Abstract
Just over one year after COVID-19 reached the United States, the number of confirmed cases exceeds 26 million. The Centers for Disease Control has consistently recommended frequent handwashing, avoiding crowds, wearing masks, and staying home as much as possible to prevent the spread of the virus. Additionally, 42 states, the District of Columbia, and Puerto Rico issued stay-at-home orders in the spring of 2020. Length of stay-at-home orders varied and states have also diverged on policies that mandate masks in public places. Through the lens of signaling theory and the emotion as social information model, the current research sheds light on how governors’ differing policies and communication have influenced COVID-19 behavior and outcomes. Governor press briefings between January 7, 2020, and January 1, 2021, were run through the linguistic inquiry and word count software. Results indicated that states with longer stay-at-home orders and a stronger mask mandate reported fewer COVID-19 cases. Furthermore, negative emotion in governor press briefings was related to fewer cases and this relationship was mediated by individuals spending less time away from home for an extended period (3–6 h). Practical implications and guidance for future public health messaging, including messaging aimed at bolstering vaccination efforts, are discussed.

Keywords
leadership, crisis, emotion, follower behavior, COVID-19

More than one year after the novel coronavirus disease 2019 (COVID-19) first reached the United States, there have been 26,157,993 confirmed cases (Dong et al., 2020; as of January 30, 2021). On January 8, 2021, the United States surpassed 300,000 cases reported in a single day (Villegas, 2021). Throughout the winter of 2020–2021, the numbers of cases, hospitalizations, and fatalities reported in a single day have continued to rise and exceed the previous records on multiple occasions. With winter weather limiting outdoor activities that are conducive to social distancing, more people are gathering and socializing indoors. However, with vaccine roll-out underway, public health experts are warning that greater adherence to public health measures will be necessary (Rahman, 2020). Meanwhile, many are experiencing what Dr. Anthony Fauci, the director of the National Institute of Allergy and Infectious Diseases, calls “COVID fatigue” whereby individuals growing tired of socially distancing and adhering to safety measures (Rahman, 2020). Thus, it is a good time to reflect on how policy and public health communication has influenced public behavior and adherence (or lack thereof) to safety guidance during the COVID-19 pandemic.

During crisis, strong leadership is vital. However, the appropriate response to a novel crisis, such as the COVID-19 pandemic, is not entirely clear. Former President Trump determined that given each state’s differing circumstances, it was best to allow states to decide on their individual approach in response to the pandemic. Ultimately, 42 states, the District of Columbia (DC), and Puerto Rico issued stay-at-home orders in the spring of 2020. Throughout the crisis, governors have varied in their policies and in the degree to which they are communicating with the public.

For the purpose of the current study, residents of each state will be referred to as followers and governors as leaders. As leaders, governors were and continue to be tasked with the difficult undertaking of making sense of the ambiguity surrounding a novel crisis situation. The decisions made by governors and the words chosen to disseminate information have influenced follower behavior. Emotional tone in speeches, for example, has been shown to serve as a signal to followers (Keltner & Haidt, 1999). In terms of the current situation, use of emotions can signal how critical the situation is and
how crucial it is for followers to stay at home and practice social distancing.

The current study is first focused on determining what behaviors have been linked to greater cases of COVID-19 and how state-wide policy has influenced those behaviors. Additionally, I examined how language used during press briefings made by governors related to increased or decreased follower participation in these behaviors. Signaling perspective in conjunction with the emotion as social information (EASI) model was used to explore theoretical links between leaders’ speeches and outcomes during the COVID-19 pandemic. The Linguistic Inquiry and Word Count (LIWC) 2015 software (Tausczik & Pennebaker, 2010) was used to measure use of emotions in governor speeches. Furthermore, a mediation model was tested whereby negative emotion in speeches influences public behavior and public behavior, in turn, affects the number of COVID-19 cases in each state.

**Literature Review**

In accordance with the Tenth Amendment of the U.S. Constitution, states are permitted the responsibility to safeguard the welfare, safety, and health of the public. Though COVID-19 was declared a national emergency on March 13, 2020, there were no mandates at the federal level. State governors have the power and were encouraged to issue executive orders, activate the National Guard, and request financial and military assistance from the federal government. California Governor Gavin Newsom was the first to issue a state-wide stay-at-home order on March 19, 2020. Forty-one additional states and the District of Columbia followed suit and issued stay-at-home orders. Puerto Rico issued a stay-at-home order starting March 15, 2020. South Carolina was the last state to issue a state-wide stay-at-home order effective on April 7, 2020. States varied in terms of the length of time of the order.

**Theoretical Underpinnings**

Signaling perspective offers a lens through which leaders’ observable characteristics (e.g., charisma) and emotional expressions (e.g., anger) can be perceived as signals of leaders’ unobservable characteristics and beliefs. Emotional expressions can offer information that signals the expressers’ feelings, beliefs, and intentions, which can then be received and interpreted by observers (Keltner & Haidt, 1999). The EASI model aims to describe the psychological mechanisms whereby a person’s emotional displays impact observers in a social context (Van Kleef, 2009). Emotional displays present observers with relevant information about those displaying emotion (e.g., motivations, beliefs, and intentions) and the situation, so that observers may deduce what is implied from the emotional expression. Interpretations made by observers help steer subsequent thoughts and behaviors. The assumptions of the EASI model align with the literature on leadership in that previous research suggests that leaders’ emotional expression is an important signal. For example, charismatic leaders can use emotions to symbolically signal values (Antonakis et al., 2016). However, follower thoughts and behavior may differ depending on the way each follower interprets emotional displays by leaders. For example, research indicates that the effectiveness of leader anger expressions is tied to the type of conclusion followers draw from the anger (Shao et al., 2018), and that leader anger can influence follower trust (Shao, 2019).

The signaling perspective and the EASI model complement one another. The signaling perspective emphasizes the functions of emotional display by the expresser whereas the EASI model focuses on the interpretations made by observers (Shao, 2019). Thus, this involves a two-stage process whereby expressers signal information through emotional displays whereas observers infer information from the emotional displays. Positive and negative emotions can signal different types of information and these emotional expressions can affect how followers infer information. In turn, follower inferences and perceptions will likely contribute to how they think and behave.

In the present study, I draw upon signaling theory in conjunction with the EASI model to examine leaders’ positive and negative emotions and the influence on follower behavior. Specifically, I explored public behavior in each state and the number of COVID-19 cases relative to governor speeches. Looking at emotions as signals is not entirely novel; prior research indicates that emotional displays convey information about expressers and provide receivers with information about the expressers’ feelings, beliefs, and intentions (Keltner & Haidt, 1999; Shao, 2019).

**Adherence to Safety Guidance and COVID-19 Infection**

From early on in the pandemic, agencies such as the Centers for Disease Control (CDC) and the World Health Organization (WHO) have worked to define and disseminate safety guidance aimed at reducing the spread of COVID-19. Throughout the COVID-19 pandemic, experts have consistently recommended that individuals should increase the frequency of handwashing, avoid crowded areas as much as possible, wear a mask or face covering in public places, and monitor symptoms (CDC, 2020). Furthermore, experts have advised that individuals should stay at home as much as possible to prevent the spread of the virus. Because the virus is primarily spread through close contact with an infected person, staying at home is the best way to avoid potential exposure. The greater the number of people you are in contact with, the greater the likelihood is of being
exposed to COVID-19 (CDC, 2020). That said, some individuals need to leave home to work an essential job. All individuals need to leave the house sometimes to get necessities such as groceries and medications. Lastly, some people either do not perceive the pandemic as a serious threat and/or choose to leave the house for recreational purposes. A host of factors serve to influence individual decisions. For example, Probst et al. (2020) found that financial security was related to the enactment of CDC-recommended guidelines. Although information about why people are leaving their houses is not widely available, there are differences in how often people are leaving the house and where they are going.

**Hypothesis 1:** There will be a positive relationship between COVID-19 cases and (1) restaurant visits, (2) retail and recreation mobility, (3) use of public transit, and (4) individuals spending 3–6 h away from home location.

**Hypothesis 2:** There will be a negative relationship between COVID-19 cases and (1) mask usage and (2) increase in staying at home.

Policy and behavior of residents in each state have varied widely. Some states issued state-wide stay-at-home orders, whereas others did not; and the length and timing of stay-at-home orders varied as well (Mervosh et al., 2020). Some states issued state-wide mask mandates, whereas others have not (New York Times; NYT, 2020). States also differed in terms of what types of dining (indoor or outdoor) and activities were allowed to resume once the stay-at-home orders were lifted. Lastly, the amount and type of communication that governors were having with the public, through press conferences and otherwise, diverged by state. Using the executive power to enact a state-wide policy or mandate can, in and of itself, send a strong message about the criticality of the situation. By signaling threat and by reducing locations that people could go, longer stay-at-home orders should mitigate the spread of COVID-19.

**Hypothesis 3:** States that issued longer stay-at-home orders in the spring will have fewer cases of COVID-19.

**Hypothesis 4:** States that issued mask mandates will have fewer cases of COVID-19.

**Crisis, Public Health Messaging, and Leadership**

In organizational research, crises are defined as high-impact occurrences that threaten the viability of organizations (Pearson & Clair, 1998). Although not typically described as an organization, the country is a group of individuals with common goals and some level of shared leadership. Creating and implementing a vision to resolve the current crisis present significant challenges for leaders (Mumford et al., 2007). Initially, leaders must make sense of the ambiguous conditions surrounding the crisis because differing interpretations of the same events can arise (Combe & Carrington, 2015; Kilduff et al., 2000; Markóczy, 1997). Under crisis conditions, people have limited experience in dealing with the challenges they have to confront, because these are typically novel (Lepine et al., 2005). This requires individuals to first make sense of ambiguous events, and then to agree on the way to proceed.

For the reasons above, how the public receives health-related messaging is important. A common public health messaging tactic is use of fear (Witte & Allen, 2000), anger (Gerend & Maner, 2011), or other negative emotions. Thus, I hypothesized that greater use of negative emotion in governor speeches will be associated with greater adherence to safety guidance aimed at reducing COVID-19 and, in turn, adherence to safety guidance will relate to fewer COVID-19 cases by state. One strong message from the beginning of the pandemic has been to stay at home as much as possible and only leave the house for essentials (groceries, prescriptions, etc.). The rationale was that avoiding crowds and public spaces was the best way to reduce the spread.

**Hypothesis 5:** Less time spent away from home will mediate the relationship between governor use of negative emotion in speeches and COVID-19 cases whereby negative emotion is linked to less time spent away from home and less time spent away from home relates to fewer cases of COVID-19.

**Method**

**Data and Measures**

The New York Times has tracked the number of COVID-19 cases and deaths by state and by day from January 21, 2020 through present in the “Coronavirus (COVID-19) Data in the United States.” This file was used to compile cases and deaths for every state as of January 30, 2021. Per capita figures were obtained by dividing number of cases and deaths by the state population and multiplying by 100,000. Therefore, cases and deaths are in terms of cases per 100,000 people in the state. Population data is from the U.S. Census Bureau (2020).

Information about whether and when stay-at-home orders were issued was obtained from each state government website. Data on when states began to reopen was reported by The Washington Post (2020). Whether a state-wide mask mandate was in effect as of November 1, 2020 was verified by The New York Times (2020). Data for mask mandates were categorized as 0 = none, 5 = sometimes, and 1 = full state mandate.
Next, mobility data was obtained by Google (2020). Google creates these reports with aggregated, anonymized sets of data from users who have turned on the “location history” setting on their mobile phones. These reports provide information about mobility in each state on an approximately bi-monthly basis. Mobility data reflects percent increases or decreases (from baseline) in time spent at categorized locations including (1) retail and recreation, (2) grocery and pharmacy, (3) parks, (4) public transportation, (5) workplace, and (6) residential areas. Baseline data represents a “normal” time spent at these locations during that day of the week and is the median value of the 5-week period from January 3, 2020, to February 6, 2020. The mobility data used in analyses was from January 5, 2020, but it should be noted that the data files are pertaining to mobility from a few days previously.

Information about restaurant visits, being at a location away from home, mask usage, and vaccine acceptance was compiled by Carnegie Mellon University’s Delphi Group and can be found on their COVIDCAST Website.3 Restaurant visits is “the daily number of visits to restaurants per 100,000 people, based on SafeGraph’s Weekly Patterns dataset” (Carnegie Mellon University; CMU, 2020). CMU’s Delphi Group received data from SafeGraph, which collects weekly information using anonymized location data from mobile phones. These counts only include people from SafeGraph’s panel whose visits are tracked and do not reflect the entire population. The “at an away location 3–6 h” variable refers to a “7-day trailing average of fraction of people spending 3–6 h away from home, based on SafeGraph mobility data” (CMU, 2020). Mask usage is based on the “percentage of people who say they wear a mask most or all of the time while in public, based on surveys of Facebook users” and vaccine acceptance is based on the “percentage of people who would definitely or probably choose to receive a COVID vaccine if it were offered to them today, based on surveys of Facebook users” (CMU, 2020). Each day, the Delphi Group at CMU surveys tens of thousands of Facebook users to ask them a broad set of questions related to COVID-19.

To evaluate the effect of governor communication on public behavior, transcripts were collected and analyzed. Transcriptions of governor press conferences between January 7, 2020, and January 1, 2021, were obtained from the transcription service company Rev. All transcripts can be found on the company’s website, rev.com.4 In total, 240 press briefings from 29 different state governors were analyzed.5 Only words spoken by the governor were included; comments by invited guests were excluded from the briefing prior to analysis. Transcripts were analyzed using the LIWC 2015 software (Tausczik & Pennebaker, 2010). Thematic dictionaries have been established by the LIWC manufacturer and these dictionaries have been validated (Pennebaker et al., 2015). These dictionaries have been used previously in psychology research including in another recent study looking at governor gender and stay-at-home orders relative to governor press briefings earlier in the pandemic (Sergent & Stajkovic, 2020). The LIWC program provides dictionaries that assess 41 psychological variables and six personal concern categories. In line with the proposed theoretical links above, I was most interested in examining the variables pertaining to emotion (specifically negative emotion). Variables are created based on the percentage of words in a text that belong to a specific dictionary, such as the negative emotion dictionary. Therefore, values will not be skewed based on length of speech or how many speeches were given by a particular governor.

Results

Descriptive statistics and correlations appear in Table 1. As proposed in Hypothesis 1, COVID-19 cases were positively correlated with (1) restaurant visits, (2) retail and recreation mobility, (3) use of public transit, and (4) individuals spending 3–6 h away from home location. COVID-19 cases were also correlated with (1) grocery and pharmacy mobility, (2) parks mobility, and (3) workplace mobility. As proposed in Hypothesis 2, COVID-19 cases were negatively correlated with percent increase in time spent in residential areas and with mask usage. These results fully support Hypotheses 1 and 2.

Hypothesis 3 posited that the length of stay-at-home orders would be linked to fewer cases of COVID-19 and Hypothesis 4 posited that having a mask mandate would be linked to fewer cases of COVID-19. To test these hypotheses, I ran a multiple linear regression. Length of stay-at-home orders, ranging from 0 (no order) to 273 days, was related to fewer cases of COVID-19 (B = −0.315, t = −2.380, p = .021). Mask mandate, ranging from 0 (none) to 3 (full state mandate), was also related to fewer cases of COVID-19 (B = −0.295, t = −2.229, p = .030). These results offer full support for Hypotheses 3 and 4.

Hypothesis 5 proposed that the relationship between negative emotion in governor speeches and COVID-19 cases would be mediated by time spent away from home such that negative emotion would have a negative relationship with spending 3–6 h away from home and spending 3–6 h away from home would have a positive relationship with the number of COVID-19 cases. Mediation analyses were conducted using the PROCESS 3.0 macro developed by Hayes (2018) for SPSS. Results were based on model 4 with 5,000 bootstrap samples for bias-corrected bootstrap 95% confidence intervals. Standardized coefficients are reported. Mediation results are reported in Table 2. Negative tone had a significant negative relationship with spending 3–6 h away from home and spending 3–6 h away from home showed a significant, positive relationship with COVID-19 cases.
Moreover, with the addition of the mediation variable (3–6 h away), negative tone no longer significantly predicts COVID-19 cases. This provides evidence for full mediation and offers support for Hypothesis 5. Because negative emotion was correlated with restaurant visits and mobility at retail and recreation, I tested mediation models with these variables as well. Results are reported in Table 2.

Although no formal hypotheses were posed about vaccine acceptance, getting enough people vaccinated to achieve herd immunity will be the next hurdle in the long battle with COVID-19. Thus, I explored the factors that influence vaccine acceptance. As can be seen in the correlation table, length of stay-at-home order has a positive relationship with the likelihood of getting vaccinated. Additionally, vaccine acceptance was related to the following LIWC variables: friend ($r = .409, p = .028$), leisure ($r = .410, p = .027$), informal ($r = -.68, p < .001$), and non-fluent ($r = -.586, p = .001$).

How these results should be used to inform future speeches made by governors and other public health officials will be outlined in the practical implications below.

### Discussion

The current study explored the effects of public behavior on COVID-19 outcomes and how state-wide policy influenced public behavior in the right (or wrong) way to curb COVID-19 cases. As can be seen, more time spent away from home overall seems to show a strong relationship with the number of reported cases. The strongest positive correlations with COVID-19 cases were with restaurant visits; retail and

### Table 1. Correlations, Means, and Standard Deviations.

|            | M     | SD    | 1     | 2   | 3   | 4   | 5   | 6   | 7   |
|------------|-------|-------|-------|-----|-----|-----|-----|-----|-----|
| 1. Cases   | 7,760.15 | 2,379.00 | 1     |     |     |     |     |     |     |
| 2. SAH length | 36.19  | 37.52  | -.42**| 1   |     |     |     |     |     |
| 3. Mask mandate | .66    | .44    | -.41**| .36**| 1   |     |     |     |     |
| 4. Retail & rec | -17.41 | 8.97   | .50** | -.63**| -.48**| 1   |     |     |     |
| 5. Grocery & pharm | -4.71  | 5.83   | .41** | -.48**| -.26  | .84**| 1   |     |     |
| 6. Public transit | -10.86 | 14.89  | .30*  | -.41**| -.31* | .65**| .69**| 1   |     |
| 7. Parks    | -29.43 | 16.31  | .45** | -.42**| -.48**| .76**| .74**| .58**| 1   |
| 8. Workplace| -30.18 | 11.15  | .35*  | -.42**| -.48**| .76**| .74**| .61**| .72**|
| 9. Residential| 11.39  | 3.26   | -.48**| .59**| .45** | -.91**| -.75**| -.54**| -.89**|
| 10. Restaurant visits | 376.49 | 262.79 | .53** | -.40**| -.30* | .71**| .60**| .33*  | .73**|
| 11. 3–6 h away | .07    | .01    | .53** | -.23  | -.35**| .50**| .42**| .34*  | .54**|
| 12. Mask usage | 92.36  | 4.10   | -.54**| .64**| .70**  | -.71**| -.61**| -.49**| -.71**|
| 13. Vaccine accept | 73.50  | 6.06   | -.46**| .46**| .39**  | -.74**| -.58**| -.26  | -.75**|
| 14. Negative emotion | .91    | .35    | -.42**| .23  | .22   | -.37* | -.35  | -.26  | -.30  |
| 15. Sad     | .21    | .09    | -.44**| .28  | .27   | -.33  | -.31  | -.24  | -.34  |

| 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
|----|----|----|----|----|----|----|----|
| 1. Cases |     |     |     |     |     |     |     |
| 2. SAH order length |     |     |     |     |     |     |     |
| 3. Mask mandate |     |     |     |     |     |     |     |
| 4. Retail & rec |     |     |     |     |     |     |     |
| 5. Grocery & pharm |     |     |     |     |     |     |     |
| 6. Public transit |     |     |     |     |     |     |     |
| 7. Parks |     |     |     |     |     |     |     |
| 8. Workplace |     |     |     |     |     |     |     |
| 9. Residential |     |     |     |     |     |     |     |
| 10. Restaurant visits |     |     |     |     |     |     |     |
| 11. 3–6 h away |     |     |     |     |     |     |     |
| 12. Mask usage |     |     |     |     |     |     |     |
| 13. Vaccine accept |     |     |     |     |     |     |     |
| 14. Negative emotion |     |     |     |     |     |     |     |
| 15. Sad |     |     |     |     |     |     |     |

Note. N = 52. For correlations with LIWC variables (14–16), N = 29. Mask mandate was reported as 0 = none; 5 = sometimes; and 1 = full state mandate. Variables 4–9, 12, and 13 are percentages ranging from −99 to +99. Variables 14–16 are the average percentages of words in that category used in all speeches made by a governor (by state). SAH = stay at home; LIWC = linguistic inquiry and word count.

*p < .05. **p < .01. ***p < .001.
recreation mobility; and 3–6 h away from home. This may be indicative that individuals are especially likely to become infected in restaurant, retail, and recreation locations. This makes sense because individuals are also less likely to be wearing a mask when eating or drinking and, in all of these locations, ability to properly social distance may be limited. Though COVID-19 cases were also related to grocery/pharmacy, workplace, transit, and park mobility data, correlations were slightly lower. This may be due to greater enforcement of safety guidance, greater ability to socially distance, and increased usage of masks in these locations. It should be noted, though, that correlations between time spent at these locations and COVID-19 cases are positive and significant as well. The risk in these locations is not zero. Meanwhile, mobility in residential areas (at home) was negatively related to the number of cases and mask usage was also negatively related to the number of cases. This offers more empirical evidence that staying at home as much as possible and wearing a mask in public spaces can significantly mitigate the spread of COVID-19.

States varied in terms of whether they issued stay-at-home orders, how long orders were in place, and whether mask mandates were in effect for essential trips (and once the stay-at-home orders were lifted). This study highlights the impact of stay-at-home orders and mask mandates on reducing the spread of COVID-19. Although it would not have been economically sustainable for many individuals to endure a full stay-at-home order throughout the entire pandemic, having a longer order in the spring (March/April) was shown to have a lasting impact all the way through January 28, 2021, more than a year after the first case was identified in the United States. It should be noted that some states had regional stay-at-home orders or differed on whether they permitted indoor dining throughout the months of December 2020 and January 2021. This may influence relationships between restaurant visits and cases. However, the regional stay-at-home orders or closures of restaurants were due to extraordinary high cases and hospitalizations in those areas. Thus, if anything, this would have skewed the data in the opposite direction of my findings (i.e., more restaurant visits would have been associated with fewer cases). States also diverged on the extent of their mask mandates (or lack thereof). Masks show a strong negative relationship with COVID-19 cases so mask mandates seem like a simple way to reduce the spread of COVID-19 with very little downside. The CDC recently (January 29, 2021) issued an order requiring the wearing of masks by travelers using public transit. This order applies to all passengers on airplanes, ships, ferries, trains, subways, buses, taxis, and rideshares traveling into, within, or outside of the United States. Having this federal policy should certainly help reduce the spread of COVID-19 at public transit locations.

The current study was also focused on the effect of emotional tone in messaging about public health. Specifically, governor speeches were transcribed and analyzed with LIWC software. Findings demonstrate that negative emotion was related to fewer cases and deaths in a state. Furthermore, this relationship was mediated by public behavior; the mediation effect was observed whereby negative tone was related to spending 3–6 h away from home and spending 3–6 h away from home was positively related to the number of COVID-19 cases. If individuals are spending 3–6 h away from home, this is likely not capturing essential trips such as trips to get groceries or to pick up a prescription. Although the data do not expand on specifically where the 3–6 h is spent, the timeframe would suggest that this time away from

Table 2. Mediation Results.

| Predictor             | Mediator = 3–6 h away | Mediator = restaurant visits | Mediator = retail and recreation |
|-----------------------|-----------------------|------------------------------|-------------------------------|
| DV = COVID-19 cases   | B SE                  | DV = COVID-19 cases          | DV = COVID-19 cases           |
| Negative emotion      | -0.0193*              | -390.58**                   | -7.69*                        |
| 3–6 h away            | 0.01                  | 127.86                       | 3.60                          |
|                       | -1,114.63             | -1,126.51                    | -1,407.70                     |
|                       | 47,794.33*            | 2.33†                        | 81.77†                        |
|                       |                       | 1874.51                      | 916.36                        |
|                       |                       | 857.99                       | 41.39                         |

Note. N = 29. SE = standard error; COVID-19 = coronavirus disease 2019; DV = dependent variable. †p < .10. *p < .05. **p < .01. ***p < .001.
home is not spent on essential activities, which typically take much less time.

Even though the current study supports use of negative tone to encourage adherence to safety guidance, there may be more to the story. Previous research suggests incorporating different types of emotion into speeches or public health messaging because different emotions can serve different purposes (Nabi, 2015). Although fear is generally associated with inactions or avoidance (such as staying at home as much as possible), positive emotions such as hope may be associated with inspiring action (Nabi, 2015) including washing hands more frequently and could inspire action to get vaccinated when it is possible to do so. Because staying safe during the pandemic involves a combination of behaviors, public health messaging should involve a combination of emotional appeals.

Limitations

Although we report current results, the effects of this pandemic are ever-evolving and some results may differ as governors continue to deliver new press briefings and once certain counts or datasets are finalized. However, research in this topic area is greatly needed as soon as it is available to inform practice in regard to policy and public health messaging. Data was also pulled from various sources that were publicly available. Although it would not have been possible to conduct this study using an experimental research design, it should still be noted that causality cannot be inferred from these findings and results should be interpreted with caution.

LIWC software calculates scores for negative emotion overall, as well as terms related to the following negative emotions: anxious, anger, and sad. This means that I was not able to measure the effect of fear specifically. The use of fear in public health messaging seems to have the most evidence in terms of influence on behavior (Witte & Allen, 2000). In the future, the addition of a dictionary for terms related to fear may prove helpful in many streams of research. Moreover, LIWC provides overall scores for positive and negative emotion throughout a speech but does not assess other aspects such as emotional flow in speeches.

In addition, while the rev.com transcripts were an incredible resource for the current research, I was only able to obtain transcripts from 29 governors. Furthermore, it is possible that words by governors were incorrectly recorded by the third-party transcription service, which could influence results. However, any discrepancies would likely have a minimal effect on results because of the high volume of total words analyzed.

Practical Implications

This study demonstrates empirical evidence linking public behavior to the spread of COVID-19. Understanding where and how COVID-19 is spread, as well as how we can reduce the spread, is critical to informing the best policies, mandates, orders, and guidance moving forward. Much of this evidence gives more credibility to the guidance the CDC and the WHO were already providing. However, correlational results can offer some insight as to where to focus efforts. Findings also highlighted the lasting impact of stay-at-home orders and mask mandates in reducing the spread of COVID-19. With new variants popping up in the United States, and with these variants being much more transmissible than the previous strand, it is more important than ever to encourage staying home as much as possible. The presence of new variants that are more easily transmitted also gives more reason to have widespread mask mandates that are strictly enforced. The CDC’s federal mask mandate for public transit is a step in the right direction.

Based on the results of this study, negative emotion had a direct effect on COVID-19 cases. Thus, it is recommended that speeches attempt to make use of negative emotions, such as sadness. Negative emotions, such as fear, have been shown to be useful in reducing harmful actions. Fear tactics have been found to be most successful when the goal is to inspire inaction (e.g., staying at home; Nabi, 2015). However, positive emotions, such as hope, may inspire actions such as handwashing; however, that was not explored in the current study. Although the current study found better results with the use of negative emotion, as vaccines are beginning to be distributed, positive emotion in messaging may also be beneficial in encouraging action, and motivating individuals to get vaccinated. Dr. Anthony Fauci has said that as much as 90% of the population may have to be vaccinated before we can achieve blanket herd immunity (Weixel, 2020). Dr. Fauci acknowledges this figure has increased since previous interviews, but the more infectious a disease is, the higher rate of vaccination is needed (Weixel, 2020). Achieving herd immunity will likely take time to accomplish and encouraging 90% of individuals to get vaccinated may be challenging. Although COVID-19 vaccine distribution has begun, public health officials have stated that we must “double down” on public health measures (Rahman, 2020). This means that individuals will need to continue wearing a mask, practicing social distancing, and washing their hands.

Lastly, though no formal hypotheses were made regarding vaccine acceptance, I explored what language in previous speeches was related to current levels of vaccine acceptance. Based on the Facebook survey data collected by CMU’s Delphi Group, the average vaccine acceptance across the United States was 78.5%. Having 78.5% of the population vaccinated would certainly help slow the transmission of COVID-19 as well as reduce opportunities for the virus to mutate further into additional variant strains. However, Dr. Anthony Fauci claims we may need upwards of 90% of the country vaccinated to fully achieve herd immunity (Weixel, 2020). Furthermore, the 78.5%
figure includes tens of thousands of people who were surveyed, but it may not be representative of the entire U.S. population. Thus, I wanted to share which LIWC variables in previous speeches were most related to vaccine acceptance. Speech that included terms related to “friend” and “leisure” was positively associated with vaccine acceptance. This may signify benefit in highlighting the enjoyable activities that people are eager to return to such as spending time with friends and going on vacations. Other significant findings are that more informal and non-fluent languages were negatively related to vaccine acceptance. Lastly, it is vital for governors and public health officials to sound credible, competent, and formal in their language to promote vaccine acceptance. These findings should help inform governors and public health officials who wish to develop and deliver upcoming speeches that are targeted at bolstering vaccine efforts.

Conclusion
The present study explored how policy and emotional tone in governor speeches influenced public behavior and outcomes during the COVID-19 pandemic. Based on the findings, more time in public spaces was empirically shown to be related to a greater number of cases and more time at home was related to a lower number of cases. Mask usage was also related to fewer cases. Additionally, negative emotion in governor press briefings resulted in less time spent away from home, which in turn related to fewer cases. Findings from the current study highlight the complicated nature and importance in formulating public health messaging. In particular, leaders may get better results by deliberately expressing certain emotions when addressing the public to inspire particular interpretations and actions within followers. Expression of negative emotions, such as fear, may be particularly powerful in improving outcomes during a pandemic. During crisis, leaders play a vital role in making sense of a novel situation and in creating a vision for how to proceed. Strong leadership and powerful messaging have the potential to minimize harm during a global pandemic.

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