disengage from a computer screen than when in a classroom. Finally, the variable for receipt of free-or-reduced-price lunch could have a heightened influence on student growth if meals are made more difficult to obtain. During the pandemic, schools had to find new ways of getting these meals to students, which may have caused more instability in students' lives, possibly leading these students to fall even further behind in math. The possibility that these factors could have a heightened influence on students during the pandemic should not be disregarded.

Limitations

This study was limited in a few distinct ways, one of which being the period of data collection in the ECLS-K:2011. Because schools in America start at varying times of the year, and the researchers collected data at fixed times in the year, not all the students had experienced the same amount of schooling prior to the mathematics and reading assessments. An average of six months passed between the beginning and end of year assessments, but this period could have ranged anywhere from four to eight months depending on the school. This variation could affect the amount of growth certain students demonstrated from the first to second rounds of data collection in a way that is not perfectly representative of their abilities.

Another limitation is that data was only taken from the kindergarten year of school, as that year had the greatest number of observations in the dataset. Therefore, the result of this study may have been slightly different if conducted with older students, making it difficult to apply these results to any grade level.

Specifically, the variable for receipt of free-or-reduced price lunch was limited in a critical way. It does not include all the students who are eligible for the national school lunch program, only those whose families go through the process of filling out the paperwork for their children to have access to it. There are likely many children who meet the threshold of criteria to be a part of the national school lunch program, but never actually participate. Therefore, this variable

is only for students that physically *receive* the free-or-reduced-price meals.

This study was also limited in its relation to the COVID-19 pandemic. The purpose of this study was just to add to the body of research on factors in education that could be of more importance during remote instruction, but it did not explicitly give any information on how these results could change in a pandemic. Any discussion on how these factors could change or affect students differently based on this research are only hypotheses.

Future Research

As there is little data on the impact of COVID-19 on student achievement in the present, this study focuses on existing data to help add to the current pool of research that can be used to make policy concerning the pandemic in the present. However, the true effect of COVID-19 on K-12 students will not be able to be discerned until years after the pandemic has subsided, when more data from this time period is available. For future research, it is of utmost importance to understand the pandemic's real impact on students, firstly to help students that were negatively affected as much as is needed, and secondly to be prepared if a similar situation ever occurs again.

Conclusion

In a time of instability, it is necessary that schools pay attention to their neediest students, and this study helps point in the direction of what students those may be. Student engagement may be a key component to identifying at risk students and preventing them from falling behind, as this is a factor that teachers can identify in students themselves. Socioeconomic status plays a large role as well, and receipt of free-or-reduced price lunch in only the subject of math. Thankfully, having all resident parents work full time is not as important a factor, but the relationship between parents' work status and student growth may still be multiplied or changed during the pandemic. Teachers and educators should take information such as this into mind when allocating resources

and time to students, as it could make a great impact on a student's K-12 career.

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The Effect of Political Division on Compliance with COVID-19 Health Guidelines

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Abstract

Politically, during the COVID-19 pandemic, the United States is a nation divided, with different information coming from either side of the aisle (Jurkowitz, 2020) (Motta, 2020). Information plays a large role in decision making, as detailed in the theory of reasoned action (Madden, 1992). People seek out information from sources that they already agree with and trust, and will behave accordingly (Horrigan, 2017). Because left-wing and right-wing information is different, I hypothesized that people on the left and right sides of the political spectrum will behave differently. More specifically, people who are more liberal will be more likely to follow guidelines than those who are more conservative. To test this, I fielded a survey using Amazon Mechanical Turk that asked participants about their compliance with health guidelines, where they get their news from, and their political alignment. I conducted Pearson's correlation matrices between those variables for responses from the entire nation and regionally. The nationwide results were not significant, but the results from regional groups did show that liberals are more likely to comply with guidelines on a regional scale. These findings are representative of a lack of a unified federal response. People in different regions are behaving differently based on their immediate perceptions of danger, and their own personal feelings about it, which prevents the entire nation from controlling the outbreak. This is problematic for the future of the pandemic, which will only improve if everyone complies.

Keywords: COVID-19, news, political, compliance, response

Introduction

The COVID-19 pandemic is truly the first of its kind. It is the first global pandemic in the digital age, and it caused the world to stop. Both political officials and news media play an important role in disseminating information about the pandemic to the public because they act as trusted sources (CDC, 2019). Because the pandemic almost immediately became politically polarized, it has been shown that information from officials and the news media has varied depending on the source's political lean (Jurkowitz, 2020). This has implications for the future of the pandemic, considering that the public needs to unify and comply with health guidelines to ultimately contain it (CDC, 2019). Are people on different sides of the political aisle acting in a divided way based on the different information they have received?

Political party affiliation and alignment dictates the lives of many, from where people get their news from to who they associate with. It has even started to influence issues of public health, which are seemingly not political. During the COVID-19 pandemic, left-wing and right-wing politicians immediately started to give different responses. In a study that looked at tweets from members of Congress from both parties, Republicans spoke more frequently about how the virus was foreign and limiting foreign travel, calling it the "kung flu" (BBC, 2020), and Democrats encouraged people to stay home (Green, 2020). People in power serve as a trusted source to their supporters. It has been shown that

people are more likely to engage with information if it comes from a source they trust (Horrigan, 2017), so it is possible that Republicans and Democrats will be engaging with different sets of information from their respective political officials.

The media plays an important role in the response to the pandemic, but most media outlets fall victim to a political lean that changes the information they present to their viewers. The coverage of the COVID-19 pandemic has been different depending on the politics of the media outlet in question (Jurkowitz, 2020). This is indicative of a disparity in the information presented to viewers. Also, the media has been shown to play a role in increasing dislike among the electorate for the opposing party (Levendusky, 2016). Because people will usually revisit and engage with trusted sources before making a decision (Horrigan, 2017), Republicans and Democrats have been receiving different information about the coronavirus pandemic, and this may lead to differences in behavior.

There is a significant difference between the message coming from each side. The right tends to avoid and downplay the severity of the virus, likening it to a mild flu. For example, Fox News leans to the right, and anchors like Sean Hannity made claims that the coronavirus is a hoax created by the left and that a vaccine already exists (Motta, 2020). In March 2020, a poll found that only 38 percent of Fox News viewers were worried about coronavirus (Motta, 2020). Republicans were also found to believe that the coronavirus was equally as deadly as the flu (Jamieson, 2020). This is likely due to the information that they received from right-wing sources; Fox News medical correspondent Marc Siegel compared it to the flu (Ingraham, 2020). In actuality, the global death rate for COVID-19 is 3.4%, and it is less than 1% for the flu (WHO, 2020). The right-wing media has been spreading misinformation, following the lead of President Trump, which can possibly have an influence on the behavior of Republicans. They may be less likely to comply with health guidelines based on the information they have been receiving.

The leftist media has been doing the opposite. They have been trying to emphasize the importance of wearing masks and staying home to contain the spread and flatten the curve, while maintaining that the pandemic is a very serious issue. Sources like the New York Times have made all their COVID-19 articles accessible without a subscription and have focused on reporting on science rather than opinion. Additionally, CNN has had Dr. Anthony Fauci, the director of the National Institute for Allergy and Infectious Diseases, on their programming constantly to inform their viewers about the severity of the virus. This shows how since the beginning, they have taken the virus seriously and tried to emphasize the importance of staying informed. Seventy-one percent of CNN viewers were found to be concerned about the coronavirus (Motta, 2020), which shows that they were receiving different information than Republicans. Democrats thus may be more inclined to follow health guidelines based on left- wing information.

Contrary to popular belief, people do not usually panic during a crisis, but make decisions that they think are reasonable based on the information that they have sought out (CDC, 2019). The theory of reasoned action can be applied here; people take their attitude about a situation, combined with what they perceive to be the norm, form a behavioral intention, and then perform a behavior (Madden, 1992). During the pandemic, people form their own attitudes based on the media and the information that they seek out. Their perceived norms can vary based on which political officials they follow and which behaviors they are seeing other people perform.

Because much of the response to the pandemic was left up to individual states and regions, (OECD, 2020) it is possible that behavior is not consistent across the nation. As a result, it is worth investigating the regional responses around the country. There are a few regions that present interesting information regarding people's behavior, including the sunbelt, midwestern, and "red" and "blue" states. This regional classification is a novel approach to research on the response to the pandemic.

Sunbelt states, which include most southern states (Britannica, 2020), have a potentially interesting relationship with COVID-19. For the most part, the average age of people who became infected with SARS-CoV-2 in sunbelt states was lower, resulting in a lower death rate (Dunleavy, 2020). Additionally, most of the sunbelt states have a Republican majority and Republican leadership (Ballotpedia, 2019). People may perceive the pandemic as less severe because of social norms set by the Republican majority and the lower death rate, and may be less likely to comply, resulting in a significant correlation.

Coastal states and midwestern states also had very different responses to COVID-19. Coastal states included New York and California, and Midwestern states were chosen based on agreed upon borders (Simpson, 2020). At the beginning of the pandemic, coastal states were affected much more significantly by the virus. Case numbers on the east coast and in California skyrocketed in March of 2020, sparking mass panic and closures (Coronavirus Map and Case Count, 2021). Because people are typically consistent with their behavior from their initial attitude (Madden, 1992), people living in coastal states will be more likely to comply. People in Midwestern states, however, may have been able to form their own opinions based on their political alignment and news sources without many consequences. There could be a significant correlation between news source, alignment, and compliance in midwestern states.

Red and blue states were determined by which candidate won the state during the 2016 Presidential Election. Blue states were won by Hillary Clinton, red states were won by Donald Trump (Kiersz, 2016). Red states are more likely to have Republican state governments, which can change the way COVID-19 was handled. The majority of Republicans believe that the COVID-19 response is the responsibility of state governments, not the federal government (Gilberstadt et al., 2020). Also, right-wing state officials may be more likely to listen to Donald Trump (Plott, 2021), who did not encourage mask wearing for many weeks (Etehad, 2020). It can

therefore be suggested that blue states would show a positive correlation, and red states would have either a less positive or even a negative correlation.

Research that helps quantify people's response to the pandemic is beneficial in a few ways. Firstly, it helps find patterns within people's behavior during a crisis, which is important for the prediction of behavior in future crises. Additionally, it can help quantify the effects of political division and the consequences of disunified information. There also has not been much investigation into the long-term psychological causes, like the previous establishment of trusted news sources based on political alignment. This research, in investigating the correlations between alignment, news source, and compliance is novel. Previous study has linked people who vote for Democrats with being more likely to wear a mask (Bruine de Bruin et al., 2020), but has not investigated that regionally or looked at more than one political alignment. Regional differences are important to consider, especially when taking into account the role individual states had in creating their own responses.

In sum, the problem presented with this topic is whether or not political affiliation predicts the way people are behaving during the pandemic. I hypothesized that if political affiliation affects behavior based on the theory of reasoned action, and people seek out news that aligns with their political views, then Republicans will be less likely to follow guidelines than Democrats. In regard to the regional experiments, I predicted that there would be a significant correlation between news source liberalness, political alignment, and compliance in sunbelt states, midwestern states, and in red and blue states. In other words, people will act in a politically divided manner across the country and in select regions. To test this, I surveyed 1,000 people across the United States using Amazon Mechanical Turk to determine which health guidelines people are following, where they see themselves on the political spectrum, and where they get their news from.

Methods

Participants

For this experiment, I fielded a survey of a sample of people using Amazon Mechanical Turk. Participants who were interested in completing the survey were compensated ten cents for their time. Mechanical Turk did not collect the names or IP addresses of the participants, allowing for complete anonymity and very little risk for the participant. The survey should have taken about 5-7 minutes to complete. None of the questions asked for personal or private information and should not have had any damaging mental effects on the participant. The first question acted as an informed consent form for the participant. If the participant declined to give their consent, they were not directed to the questions page. They were also permitted to leave the page at any time if they were uncomfortable with answering the survey questions, but they would not receive the ten cent compensation.

Because MTurk ensured that participants' identities remained anonymous, and they were compensated for completing the survey, some do not take the questions seriously or use bots to answer as many surveys as possible. To mitigate this, I asked two questions that limited the number of insincere responses and made the collected data more reliable. Question 1 asked if the participant was blind or had a serious vision impairment (Ahler, 2020). Question 2 asked if the participant usually answered survey questions dishonestly (Lopez, 2018). If the participant answered "yes" to question 1 and "always" or "usually" to question 2, their responses were flagged as internet trolling or insincere (Ahler, 2020), and were removed from the final data set. 1,713 people completed the survey, of which 713 responses had to be rejected for insincerity or were from countries outside the United States, leaving 1,000 responses. At this point the survey was removed from MTurk.

The next question asked for the participants' Mechanical Turk Worker ID. This was used to match the responses to the participant during analysis. The following questions asked for general information from the participant that may influence their responses regarding compliance. These questions acted as controlled variables to provide other insight in the way people are behaving. Questions 4, 5 and 6 asked for age, state of residence, and previous COVID-19 testing experience, respectively. Age could have had an effect on the participant's likelihood to comply with certain health guidelines. Those who are older are more at risk and will likely want to protect themselves regardless of their political affiliation. Also, it was a short answer question to increase engagement with the participant and prevent the use of bots. State of residence can influence the likelihood that the participants follow health guidelines, especially if mask wearing and social distancing were required by state officials. If participants had been previously infected with the virus, it could lead them to believe that they are immune and do not have to follow health guidelines.

Measures

Following CDC guidelines. Questions 7-10 asked about how frequently the participant has been following CDC health guidelines for the duration of the pandemic. These questions measured the dependent variable which was compliance with health guidelines. The guidelines targeted in the survey include public mask wearing, social distancing, and hand washing. A five-point Likert scale was used, and it was adapted from a study that asked similar behavioral questions to Chinese citizens at the start of the pandemic (Wang, 2020). To condense the separate health guideline compliance data, I conducted a Cronbach's alpha test to determine if people were more often than not following all guidelines as opposed to only some of them. This also determined the internal reliability of the data set. Cronbach's alpha was calculated to be 0.73. 0.73> 0.7, so internal reliability was present. I was then able to calculate the average behavior for each participant, which will act as their overall compliance "score." That compliance score was used in the remainder of the statistical analyses.

News source and political affiliation. Both Question 11 and Question 12 were used to

measure the political liberalness of the participant. More specifically, where they get their news from and where they see themselves on the political spectrum. News liberalness and political alignment are the independent variables. The sources were ranked on the political spectrum from the far right, to slightly right, neutral, slightly left, far left. The political lean of each source chosen was determined using a Pew Research Center study (Gottfried, 2014) and information collected by All Sides. This question used a "select all that apply" feature to account for people most frequently getting their news from varied sources. The political lean of each news source was ranked on a scale of liberalness, and is represented as such in the results. Participants then used a 7-point scale that ranked options from strongly liberal to strongly conservative (Graham, 2012) (Pew Research Center) to self-report their political alignment. Asking participants to self report as opposed to trying to gauge their affiliation through opinions on policy, like other political alignment tests (Pew Research Center), kept the length of the survey down. This option also accounts for the 38 percent of American voters who are independent (LaLoggia, 2019), and those who affiliate themselves with another party entirely. The answers to these two questions served as the two independent variables in this study.
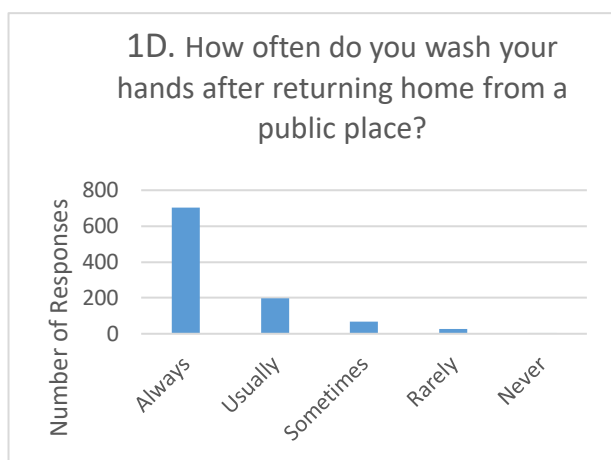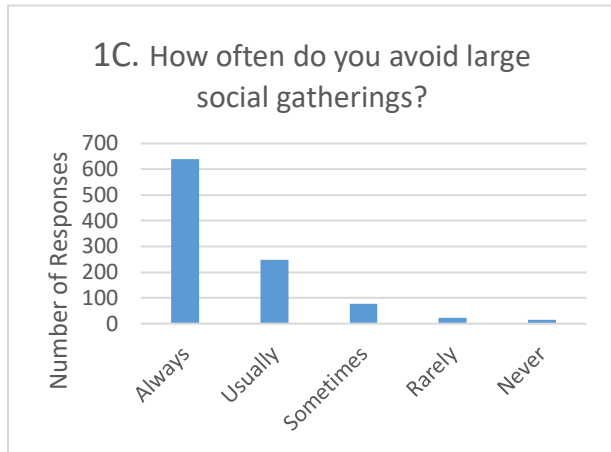
Procedure

The survey was developed using Google Forms and disseminated with Amazon Mechanical Turk. Each participant, or "worker," after clicking on the survey, was shown the informed consent form. If they decided to participate, they clicked forward and were taken to the survey questions. Google Forms presented the questions in a list. As participants completed the questions, their responses were recorded by Google Forms and Mechanical Turk. After 1,000 responses were collected, I downloaded an Excel file that listed each of the participants responses and their Worker ID. I then filtered the responses based on negative answers to the anti-tampering questions and those that listed foreign countries as their state of residence. I used Mechanical Turk to reject those responses by their Worker ID, which put the

survey back up on the site. I repeated this process until I had 1,000 responses that passed the anti-tampering questions and were from the United States. A copy of the survey can be found in the appendix.

Results

Firstly, I analyzed the demographics of the data I collected. Most notably, the majority of people are following CDC sanctioned health guidelines. Most respondents selected that they "always" or "usually" wear a mask, stay six feet apart from others, avoid large social gatherings, and wash their hands upon returning home (Figures 1a-d). Although the majority of respondents identified as liberal to some degree, all political alignments are represented. (Figure 2).

1A. How often do you wear a mask in public?

1B. How often do you stay 6 feet apart from others in public?

1C. How often do you avoid large social gatherings?

1D. How often do you wash your hands after returning home from a public place?
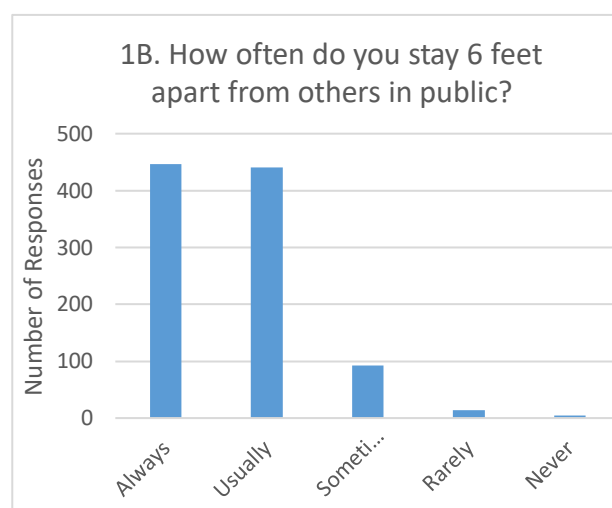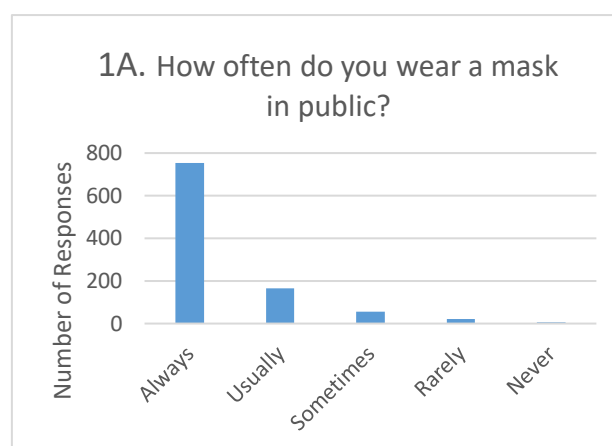
Figures 1a-d: Show the responses for survey questions that ask about compliance. *N*=1,000

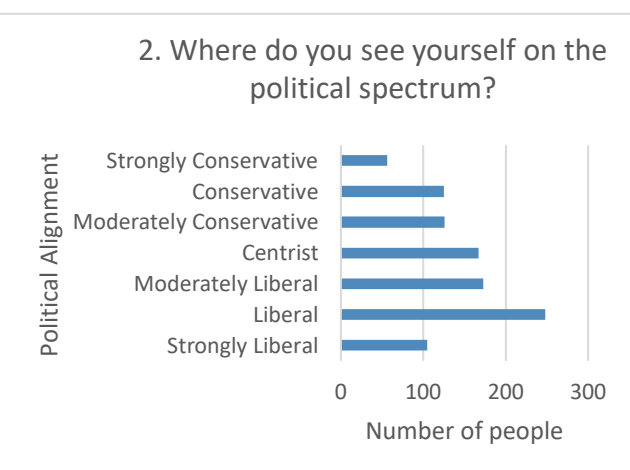## 2. Where do you see yourself on the political spectrum?

Figure 2: The frequency of each selected political alignment. *N*=1,000.

Initially, I conducted two Pearson's correlation matrix tests, one for political alignment and the other for news sources. Using a correlation accounts for the fluidity of the data collected. People fall on a scale of liberalness and their behaviors also fall on a scale of compliance, assessed by the survey. I assigned each response for the dependent variable questions (health guideline compliance) and for the independent variable questions (political alignment and news sources), a number that corresponds to the degree of compliance or the degree of liberalness. So, for the health guideline questions, "Always" corresponds with 5, and 1 corresponds with "Never." For the political alignment questions, 1 represents "Strongly conservative" and 7 represents "Strongly liberal." For the news source questions 1 represents the most conservative news source, Breitbart, or the Daily Wire, and 5 represents the most liberal, MSNBC or The Huffington Post.

Table 1:		Average compliance all states	Political alignment all states
Political alignment all states	Pearson's r	-0.002	—
	p-value	0.95	—
Average news liberalness all states	Pearson's r	-0.061	0.399 ***
	p-value	0.052	<.001

Table 1: The results of the Pearson's correlation matrix for all states. Significant *p* values (*p*<.001) are marked with a (*). *N*=1,000.

A Pearson correlation matrix was conducted to determine the relationship between average health guideline compliance and how participants saw themselves on the political spectrum. This was not found to have a significant correlation. (Table 1). This does not support my hypothesis that people would be less likely to comply with guidelines if they are more conservative. The data suggest that there is not a

significant relationship between people's compliance with health guidelines and their political alignment for all the data collected.

For the news source experiment, I first had to find the average of each participant's response since they could choose multiple sources. The greater the average of the participants' responses, the more liberal their news consumption is. I ran a Pearson's correlation matrix for the average health guideline compliance and the average news source consumption for each participant. The results of this experiment are not significantly correlated (Table 1). The data suggests that where people get their news from does not have a significant effect on their compliance with health guidelines. This refutes my hypothesis that the people who got their news from more conservative sources would be less likely to comply with health guidelines because conservative sources have consistently downplayed the severity of the pandemic. There was also a correlation run between political alignment and average news source liberalness, which was significant (Table 1). This means that people who identify as more liberal read more liberal news sources, which aligns with the original rationale. This was also seen in every other correlation performed.
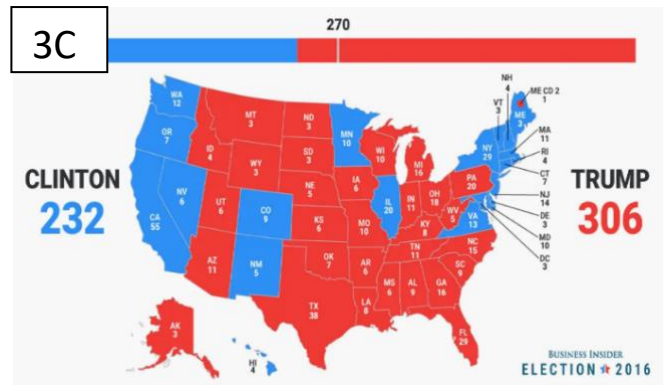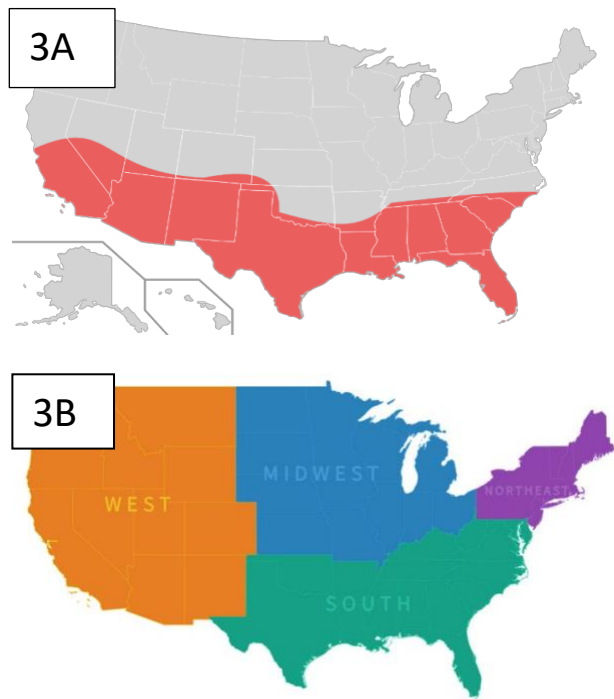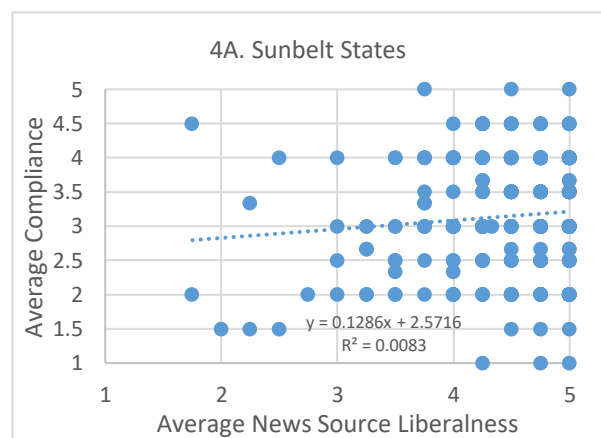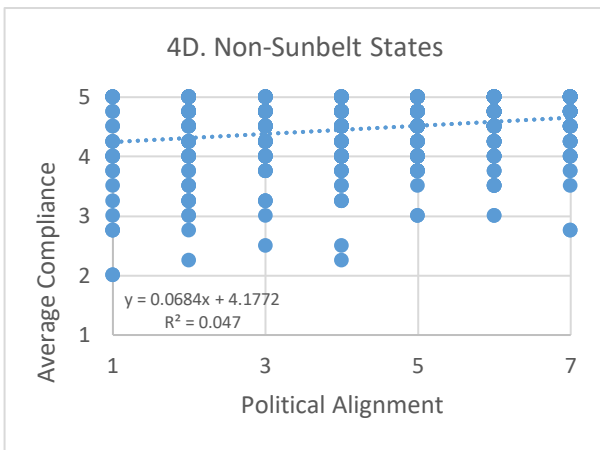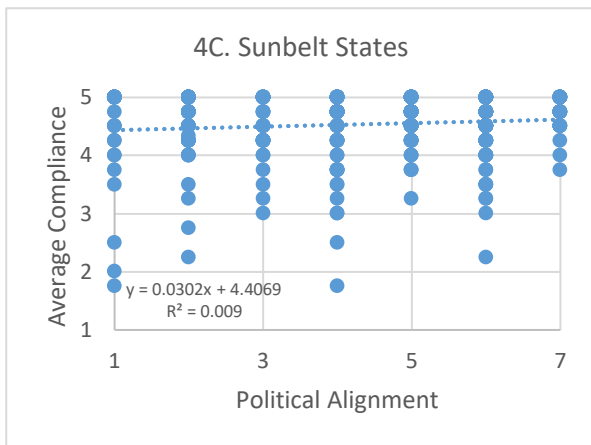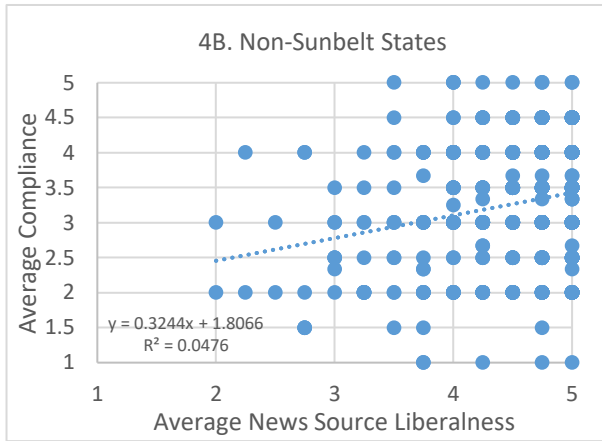
Figure 3a-c: (A) Sunbelt states. Sunbelt states include: Florida, Georgia, South Carolina, Alabama, Mississippi, Louisiana, Texas, New Mexico, California, and Nevada (Wikipedia, 2020) **(B)** The Midwest and Coastal States. Midwestern states include: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin (Simpson, 2020) **(C)** Electoral map of votes from the 2016 election (Kiersz, 2016)

After performing this analysis, I decided to section the data by region of the country to try and examine the effect of state of residence on average compliance. The regions are: sunbelt states (Figure 3a), midwestern and coastal states (Figure 3b), and states that voted Republican or Democrat in the 2016 presidential election (Figure 3c). The results of the statistical analyses for these regional groups were different when compared to the results for the entire country. This may be an indication of how divided and region-specific the response to COVID-19 was.
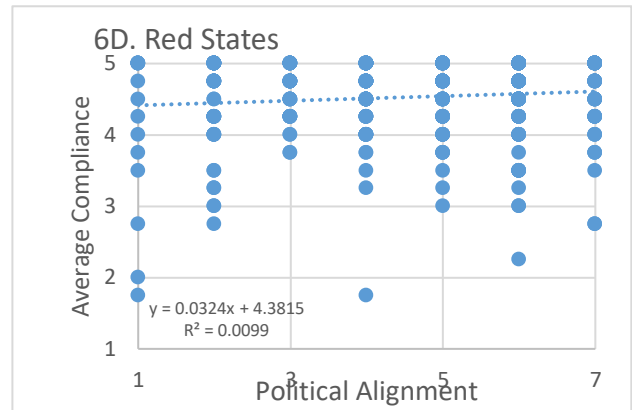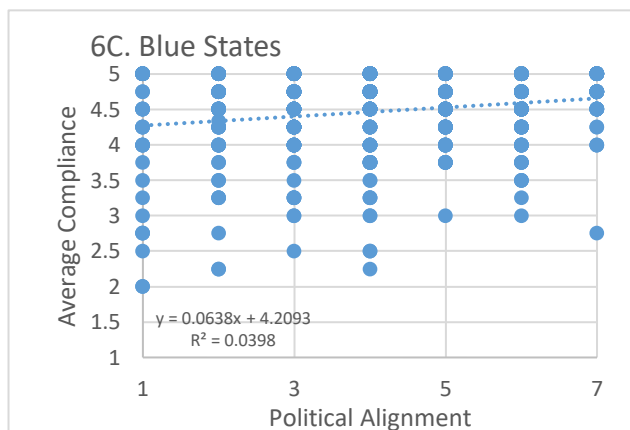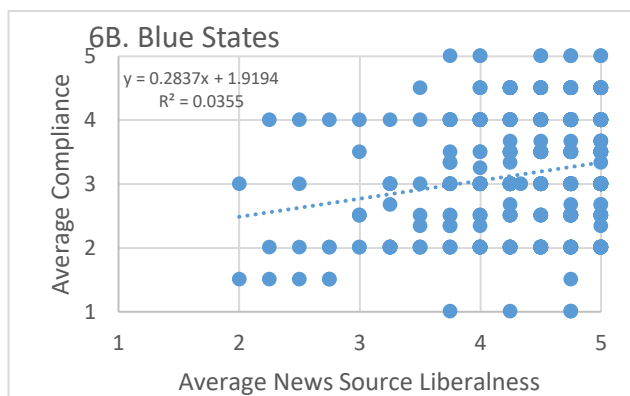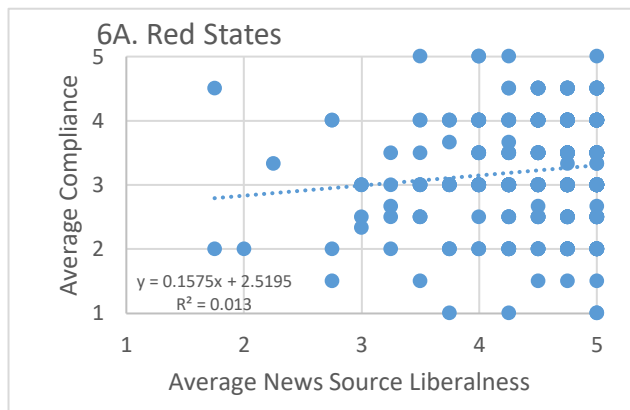
4B. Non-Sunbelt States

y = 0.3244x + 1.8066
R² = 0.0476

4C. Sunbelt States

y = 0.0302x + 4.4069
R² = 0.009

4D. Non-Sunbelt States

y = 0.0684x + 4.1772
R² = 0.047

Figures 4a-d: Correlation between news source liberalness and average compliance in (A) sunbelt and (B) non-sunbelt states. Correlation between political alignment and average compliance in (C) sunbelt and (D) non-sunbelt states. *p*<.001 for political alignment, news source liberalness and compliance in non-sunbelt states. *N*=432 for sunbelt, *N*=568 for non-sunbelt.

For the sunbelt states, midwestern states, and red and blue state groups, I conducted a Pearson's correlation test to determine if there was a significant difference in behavior for responses that came from those areas. Sunbelt states had a different response to the COVID-19 pandemic than those on the East Coast and in the Midwest. There was a total of 432 responses that came from sunbelt states. I conducted a Pearson's correlation matrix test between sunbelt states and the other states. While news source liberalness and political alignment did not have a significant effect on compliance in sunbelt states, in non-sunbelt states the correlation was significant (p<.001) (Figures 4a and 4c). These findings do not support my hypothesis that more conservative people will be less likely to comply and that there would a significant correlation in sunbelt states.

5A.

y = 0.5139x + 0.9877
R² = 0.1385

5B.

y = 0.1041x + 3.9255
R² = 0.0859
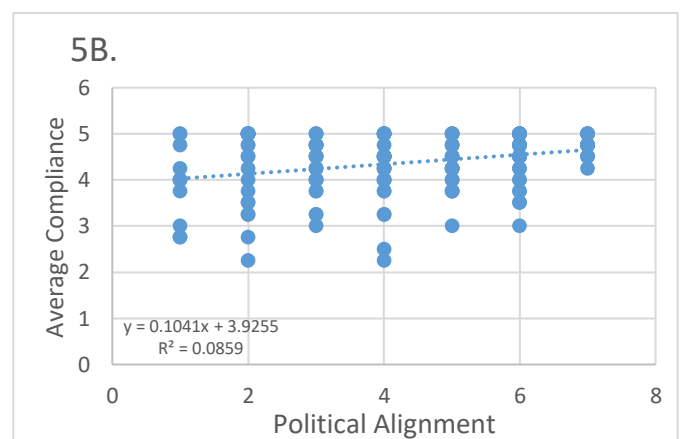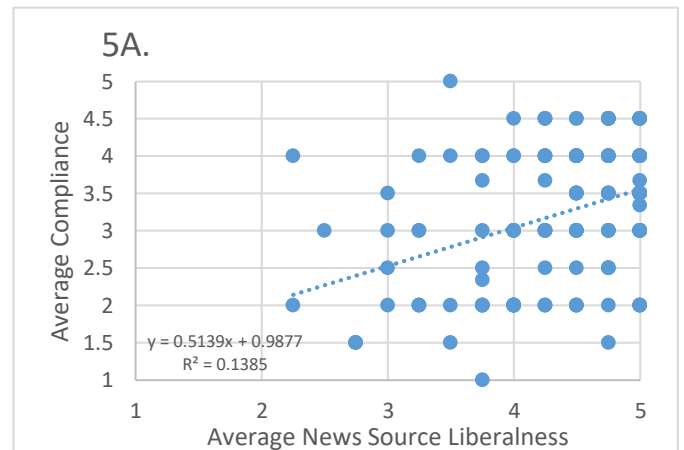
Figures 5a-b: Correlation between compliance and (A) average news source liberalness or (B) political alignment in midwestern states. *p*<.001. *N*=146

I grouped the data into coastal and midwestern states, and ran a Pearson's correlation matrix between them. The correlations for average compliance, average news liberalness, and political alignment are significant for midwestern states (Figure 5a), but not coastal states (Figure 5b). These findings supported my hypothesis that midwestern states would have a significant correlation between news liberalness, alignment, and compliance.

6A. Red States

y = 0.1575x + 2.5195
R² = 0.013

Average News Source Liberalness

6B. Blue States

y = 0.2837x + 1.9194
R² = 0.0355

Average News Source Liberalness

6C. Blue States

y = 0.0638x + 4.2093
R² = 0.0398

Political Alignment

6D. Red States

y = 0.0324x + 4.3815
R² = 0.0099

Political Alignment

Figures 6a-d: Correlation between compliance and news source liberalness in (A) red states [$p<0.5$] and (B) blue states [$p<.05$]. Correlation between compliance and political alignment, (C) red [$p<.001$] and (D) blue states [$p<.001$]. N=564 in red states and N=436 in blue states.

I additionally grouped the data by which candidate the electoral votes of each state went to in the 2016 Presidential election. States that went to Donald Trump were grouped together as red states, and states that went to Hillary Clinton were grouped together as blue states. The correlations for both groups were found to be statistically significant. (Figures 6a-d).

Discussion

The purpose of this study was to examine the effect of political alignment and news source liberalness on COVID-19 health guideline compliance. I hypothesized that there would be a significant correlation between news source liberalness or political alignment and health guideline compliance, which would imply that Democrats, and people who read liberal news are more likely to comply with health guidelines. My hypothesis was not supported after I analyzed the data on a national level. My hypothesis that there would be significant correlations between alignment, news liberalness, and compliance regionally was not supported by sunbelt state data, but was supported by red and blue state and midwestern state data.

My hypothesis was supported after I organized the data into smaller groups. It likely did not come up as significant during my original testing because there were too many different data points to suggest anything about the entire sample. Because the American response was so different from state to state, it makes sense that there would not be significant findings in the entire country. This also indicates that because the federal government left it up to the states to decide on the response, case numbers and behavior across the country is different. This can likely help explain why the U.S. has had so much trouble getting case numbers, testing and deaths under control. These behavioral patterns are demonstrative of a nation divided. During a pandemic, it is incredibly important that nations decide what is best for their people to save the most lives. The lack of federal leadership has caused people in different regions to behave differently.

More specifically, most sunbelt states happen to have Republican leadership and Republican majorities (Pew Research Center, 2020). Based on my prediction, the correlation between news source, alignment and compliance would have been significant. However, their experience with COVID-19 was unique based on these conditions. Republican leaders were typically slower to react to the crisis (Green, 2020). Additionally, the South was hit harder by the subsequent economic shutdown, and fewer southerners have adequate health insurance, resulting in a greater number of deaths (Newkirk II, 2020). Many people living in those sunbelt states were likely perceiving the virus in a much more firsthand way. Because they were seeing friends and neighbors be affected by the virus, they were more likely to put aside their personal beliefs and what they had been seeing on the news and were thus more likely to comply. This would explain the insignificant correlation between political alignment, news source and compliance. (Figures 8a-b).

The correlations were significant in the Midwest and were not significant in states outside the Midwest. This is likely due to the delayed effect COVID-19 had in the Midwest. Coastal

states, like New York and California, almost act as outliers in the data set. They had such a severe onset of the virus in March that people were more likely to comply based on the state policy. However, the Midwest did see a spike in cases during the summer when data were collected. Coastal states were experiencing flattened curves and stagnant numbers during this time (New York Times, 2020). Because the Midwest had that delayed response, their personal perceptions may have played more of a role in the reasoning behind their behavior instead of strict state-set policy. This could have caused the significant correlation between political alignment, news source liberalness, and compliance with health guidelines, which was not seen in coastal states. According to the theory of reasoned action (Madden, 1992), people living on the coast were taking the virus more seriously because it posed a more immediate danger. People on the coast were more likely to put their own personal beliefs aside when behaving to protect themselves and others due to the grave tone of the information presented to them.

In red and blue states, people from opposite ends of the spectrum were almost as equally likely to comply (Figure 6a-d). Their compliance did increase with increased news source liberalness and was found to be significant in both groups. This is probably because the states were split into two smaller groups, red and blue. This would have caused a smaller spread in the data, which could have caused a significant correlation. The average compliance was greater in blue states than in red states. This could just be a result of the increased amount of liberal responses from blue states.

The theory of reasoned action can be widely applied to the behavior demonstrated in this experiment. People across the nation have been reading the news about the virus and have been acting as they see fit based on their perception of its danger. This caused the overwhelming "Always" and "Usually" responses for specific health guideline questions (Figures 1a-d). People have been more often than not perceiving the situation as dangerous and have been acting accordingly. However, this does not align with sensationalist media coverage and misinformation

perpetuated by political leaders. Donald Trump was found to be the greatest perpetuator of COVID-19 misinformation (Bergengruen & W.J. Hennigan, 2020). The media has also been found to misreport scientific findings. It presents them as fact, when more often than not, they are only theory or part of a larger idea (Ranshohoff, 2001). This suggests a further nuance to the way people are perceiving and processing information. They are using their judgement to decide what information is trustworthy and what is not, which is something that has likely come up more during the digital age. People, since they are so bombarded with information every day, have had to learn how to distinguish between accurate and inaccurate information. This would explain people reporting compliance when media coverage and political leaders have not always stressed its importance.

Why are case numbers still astounding in this country if people are saying that they are complying? There are a few potential sources of error in this study that could help explain this finding. Firstly, it is possible that some usage of bots did occur even with the addition of anti-tampering questions. A bot could have answered the questions and not been flagged by chance. This, however, would have a small chance of occurring and may have contributed to a few random errors, likely not enough to throw the whole study.

An additional source of error could be that participants were dishonest about their compliance or were not paying attention to the questions they were answering. It is possible that some participants lied on purpose and increased their compliance with health guidelines to make themselves feel better about their behavior. They also could have lied about which sources they get their news from or their political alignment to make themselves seem less radical. This has been seen in other scientific studies and especially in political polling. During the 2016 election season, a significant number of polls projected Clinton's win, but were shown to be inaccurate due to dishonesty from participants. People tend to answer questions dishonestly when the true answer is not socially acceptable (Mercer et al., 2016). In 2016, it was admitting your support for Trump. In the context of this experiment, it is admitting that you have not been complying with guidelines, since compliance has been emphasized as the social norm. People typically do not want to be a part of the out group, so it is possible that they lied on this survey to make themselves feel like part of the in group.

A final source of error could be the lack of specificity when asking about news sources. The information covered on television is presented differently and can vary from the information presented in print or on the internet. TV news has been shown to frame its programming around stories that the viewer may find more entertaining than informative, while print media can go more in depth about specific policy or other details. For example, when Al Gore and George W. Bush were running for president in 2000, TV news covered more about their personalities than their beliefs and ideas (Pew Research Center, 2000). This type of media coverage can change the public's perception of the pandemic, which ultimately will influence their behavior. On the internet, articles typically have sensationalized headlines to capture attention and make the viewer click on the story, known as clickbait (Frampton, 2015). In neglecting to ask which way people get their news, being on the internet, TV, or print, the survey loses some reliability.

In future studies, I would like to examine the political bias in modern journalism and how that has changed over time. News sources play a big role in cementing people's opinions, and now with the Internet, people can always find someone to agree with. In bringing people together, the Internet has divided them. I also want to examine how people perceive their political leaders and their parties, and how they perceive those across the aisle. Examining how people feel about those they do not agree with politically can provide insight into the depth of political division.

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The Effects of Emotional Neglect on the Stress Response

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Abstract

Mental health disorders have numerous impacts on the body. The purpose of this study was to evaluate how emotional neglect and toxic stress impact a child's stress response in order to find effective ways to treat anxiety disorders. The study explored the hypothesis that emotional neglect negatively impacts a child's ability to combat stress. 117 participants were given a series of questions pertaining to the quality of their childhood and their current stress and anxiety levels. Upon analysis, the results indicated that children lacking emotional support and attachment with their guardians were significantly more likely to experience persistent stress than those with nurturing environments. As a mental health epidemic rages across the United States, the inter-relations between psychological trauma and biological responses underscore the importance of early therapeutic interventions and the development of new medications to aid children subject to emotional neglect.

Keywords: toxic stress, emotional neglect, stress response

Introduction

Emotional neglect refers to when a child is unable to thrive due to a lack of nurture and support and is an extremely common form of child maltreatment. A report from 2020 by the World Health Organization estimates that approximately 300 million children are subject to psychological harm each year. According to the National Society for the Prevention of Cruelty to Children (n.d.), children facing neglect show an array of symptoms, including substance abuse, mental health problems, or food theft (Chilton & Rabinowich, n.d.). Negligent parents are generally disconnected and uninvolved in their child's life and are inattentive to their child's needs— both physical and emotional. These parents do not seek attachment—a close relationship—with their children. Secure attachment with a parent allows a child to gain control of their emotions and gain a sense of confidence. Not having this attachment can inhibit the way a child functions emotionally, socially, and physically.

Stress and Relaxation Responses

The body has three major stress responses: the positive response, the tolerable response, and the toxic response. Harvard University's Center on the Developing Child (2020) and Florida State University (n.d.) differentiate between the responses, asserting that the positive response is vital to development and includes a minor increase in cortisol levels and heart rate. A tolerable stress response occurs when the body is activated to a stronger degree due to major losses. If the child has healthy relations with their guardians and a supportive environment, the response can be buffered, and the organs and brain can recover from the stress. The most damaging stress response—the toxic stress response— occurs when a child faces persistent adversity, such as abuse, neglect, or violence without adult support. In 2017, the Nationwide Children's Hospital warned that

this stress response disrupts the organ systems and the functions of the brain, leading to a higher risk of stress-related diseases such as heart disease and depression in adulthood.

The body generally has a relaxation response, in which the parasympathetic nervous system brings the heart rate and blood pressure down (Furness, 2008); most children facing neglect do not have an adequate relaxation response. Some children, however, are more resilient, meaning they can better adapt to adversity and neglect. This is determined by a child's relationships with others, quality of home life, and social support (Franke, 2014). However, other children may be more vulnerable to the effects of neglect and be unable to cope with stress due to the lack of a support system. Children with abusive parents or maladaptive behaviors are more vulnerable to the negative effects of toxic stress. Maternal affection and warmth appear to be a major factor in a child's ability to combat stress. Maternal warmth acts as a buffer to factors such as poverty or abuse (Chen, Miller, Kobor, & Cole, 2011). Low levels of parental warmth coupled with child abuse have been shown to cause higher health risks in neglected children as adults.

Conversely, parental warmth and affection during childhood were associated with fewer health risks in adulthood. Children in abusive environments generally require early therapeutic interventions to recover from the psychological trauma they endure. Children who do not receive help early on generally face Post Traumatic Stress Disorder (PTSD) in adulthood, which often leads to anger management issues, anxiety, and depression. The purpose of this study was to pinpoint the external causes of stress and anxiety, and to apply the findings to create impactful interventions for children suffering from emotional neglect. The study aimed to analyze the relationship between the quality of a person's childhood and their ability to combat stress in their daily lives. The hypothesis asserted that emotional

neglect coupled with toxic stress limits a child's ability to manage stress.

Methods

Participants

Participants in this study included 117 academically successful high school students aged 14 to 18 from the Georgia suburbs. Participants were recruited from merit-based service clubs including the National Honors Society and the Beta Club. Specific demographic information was not collected. Each participant voluntarily took part in the study and was aware of the purpose of the research.

Materials

All participants received informed consent forms outlining the purpose of the study, the benefits and risks of participation, and the terms of confidentiality and voluntary participation. Each participant's identity was kept anonymous throughout the study and contact information for the researchers was provided. Participants were only permitted to participate after submitting their consent form. They were allowed to stop participating in the study at any time and given the option of not answering questions that caused any discomfort. The consent form also outlined what the participant would be expected to do in the study. An electronically distributed survey (see appendix) was used in the study as well; participants responded to a series of questions about their childhood using a Likert scale, responding with 'strongly agree,' 'agree,' 'neutral,' 'disagree,' 'strongly disagree,' or 'I do not wish to answer this question.' The scale allowed for an analysis of the relation between a variety of home environments and stress levels and was designed in a manner to allow participants to best express the extent to which they agreed or disagreed with each statement about their home life. This data was later analyzed to understand the link between emotional neglect and the stress response.

Dependent Measures

The dependent variable in this study was the stress levels of each participant; the independent variable was the quality of home life (persistence of stress, quality of childhood, parental trust, familial support, and out of home care). A Likert scale was used to measure the dependent variable.

Procedure

Each participant received an identical survey. Questions were chosen based on the World Health Organization and Center for Disease Control's criteria on neglect and abuse. To differentiate between toxic stress and 'seasonal' stress, participants were asked to state whether the majority of their stress could be attributed to academics and school; this set aside participants with persistent stress and intermittent stress. Participants also answered questions on how close—or attached— they are with their caregivers. Additionally, the survey included questions about how much each participant trusted their parents and whether they had fond memories of their childhood.

The questions of parental presence, environmental stability, and economic stability allowed for an analysis of the correlations between the quality of home life and the stress response. After each participant completed the survey, the data was analyzed for trends between neglect and the stress response using the correlation coefficient (R). The final step was to apply the data to expanding on mental illness work and creating new medications and effective interventions for children facing toxic stress.

Results

Persistence of Stress

18.8% of participants reported being unable to manage their stress. These participants also reported signs of emotional neglect. The participants that reported difficulty in combatting stress also reported that their stress persisted year-long to no avail; meanwhile, those who did not struggle to combat stress reported that their stress was intermittent. The correlation coefficient for being able to manage stress and having persistent stress was R= –0.511, indicating a moderate negative correlation as shown in Figure 1 below.
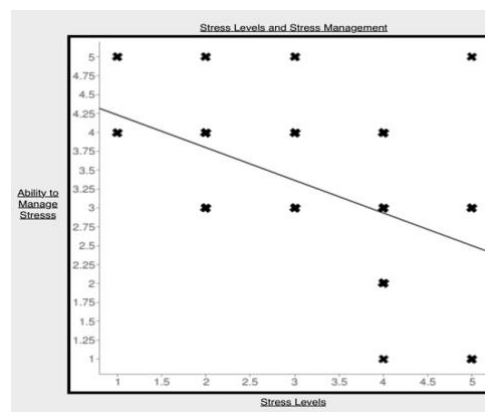

Figure 1. Persistence of Stress and Stress Management

Quality of Childhood

Some participants struggling to manage their stress found that they do not have fond memories of their childhood, while some participants who were able to manage stress reported having positive memories of their childhood. However, the R-value was a mere 0.044, indicating a weak, insignificant correlation between having negative childhood memories and being unable to combat stress. Figure 2 below displays that the two variables are unrelated.
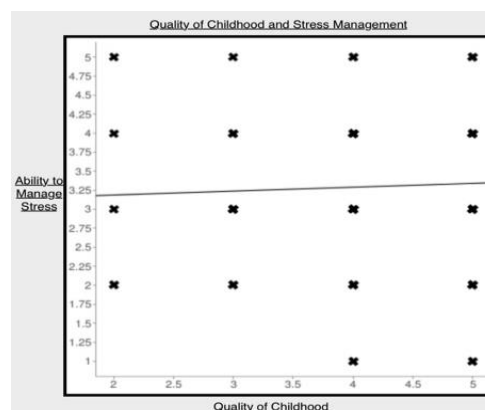

Figure 2. Quality of Childhood and Stress Management

Trust in Parents

Those who did not trust their parents experienced higher stress levels. The R-value for the correlation between being able to manage stress and trusting and confiding in parents was 0.417, showing a relatively weak positive correlation and supporting the claim that those who do not confide in their parents are more likely to struggle combating stress. Figure 3 shows that emotional neglect is correlated —to some degree— to difficulty combating stress.
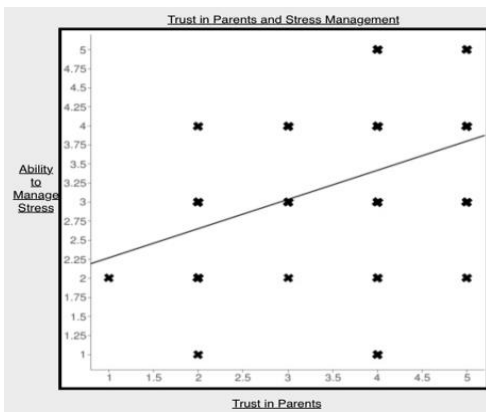

Figure 3. Stress Management and Trust in Parents

Familial Support

Participants who reported being able to combat stress also reported having adequate support from their parents to accomplish their goals, yielding an R-value of 0.502, indicating a moderate positive correlation between the two variables. Having parents that cater to a child's needs greatly improves the child's ability to manage their stress, as presented in Figure 4.
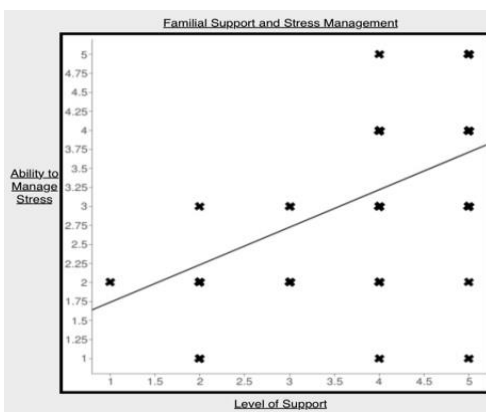

Figure 4. Stress Management and Levels of Familial Stress

Extent of Out of Home Care

While 86% of all participants reported that the majority of their stress stems from the school environment, 18.8% of those participants were unable to manage that stress — these were the same participants that reported signs of emotional neglect. The results also show that academic ability and intelligence are not a determining factor in the ability to combat stress; the participants in the study were members of academic-based invite clubs, showing that intelligence levels do not impact how a child can manage stress.

The data supports the hypothesis because those who had a nurturing environment reported that they could manage their stress and that their stress did not persist year-round. As shown in Figure 5, there appears to be a weak, insignificant relationship between having a nanny or attending daycare and the ability to combat stress (R= – 0.153). Parenting style and the home environment are often the most important factors in determining a child's ability to manage stress.
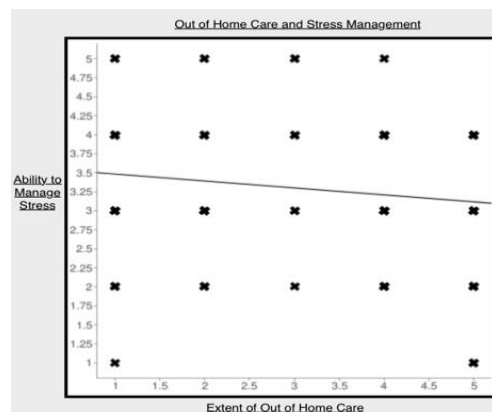

Figure 5. Stress Management and Extent of Out of Home Care

Discussion

The findings of this study support the initial hypothesis, as the data portrays a correlation between emotional neglect and an ineffective, decreased stress response. The results are additionally corroborated by the findings of psychologist Harry Harlow. Harlow's findings

revolved around the concept of attachment: the emotional bond between a child and their parent or guardian. Harlow found that familiarity and comfort with a parent are vital to a child's development. The Association for Psychological Science (2018) found that deprivation of attachment leads to increased levels of anxiety, sensitivity to aggressive emotions, and an increased likelihood of health problems in the future.

The hypothesis is supported because those who reported having parents that show signs of emotional negligence and a lack of attachment found it more difficult to combat stress as they did not develop emotional bonds. Furthermore, Mary Ainsworth's research on attachment also showed that children who were unable to find comfort in their parent's presence were more likely to be anxious as they continued developing (Van Rosmalen, Van der Veer, & Van der Horst, 2015). Similarly, J. McVicker Hunt's research found that children who did not receive enough care or attention were more 'vacant,' lacking skills present in children who receive ample care and support (Hunt, 1979).

Limitations

The study does, however, have a few limitations. The results depended on self-reported data due to the survey format and use of the Likert scale. There is a possibility that participants did not accurately report their feelings of stress. Additionally, stress stems from causes outside of emotional neglect; further analysis would be needed to discern whether emotional neglect was the root cause of the stress reported by the participants. The study also may not be representative of all high school students because participants were academically successful and from specific organizations. Performing the study again with a larger sample size and expanding the sample beyond the constraints of the two organizations can yield more useful information

about the connection between emotional neglect and the ability to manage stress.

Health Problems

It is evident, based on the data, that those with unhealthy relations with their parents are more likely to suffer from anxiety disorders and struggle with managing their stress. It can be deduced that emotional neglect can be attributed to a hyperactive amygdala, which detects if a stimulus is threatening and releases cortisol. The increased cortisol levels affect activity in the brain. The amygdala is increasingly hyperactive when a child is unable to combat their stress, causing the child to feel the symptoms of stress and anxiety strongly. The prefrontal cortex of the brain, responsible for decision making and personality expression, will also be affected by the amygdala. The prefrontal cortex is especially sensitive to the elevation of chemicals in the brain caused by stress (Arnsten, 2009). The child is more prone to irrational behavior, poor decision-making, and negative self-expression due to the overly active amygdala. The changes in brain structure likely inhibit the brain's ability to communicate and function properly.

Children not suffering from neglect are more likely to be able to combat stress and less likely to suffer from stress-related diseases (heart disease, depression, anxiety) or substance abuse in adulthood. Children unable to trust their parents are more likely to respond more negatively to stress than children with healthy parental relations. They are also more likely to have lower self-esteem and struggle developing healthy relationships (World Health Organization, 2020). In adulthood, neglected children are at a higher risk for cognitive delays and impairments of executive function. Neglect alters the way the body develops the stress management system, and also disrupts the way the brain processes information, leading to an increase in anxiety or depression.

Stress Management

Generally, early therapeutic interventions with the aid of pediatricians and guardians to teach stress-management techniques and improve the social environment can help a child learn to manage stress (Franke, 2014). Interventions include screening for toxic stress factors such as poverty, substance abuse, and social isolation; social-emotional screening is also an interventional technique used by doctors to predict behavioral issues in children (Franke, 2014). Identifying children facing toxic stress is crucial so they may receive cognitive behavioral therapy, child-parent therapy, or learn relaxation techniques to build up resiliency. Additionally, a focus on the guardian has shown positive results. Home visits, parenting classes, improving access to social resources, and peer support are caregiver-based interventions proven beneficial in improving a child's home life (Franke, 2014). On a national scale, advocacy for financial support to implement more screening and interventions for toxic stress is vital.

If an intervention does not occur promptly, a child does not learn to manage stress effectively. Because neglect inhibits the ability of certain neurotransmitters to be released in the brain, finding a way to trigger the release of these neurotransmitters can potentially help children suffering from toxic stress (Schumann, Bauman, & Amaral, 2010). While neglect cannot be eliminated, the release of certain chemicals in the body can help in combating stress; creating a pharmaceutical drug with these substances can help those who did not receive early interventions in childhood. Oxytocin, released by the pituitary gland in the brain, reinforces attachment between children and their mothers (Levy et al., 2014). Neglected children do not experience the sensation this hormone releases and lack trusting behaviors. Propranolol is also helpful in reducing symptoms of stress; a beta-blocker, propranolol reduces physical signs of anxiety such as an increased heart rate or higher blood pressure and is often used to treat PTSD patients. Because many neglected children face PTSD in adulthood, propranolol can

greatly aid in the stress response. It blocks the effects of both epinephrine and norepinephrine, thus reducing stress symptoms effectively (Levy et al., 2014). In addition, selective serotonin reuptake inhibitors (SSRIs) block serotonin reabsorption and allow for more serotonin activity. SSRIs are generally used to treat anxiety and depression, both common results of emotional neglect. The use of SSRIs stabilizes feelings of happiness and well-being (Levy et al., 2014). Inhibiting cortisol, a major stress hormone, can limit the effects of stress as well. Implementing early interventions and developing effective drugs are key to improving the stress response in neglected children.

Conclusion

Mental illness and stress and anxiety levels are increasing steadily in the United States; however, investing in mental health research can save lives and improve the quality of life for many suffering from mental health problems. Understanding both the causes and the effects of mental illnesses can allow mental health professionals to be better equipped to deal with the problem and overcome it before it begins to take effect in children. This research can help to pinpoint the causes of stress and anxiety, and to develop an effective drug to combat the negative effects of an emotionally neglectful upbringing. It can be used to understand how children are biologically affected by psychological trauma to better provide for kids from traumatic backgrounds. Increasing interventions and finding new drugs and treatments for stress and anxiety can help children manage toxic stress and anxiety, potentially reducing suicide and depression rates. Increased awareness for the effect neglect has on a child's brain can potentially decrease abusive parenting once the public understands the consequences of neglectful parenting styles.

Although the effects of psychological trauma and mental health cannot be seen by the naked eye, its effects are major towards a child's well-being and development. Mental health affects

a person from childhood to adulthood; it affects how a person makes decisions and how they relate to others. Prioritizing mental health increases the chances for early therapeutic intervention for treatment. This research serves to educate the public about the effects of emotional neglect and to find new techniques to support children facing toxic stress and neglect.

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Exploring the Correlation Between Awareness of Climate Change and the Mode of Transportation Among Adults

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Abstract

The increasing levels of CO2 gas in the atmosphere are partially due to the emissions caused by automobiles. Therefore, the link between transportation activities and the environment has become a key issue. Environmental awareness in individuals is significant in their choice of transportation. For example, as the pollution haze increased in some parts of Beijing and Tianjin, more residents were driven to undertake low carbon consumption consciously (Su-Ping, H., et al., 2020). This experiment investigates the relationship between climate change awareness and the mode of transportation among adults. It was hypothesized that increased knowledge of environmental issues affects adults' choice of transportation in that they will own a car with a high mpg (miles per gallon). A questionnaire survey helped to collect data to test the research hypothesis. The average score was 9/16, this is a slightly positive result, but there is still ample room for improvement. The overall trendline result from the scatter graph suggests that the higher the person's awareness, the higher/better is the mpg of their car. However, because the correlation coefficient is extremely low, we cannot come to a concrete conclusion about the correlation. When separating men and women, women's scores coincided with a good mpg in their car, but its correlation coefficient was low as well. Differently, the results for men show a weak negative correlation by having a correlation coefficient of -0.3. In general, these results indicate that there is a certain lack of environmental awareness. Further studies should be done to find a correlation between climate change awareness and choice of transportation.

Keywords: transportation, awareness, climate

Introduction

Driving to work, taking the kids to school, and going out with friends is part of an adult's normal day. Unfortunately, these activities are leading to the collapse of our planet. The rising temperatures on Earth are potentially destroying our ecosystem, which will make life on Earth impossible (Hansen, J. et al., 2013). The term *Climate Change* refers to a variation of average weather conditions mostly attributed to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels ("Global Climate Change," 2020). The Natural Resources Defense Council, Inc. (NRDC), a United States-based non-profit international environmental advocacy group, stated that the greenhouse gas (GHG) emissions humans generate are the leading cause of the earth's rapidly changing climate ("Global Climate Change," 2020). Although greenhouse gases play an important role in keeping the planet warm enough to inhabit, the amount of these gases has dramatically increased over the past decades ("Global Climate Change," 2020). Such increased levels of gas in the atmosphere are partially due to the emissions caused by automobiles, therefore, the link between transportation activities and the environment has

become a key issue. Todor Stojanovski, part of the Urban and regional studies program at KTH Royal Institute of Technology, writes, "The urban transportation is responsible for roughly one-third of all CO2 emissions in the Earth's atmosphere making mobility a crucial sustainability challenge in cities" (Stojanovski, 2019). There is no doubt that the increasing levels of CO2 gas in the atmosphere are partially due to transportation. People worldwide should take into consideration this aspect; the protection of our environment should be a priority. As a world power, the U.S. should be the leader in the conservation of the environment, having citizens that care and take action to reduce such carbon dioxide emissions.

Literature Review

Since the year 2000, the increase of fossil fuel emissions in the atmosphere has increased at a troublesome rate (Hansen, J. et al., 2013). By using Earth's measured energy imbalance, paleoclimate data, and the global carbon cycle, a study made in San Francisco provides support for the idea that it is necessary to limit or reverse at least one of the following fossil fuel CO2 emissions, land use emissions, and growth of non-CO2 forcing in order to stabilize climate and avoid potentially disastrous impacts in the environment (Hansen, J. et al., 2013). This highlights the importance of reduction of carbon dioxide emissions which are already having an effect by increasing Earth's average temperature which, as already discussed, increases the rate of climate change.

A scientific panel from the United Nations have commented that the absorption of carbon dioxide over recent years has been "enough to make seawater more acidic and hold less oxygen," which affects sea life, while freshwater from melting ice sheets has become a significant cause of rising sea levels (Robert, 2019). These effects are already being noticed in coastal cities such as New York, an area close to this study, where the sea levels are threatening the existence of this island. *Express*, an online global newspaper, mentioned that an annual review of US coast lines had found that sea level rises are speeding up year-on-year (Martin, 2020). The increasing sea levels

in the U.S. are threatening the existence of coastal cities, making climate change a great problem for people living in these areas, therefore the reduction of CO2 emissions should be a priority, not only for the government but for the people. Effects on seas and oceans are the most noticeable. The prolonged continuation of this climate change will have a drastic effect on the economy by "disrupting global fisheries," and it would also result in an increase of natural disasters around the country "threatening the 680 million people who live in low-lying coastal communities with higher tides, flooding and storm surges" (Robert, 2019). Such drastic effects should inspire people living in coastal cities to change their habits and find ways to reduce CO2 emissions as soon as possible, making the reduction of climate change a priority in their everyday life.

The increase of such emissions is known to be mainly caused by the incremental number of automobiles used worldwide. Rosalia Castellano, a member of the department for environmental research at the Parthenope University of Naples, writes as a result of her research with other colleagues that the use of motor vehicles, measured by the consumption of fuel (FLCNS), is associated with high levels of pollutants (Castellano, et al, 2010). The results made in this paper showed that motor vehicles have a lot of influence on the level of pollutants in the atmosphere. This shows that there is a strong correlation between cars and the increment of greenhouse gas emissions in the atmosphere.

Based on the above results and the national awareness of this problem, many rely on the instructions of environmental health professionals (EHPs). A study published in *The Journal of Environmental Health*, measured the attitudes and behaviors of environmental health professionals on climate change. The study concluded that EHPs have the responsibility to communicate the dangers of climate change to communities. That EHPs should provide expertise and guidance toward solutions, and serve as a trusted, nonpartisan voice in local, regional, and national policy decisions (McAdams, J. W. et al., 2019). Most people rely on the decision of such environmental

professionals but the individual person is the one that should make the change, EHPs can suggest environmental ways of living but the people themselves are the ones that have to accept those measures. In addition to environmental health professionals, citizens in general rely on their local governmental figures and policies to make changes. Cities such as N.Y.C., one of New York's most vulnerable cities to climate change, has made some changes of its own. The Metropolitan Transit Agency (MTA) made a spending plan for all-electric busses. Emily Nonko, the Urbanism reporter at New York City, reports that the MTA's board unanimously approved a $51.5-billion capital spending plan (Nonko, 2019). Although the plan does not focus on a carbon market, its main intention is to decrease pollution and provide environmental sustainability and resiliency (Nonko, 2019). This interest in environmental sustainability is expected to grow and influence more of the state government to make new laws regarding transportation practices. Therefore, individuals should be ready for future changes to come by developing interest in environmental protection.

Although policymakers and state economists are expected to make substantial changes in transportation policies, individuals aware of climate change should already be taking action. Environmental awareness in individuals around the world has been shown to be significant in their choice of transportation. A research study by the University of Science and Technology of China concluded that although environmental awareness is positively associated with the individual's intention to use ride-sharing services, its impact is very small due to the lack of environmental protection popularity (Wang, Y. et al., 2018). This shows the importance of encouraging environmental awareness to individuals. A study published in the *Ecological Chemistry and Engineering Journal* regarding people's environmental awareness showed that as the pollution haze increased in some parts of Beijing and Tianjin, more residents were driven to undertake low carbon consumption consciously (Su-Ping, H., et al., 2020). Because they are

surrounded by a horrible state of nature, people are indeed invested in lowering the carbon dioxide emissions. The results show that people's climate and environmental issues awareness indeed affects their low carbon use positively (Su-Ping, H., et al., 2020). This supports the idea that awareness does inspire people to change their habits, however we should take into account the circumstances from where such studies were made. Currently New York is not suffering from clouds full of pollutants, although environmental changes are happening, they are not as clear and visual to the human eye, this lack of urgency may negatively affect people's awareness and choices of transportation.

Research done in the U.S. regarding transitions among monomodal and multimodal car users reveals that most Americans are multimodal car users, which means that they interact with multiple modes of transportation. Researchers Ralph Buehler and Andrea Hamre concluded that the majority of Americans are multimodal car users who drive and make at least one weekly trip by foot, bicycle, or public transportation (Buehler and Hamre, 2015). Also, their findings show that one in four American car users makes at least 7 trips by walking, cycling, or public transportation during the week (Buehler and Hamre, 2015). These results show that most Americans rely on other ways of transportation and not only their car. They tend to prefer a mode of transportation that reduces the constant CO2 emissions. Such results show that Americans are indeed aware of climate change and are trying to find ways to reduce carbon dioxide emissions. However, cars are still in constant use within the U.S., and although most Americans are multimodal car users, in some parts of the country owning a car is the only effective way for a person to carry out their daily activities. This is the result of a number of factors, one of them being the lack of effective public transportation in certain areas, one of them is Long Island, NY, the area in which this study is conducted.

The analysis of these literature studies inspired the essential question of this research: How does awareness of climate change correlate

with the mode of transportation among adults? The following correlational research will attempt to provide support for the idea that increased knowledge of environmental issues affects adults' choice of transportation in that they will own a car with a high mpg (miles per gallon). In order to effectively address a gap in research, the study focuses on the specific mpg of the individual's car as a way to measure transportation components, a variable that has not been measured in prior research. The study is carried out in a suburban setting where public transportation is highly ineffective, and most people living or working within the zone own at least one vehicle per family. In this particular region, automobiles are essential to maintain transportation to and from work to earn a living. Their constant use validates the importance of maintaining a car with higher mpg that will consume less gasoline in the everyday activities of the people.

Methodology

A questionnaire survey was used to collect data to test the research hypothesis. The questionnaire consists of four components: a global climate change quiz, personal response, a brief description of the individual's primary car, and gender specification. The quiz is composed of 16 questions of mid-low knowledge and understanding of climate change. The personal response regards the participant's preference to buy a car environmentally friendlier. It was asked for them to inform what type of car they drive specifically (year/brand/name), in order to search and find out the mpg of each car. The mpg was determined only on the city setting to avoid the influence of highway speed. Gender specification was required to analyze data separately and have a clearer understanding of the correlation within different variables (male/female). Please see the appendix for the questionnaire used to collect participant responses.

The research was conducted in Long Island, N.Y., a region where public transportation is not effective for many people. Given that most will own a car and drive it constantly, this study will just focus on the primary car used by the individual participant. Teachers from different subjects and departments in a local High School, 71 adults, took the anonymous 16 question quiz (in paper or online) to test their knowledge on global climate change and the environment. Participants' score on the quiz determined their environmental awareness score. The time frame of recipient responses was from mid-February to mid-March of 2020. The environmental awareness score, the number of questions the participant scored correctly, is compared to the mpg of their car on scatter graph form, with a linear forecast trendline to serve as a guide. Responding subjects were then divided into two groups: males (20) and females (49), in order to further expand the study, compare variables, and explain trends. The participant's willingness to pay more for an environmentally friendlier car is presented in a pie chart form for clarity. According to my hypothesis, the higher the environmental awareness score on the quiz, the higher the mpg of their primary car. This means that an increased knowledge in climate change will result in a better mpg of the individual's vehicle.

This research method is similar to one used in a prior research made by the University of Science and Technology of China to encounter ride-sharing preferences. However, in this study, the method is focused on finding the correlation between the individual's awareness of climate change and the mpg of their primary car, not in their preferences on ride-sharing services. The method used during this study is replicable and simple. Because it was assumed that many of the participants would not be aware of the exact mpg of their car, participants instead gave an appropriate description, and the mpg was determined during analysis by the researcher through an internet search.

Results and Analysis

Results are shown in a scatter graph form. In order to portray the overall trend, a linear forecast trendline has been included. The overall average score from the quiz was 9/16, this is a slightly positive result, but there is still ample room for improvement. When comparing the

ranked score with mpg of primary car, the r value shows a non-meaningful correlation (*r*=0.012).
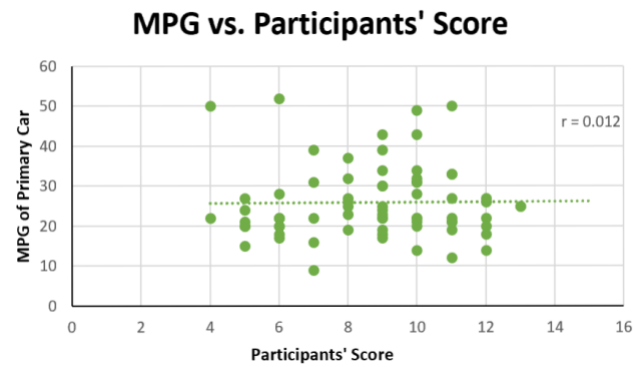
When separating the data into two groups, male and female, results show different outcomes in the correlations of these two groups. As shown in the following graphs:
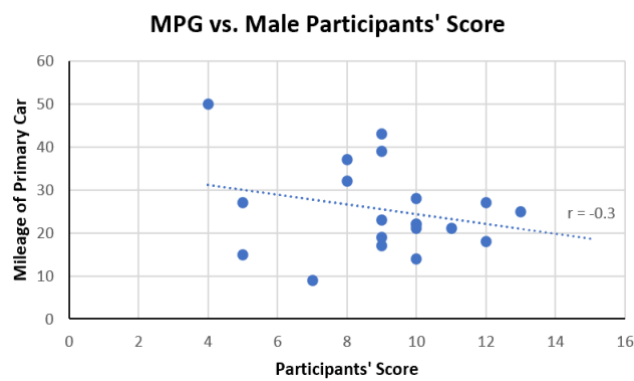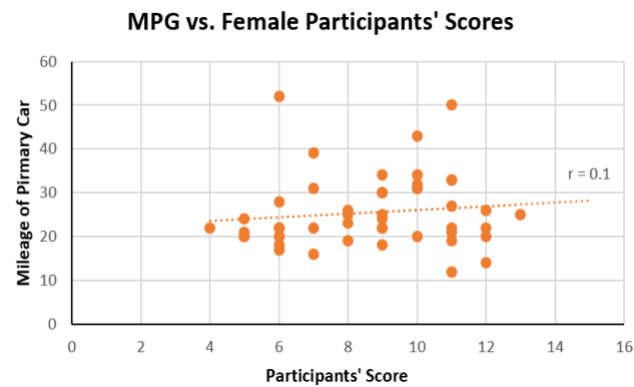

The scatter plot of the results for women shows that as the score from the quiz is ascending, the mpg of the primary car of the participant is also ascending. The trendline shows that this tendency will keep on going, providing an overall positive slope. Meaning that women's knowledge on

climate change improves their choice of transportation by purchasing a car with better mpg. However, from the correlation coefficient value of 0.1, we can infer that there is not a meaningful correlation between the x- and y- variables.

In contrast, for men, as the score is ascending, the mpg of their primary car is descending. We can determine that the more men know about the environment, the harmful the mpg of their car gets. By the trendline, we can foresee an overall negative slope on the graph if this trend continues. From the correlation coefficient value of -0.3 we can conclude that there is a weak negative correlation between the x- and y-variables.

The highest number of questions scored correctly (score) was 13 out of 16, which was answered by two participants, one being male and the other one female. The average ranked score for both groups individually is 9/16. In addition to this, the graphs show a clear difference in the number of responses between males and females, there is a greater number of female participants than male, which could result in some inconsistency.

Another interesting factor in the study is the willingness of a person to buy an environmentally friendlier/greener car, although it might be more expensive. The following pie chart determines the amount, in percentage, of adult's willingness to pay more for a greener car:
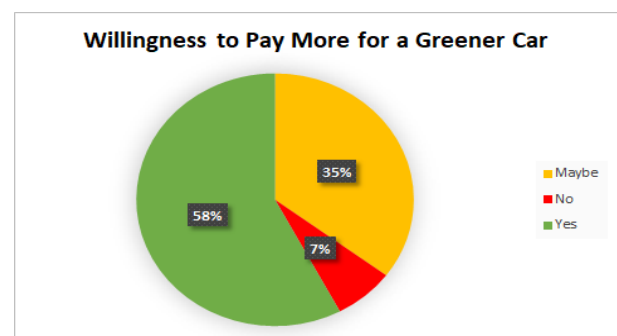
As shown in the pie chart, 58% of participants answered to be willing to pay more, 35% answered that they may be willing, and only 7% of participants recorded not being interested in paying more for a greener car. By these results, it

is determined that most people will opt to pay more for an environmentally friendlier car, however, there is little to no action being taken by many.

Discussion

The fast development of global climate change and the increased levels of CO2 show that now is the best time for adults to change their habits if they want a safe future for their children. The overall trendline result suggests that the higher the person's awareness, the higher/better the mpg of their car is. However, because the correlation coefficient is extremely low, we cannot come to a concrete conclusion about the correlation. When separating men and women, women scores coincided with a good mpg in their car, but its correlation coefficient was low as well, therefore we cannot conclude this correlation as valid. Men on the other hand, show a weak negative correlation by having a correlation coefficient of -0.3. The better the scores, the lower the mpg of their car was, meaning that they seem to connect knowledge with action to a lower degree.

In general, these results fail to support the initial hypothesis of the study. There are many factors coming into play when choosing a car such as style, affordability or speed. Any increase in speed will decrease the fuel economy of the car. If the men had a desire for a car with increased speed, that may have been a reason for differences in the results. There is no doubt that most adults, especially parents, are very sceptical about their choice of car. A family of six needs more room than a family of three, therefore some parents tend to choose vans, which are known to have lower mpg. Convenience of the person can sometimes overcome their awareness. A person may be looking for a car urgently for transportation and is willing to get the first, most convenient one they could find.

Affordability is another big factor, 58% of the participants answered that they will be willing to pay more for an environmentally friendlier car. This shows that the feeling of doing something is there, but the action is not being taken for most. Although teachers have a middle-class wage

salary, most have families to maintain resulting in a stricter budget. Therefore, most are not able to buy a car by preference but for the necessity of their family members. As technologies keep advancing so does the economy, every day more and more environmentally friendly cars are placed on the market, eventually this will lower the cost of them, making them affordable to a broad public.

In addition to the above criteria, this study suggests that there is not enough environmental knowledge in adults. The average amount of questions answered correctly in the quiz was 9 out of 16, this is just above half of the total questions answered, which takes us to the conclusion that there is a need for more climate change awareness. The use of a questionnaire survey was effective in finding that most people are willing to pay more for a greener car, showing a good amount of conscience for the environment in the minds of individuals. However, right now there is still a large group of participants that own a car with harmful mpg. This takes us to the conclusion that because there is not enough climate change awareness on Americans, their action taking is not substantial. Policymakers in New York should create more measures to spread awareness, not only for students but for adults as well, which will help increase the care and protection of our environment. There can be activities engaging the community where everyone can learn from environmental health professionals about climate change, incentives for taking college classes about the environment, and guided practices of environmental forms of living can be shown in tv shows or ads.

Limitations

The fast development of global climate change and the increased levels of CO2 show that now is the best time for adults to change their habits if they want a safe future for their children. The overall trendline result suggests that the higher the person's awareness, the higher/better the mpg of their car is. However, because the correlation coefficient is extremely low, we cannot come to a concrete conclusion about the correlation. When separating men and women, women scores

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Conclusions

In the future a broader more effective research study could be done reaching a variety of factors. Researchers are recommended to provide more time for the admission of responses, with this the number of participants can be broadened. Even better, the research can be extended to adults other than teachers from other districts within Long Island, N.Y. The combination of such results could bring the study to represent almost all Long Island, also when separating them into school districts or counties, it can be compared the most and the least action-taking zone and find out what they are doing to help prevent carbon dioxide emissions. More participants yields more data, which helps to make a study more legitimate. If the researcher were to generalize the whole American population an even broader study should be done.

The understanding brought in through this study was that women tend to have a higher action-taking effect on their choice of transportation compared to men. In order to expand on this information and/or make it more effective, researchers should choose the same number of male and female participants, so that the graphs in the study will show fair results on each

side. Researchers can expand from this study by delving deeper in the views of the people when choosing an environmentally friendlier car, and with that finding reasons for the differences between men and women's choice of transportation. The questionnaire survey could focus more on the individual's situation and needs when choosing a car, questions such as: how many people live in your household? Do they have a car of their own, or are you the family driver? This will help the researcher find out why participants own that particular vehicle. Besides that, Long Island is known for not having an effective system of public transportation, it takes more than twice the time to take the bus than driving your car, hence families tend to have two or more cars at its disposal. An extension to this study will be to ask for the number of cars a household has and finding out the mpg of such cars to have a base for comparison. The researcher could find the average mpg of cars per household and later related it to the average amount of cars per household in the region. This may lead the researcher to other conclusions based on the lack of effective public transportation of the region. Getting their income information will also be very helpful to find a correlation on the cost of the car and the participant's salary. Giving them a range of costs in which they will be comfortable on spending when it comes to an electric car and/or a car with high mpg. All this information will help researchers develop an extension of this study with results of varying perspectives to decipher why participants chose that specific car to drive and solutions to solve the carbon dioxide emissions in this specific area of study.

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