Why Do People Believe in COVID-19 Conspiracy Theories and What Are the Consequences?

Victoria Thompson

North Carolina Wesleyan College

Abstract

With the uncertainty of the coronavirus came a plethora of conspiracy theories in an attempt to explain its origins. Despite more information about the coronavirus being learned and made public by the CDC, it seems that there are still those desperately clinging to these theories. Results of a representative sample of approximately 1,000 respondents indicated that predictors of COVID conspiracy beliefs include uncertainty, low threat perception, distrust in science, conservative-leaning political beliefs, and positive feelings towards Donald Trump. Consequences of belief in these theories are relatively low intentions to take the COVID vaccine as well as relatively low willingness to follow public health officials' recommendation for controlling the spread of the virus (e.g. social distancing, wearing masks). Limitations of the current study and potential directions for future research are discussed.

Keywords: COVID-19, conspiracy theories, vaccination intentions, threat perception, COVID-19 conspiracy belief

Why Do People Believe COVID-19 Conspiracy Theories, and What are the Consequences?

Conspiracy theories have long confused and intrigued both scientists and laymen due to their elaborate yet somehow very simple nature. With the internet increasingly available at the push of a button, conspiracy theories have become more salient than ever. According to Douglas et al. (2017), conspiracy theories can be defined as "explanations for important events that involve secret plots by powerful and malevolent groups" (p. 538). Some of the more well-known and believed conspiracy theories involve the theory that the terrorist attacks on 9/11 were staged by the US government in order to wage war on the Middle East, and that the FBI was responsible for the assassination of President John F. Kennedy. Much research exists about various conspiracy theories and why people believe them, but very little of this research centers around the COVID-19 related theories. This lack of research on such a relevant topic leaves an unacceptable gap that needs to be filled.

Douglas et al. (2017) research suggests that the draw of types of conspiracy theories as a whole can be narrowed down to three primary categories of psychological motivations: epistemic, existential, and social. Epistemic motives involve "the desire for understanding, accuracy and subjective certainty" (Douglas et al. 2017, p. 538). Existential motives refer to "the desire for control and security" (Douglas et al. 2017, p. 538). Social motives, on the other hand, refer to "the desire to maintain a positive image of the self or group" (Douglas et al. 2017, p. 538). Each of these motives-- epistemic, existential and social-- all connect to the novel coronavirus, a global pandemic that has become the focus of most conspiracy theories.

What COVID-related theories do people believe? A study by Uscinski et al. (2020) showed that 29% of respondents believed that COVID-19 reports have been exaggerated to

damage President Trump and 31% of respondents believed that COVID-19 was purposefully created and spread. These numbers might be shocking to some, considering the seemingly obvious gravity of the situation. Political scientists Uscinski et al. (2020) suggest that there are a variety of psychological and political factors behind these beliefs. The driving force behind the widespread acceptance of COVID-19 conspiracy theories is a need to feel in control (Enders & Uscinski, 2020). This idea relates back to Douglas et al.'s ideas about existential motives for conspiracy belief. These theories help to take a frightening and uncertain time and provide some explanations. Additionally, they downplay the severity of the situation, which provides psychological relief (Enders & Uscinski, 2020).

Why Do People Believe Conspiracy Theories?

As previously stated, there are numerous correlates to belief in conspiracy theories. Some of the more notable correlates are the perceived lack of control, rejection of science, political extremism, lower education, and the need for cognitive closure. Each of these have been heavily linked to conspiracy theories. This section aims to analyze each of these briefly.

Lack of Control

Feelings of powerlessness have been shown to be related to both conspiracy beliefs and lower education. This relationship, according to van Prooijen (2016) is due to multiple factors, including cognitive complexity, which he defines as "ability to detect nuances and subtle differences across judgement domains, along with a tendency to consciously reflect on these nuances" (p. 2). As it turns out, education and cognitive complexity nurture and strengthen each other. Conspiracy theories tend to be extremely simple reasonings for very complex situations, and it therefore stands to reason that those with less cognitive complexity would be more likely to accept these ideas without extensively reflecting on them. Education, says van Prooijen

(2016), allows people to learn to solve problems and adapt to their environments. Because of these gained skills, those with more education feel more secure and in control. Van Prooijen (2016) also points out how people with less education tend to see patterns and connections that do not exist. A prominent example of illusory pattern perception is the theory about 5G internet's relation to the coronavirus. Both 5G internet and the coronavirus are relatively new and largely not understood by the common person, so people who are feeling less strongly in control of their life might jump to the conclusion that the two are somehow related. This point further shows that those who lack advanced education lack that feeling of control, and therefore are essentially doing mental backflips in order to make sense of these out of control events going on around them. The results of Van Proojien's (2016) survey point to a thinking pattern like this: education leads to analytical thinking, which leads to less belief in simple solutions for complex problems. This way of thinking, in turn, leads to decreased belief in conspiracies. He also found that those who have less education feel less in control, which, in turn, causes them to turn toward these conspiracy theories.

Political Extremism

One notable correlate of conspiracy belief is political extremism, both at the left and right ends of the spectrum (van Prooijen et al., 2015). Here, extremism is measured on a self-classified political ideology scale, with lower numbers being further left-wing and higher numbers being further right-wing. Participants filled out multiple surveys in order to assess conspiracy belief and paranoia. As it turns out, right and left- wing extremists, although seemingly opposites, seem to have similar thought patterns, including a very rigid and structured way of thinking, also known as black and white thinking, that aims to make sense of significant events. Right-wing extremists tend to lean towards theories such as an impending New World Order, while left-wing

extremists tend to lean more towards anti-capitalist and anti-government conspiracy theories, such as 9/11 being orchestrated by the government. Not surprisingly, it seems that these people only receive and trust information from their groups, which van Prooijen et al. (2015) call a "crippled epistemology," a term that accurately reflects their tendency to be closed-minded to all views except those of their group (p. 1). This is only amplified by social media, which tends to form an echo chamber, of sorts, for these extremists. They can easily find and locate those who agree with them, and, once they do, they essentially shut out all information that contradicts what their group says. Additionally, political extremists tend to believe in simple solutions for complex problems, which only further fuels their conspiracy beliefs. For example, an extremist may believe that the obvious solution to immigration is to build a border wall. While this may have an effect, it will likely not solve the problem they are concerned about. This research is important because it highlights how political extremists' way of thinking naturally leads to higher conspiratorial thinking patterns.

Need for Cognitive Closure

Another known correlate of belief in conspiracy theories is the need for cognitive closure. Those with high need for cognitive closure are "determined to form quick judgements on any given topic," and, when they are unable to do so, it causes them high levels of anxiety (Marchlewska et al., 2017, p. 4). For example, those with higher need for cognitive closure might be concerned about the coronavirus. They log onto Facebook, and the first thing they see is a story from a local blogger about how the virus would be eradicated if only every person in the country were to increase the amount of protein in their diets. Despite the lack of evidence for this claim, those high in need for cognitive closure are likely to latch onto this idea and refuse to accept that their belief might not be the correct solution. This is where conspiracy beliefs fit in.

Due to the strong need to rid themselves of uncertainty and the anxiety that comes with it, people who are high in the need for cognitive closure tend to grab onto conspiracy theories (especially salient ones), which tend to provide some type of closure (Marchlewska et al., 2017). Unfortunately, as Marchlewska et al. (2017) point out, this need for closure often leads to snap judgements and biased knowledge formation. Conspiracy beliefs tend to be easily accessible explanations for scary events, meaning that those with a high need for cognitive closure are highly likely to grab onto these explanations and not let go.

Rejection of Science

Rejection of science is a well-known correlate of conspiracist ideation, defined by Lewandosky et al. as "the attempt to explain a significant political or social event as a secret plot by powerful individuals" (2013, 623). These theories typically center on topics such as climate change, the moon landing, and vaccines. Vaccines and their legitimacy have become a hotly debated topic in recent years, with multiple anti-vaccination groups appearing all over the United States. Many people are convinced that the pharmaceutical industry, or "Big Pharma," is corrupt and therefore vaccines are not safe. Some even claim that vaccines have caused significant health risks to them or a loved one. Of course, there is no proof to these theories, but this does not appear to be a deterrent to those who believe them. In fact, a study by Jolley and Douglas (2014) showed that mere exposure to an anti-vaccination conspiracy theory reduced intentions to vaccinate a fictitious child, even when participants were later exposed to positive information about vaccines. Clearly, those who are distrustful of science as a whole are more prone to believe theories that fit their own anti-vaccine beliefs.

All of these factors are related to strong beliefs in conspiracy theories, and it is even possible for these factors to overlap. Rejection of science, need for cognitive closure, and lower

education, for example, could easily overlap, given that all three seem to involve making decisions without much consideration or critical thought. The lack of consideration makes it easier for conspiracy theories to become ingrained in the minds of those who cannot or will not further research what they read.

Why Do People Who Believe in Conspiracy Theories Reject Science?

It seems that, while belief in conspiracy theories is rising, belief in science is decreasing. Many of the questionable news sources (e.g.,Youtube videos and blog posts made by people with no formal scientific training) claim to know more than top scientists, and many people believe these outrageous claims. They feel that the government and nation's top doctors and scientists cannot be trusted and are therefore lying about climate change, vaccines, HIV/AIDS and now, COVID-19 as well. An important thing to note here is the difference between healthy skepticism and rejection of science. Skepticism, as noted by Lewandosky, et al., is not only at the very core of scientific reasoning, but has also been shown to "improve peoples' discrimination between true and false information" (2013). True skepticism, then, is necessary to the scientific process, while the rejection of science can be defined as the "dismissal of well-established scientific results" (Lewandosky et al., 2013, p. 623) and is therefore not the same as skepticism. After having participants fill out a survey covering multiple conspiracy beliefs, Lewandosky et al.'s (2013) results showed that conspiracist ideation is indeed correlated to rejection of science, which is unsurprising to those who are familiar with conspiracy theories and/or those who strongly endorse them. These results show that rejection of science is common among conspiracy theorists, and that correlation undoubtedly holds true in the present world pandemic as well, where many theorists reject the scientific facts in favor of their own idea, a phenomenon known as denialism (Uscinski et al. 2020). Denialists and conspiracy theorist populations tend to have

significant overlap given that they are both predisposed to be suspicious and distrustful of experts and authority figures (Uscinski et al. 2020).

Populism

Also associated with the previously discussed variables such as rejection of science and need for cognitive closure, populism seems to be strongly associated with conspiracist ideation. Populism is defined by political scientists Silva et al. (2017) as a belief system that sees two major groups in society: the elites and the people. The elites are the corrupt people in power, and the people are the ones who are oppressed by the elite. According to a study by Silva et al. (2017) in which participants were asked to fill out a scale to measure populism and another scale to measure conspiracy beliefs, the overlap in populism and conspiracy belief is largely due to beliefs in malevolent global conspiracies and control of information. Malevolent global conspiracies refer to a small but powerful group secretly running the world, and control of information refers to new and important information and/or technology that exists but is being hidden for personal gain. It should be no surprise that this way of thinking is highly associated with conspiracy belief, considering the anti-government and anti-elitist views of many conspiracy theories. The novel coronavirus is no exception to this rule, as many of the most prominent theories credit the virus' origins to powerful people and industries like Bill Gates, "Big Pharma," the Chinese government, and more. Typically, these theories either claim that Bill Gates and/or Big Pharma are attempting to gain profit off of the virus by implementing DNA-altering microchips into the vaccine, or that the Chinese government created the virus as a bioweapon and released it into the world in order to weaken other major world powers so they can wage war against them and take over the world. Mindsets like this that involve deep distrusts of authority seem to perpetuate rejections of science among conspiracy theorists.

Undue Suspicion

It seems that this rejection of science is also due to undue suspicion caused by conspiracy theories. In 2017, Jolley and Douglas studied whether the order in which one received information about vaccination affected their views. They showed various groups either positive (anti-conspiracy) or negative (conspiracy) information about a fictitious vaccine for a fictitious disease. Some groups were exposed to positive information and then negative, some vice versa, and some only saw one or the other. As it turns out, most people who saw the conspiracy information first tended to latch onto it and not believe the anti-conspiracy information presented after. It seems that, as mentioned previously, the more salient that false information was, the quicker people latched onto it. This idea relates back to the spreading of misinformation on social media. Because it has become so easy to access this information, people who see the false information first are likely to experience the primacy effect and refuse to let it go, even when subsequently exposed to accurate information.

Rejection of science is heavily related to conspiracist ideation due to the increasing popularity of misinformation. This misinformation casts undue suspicion onto well-established scientific facts, which, in turn, causes people to doubt. Populism also seems to be connected to this rejection of science due to their heavy distrust of the wealthy and powerful elites. These mindsets seem to be becoming more popular as the salience of conspiracy theories increases.

How Misinformation Is Spread

Social media is currently a major source of misinformation, since it is where conspiracy theories seem to be most salient. Anyone with an account can post information on social media, and therefore it is easier to be exposed to conspiracy theories. This section discusses how these

theories seem to get spread around on Facebook and Twitter, the two platforms that host the most misinformation.

Computer scientists Mustafaraj and Metaxas (2017) did a study in which they broke down the basic structure of fake news spreading on Facebook and Twitter. The study is based around the 2016 election, which seems to coincide with a massive rise in social media hoaxes. It seems as though there is a pattern for spreading fake news across Facebook and Twitter, and the "recipe," so to speak, is outlined in the study by Mustafaraj and Metaxas (2017). The steps can be summarized as follows: First, register a catchy and attention-grabbing domain name for a website. Second, create a social media account under a fictitious name (or, on Twitter, just a vague username). Third, find a group who is interested in your topic. Fourth, target people in those groups with your messages. Finally, let the people spread the news. This pattern seems to work for both Facebook and Twitter. Of course, as the authors point out, propaganda and fake news existed long before social media, but social media has made stories like these considerably more salient and easier to locate. It does not take long to scroll on Facebook or Twitter before coming across an article from a seemingly random, unknown news source claiming to know major information about the government, world events, etc. that seemingly nobody else knows. They often claim that "the media/scientists/government/whatever doesn't want you to know this information." The coronavirus is no exception to this idea, as new "news websites" seem to be popping up every day with "new information" about the origins, nature, and cure for COVID-19.

Given all of the previously discussed correlates to conspiracy belief and the effectiveness of the five-step plan outlined by Mustafaraj and Metaxas (2017), it is not difficult to believe the avalanche of false information that has been spreading ever since before the novel coronavirus has become incredibly widespread. The coronavirus pandemic is a very uncertain and frightening

event, and people are seeking answers. When these fake news sources appear with seemingly plausible (or even implausible) explanations for these things, people are quick to latch on and subsequently spread the news for everyone else to see, too. Much of this confusion could be cleared up with research, but, perhaps due to low education levels or a strong need for cognitive closure, people who see these articles seem to feel no need to further research the topic and just blindly trust whatever is being fed to them.

Conspiracy Theories About COVID-19

Since its origins, SARS-CoV-2, better known as the coronavirus or COVID-19, has been shrouded in mystery. Its mysterious origins, strange symptoms, 14-day incubation period, and shutdowns have left everyone in a turmoil. Like in many cases, the anxiety and fear caused by this virus have given birth to many, many conspiracy theories. Some of them are plausible, and some of them strain credulity. The question is, though, why are people believing them in the first place? This section aims to answer that question.

Uscinski et al. (2020) set out to see who exactly is buying into these theories. They asked respondents about two of the more prominent theories— (1) The virus was created and spread on purpose, and (2) The threat of the virus has been greatly exaggerated. Their study reported three major findings that offer key insights as to who these COVID conspiracists are. Firstly, unlike other conspiracy theories, they found no correlation between education and belief in COVID-19 conspiracy theories. They also found no real difference across other socio-demographic factors. Secondly, they found that there are psychological and political factors playing into COVID-19 conspiracy beliefs. Specifically, they name conspiracy thinking, denialism, partisanship, ideology, religiosity, and youth as related factors. Specifically, it seems that those who are associated with the Republican party and/or subscribe to more conservative ideologies are more

likely to believe conspiracies about COVID. Additionally, denialists, or those who just blatantly refuse to believe certain facts due to the discomfort it brings them, seem to ascribe more to COVID conspiracies, as are younger people and those who tend to be more religious. Some of these factors, such as denialism and conspiracy thinking, are consistent with previous research about conspiracy beliefs (Uscinski et al., 2020) Thirdly, partisan cues, such as the responses by major political figures, seem to be inflaming these beliefs, specifically among supporters of Donald Trump. It seems that, due to his lackadaisical attitude toward the virus at the beginning, those who look up to him likely took a similar stance. The belief that the threat was exaggerated seems to be more popular among Donald Trump's supporters than among those who dislike him or do not pay attention to politics. These insights provide useful evidence in understanding who exactly believes the more popular of the COVID-19 conspiracy theories.

There are, however, some more implausible and bizarre theories as well, including elements like 5G internet and Bill Gates. How could anyone buy into those conspiracy theories? Political scientists Enders and Uscinski (2020) pose a possible answer. According to them (and what is already known about conspiracy theories), these beliefs can stem from many things, including political or religious motivations. More important than these in this particular case, however, are three psychological factors--uncertainty, anxiety, and feelings of powerlessness. The pandemic has brought with it immense amounts of stress and uncertainty. These theories can help to bring psychological comfort and relief to people who feel scared and out of control. As Enders and Uscinski (2020) point out, although these theories are typically illogical and ill-defined, they are attractive to people because they restore that feeling of control. If China, Bill Gates, or 5G internet can be blamed for the virus' origins, then this justifies the feeling of powerlessness by showing that it was completely out of the regular peoples' hands to begin with.

Theories also downplay the severity of the virus, which relieves anxiety. Maybe there aren't thousands of people dying every day. Maybe the media/the government/the scientists are just lying. The pandemic, according to Enders and Uscinski (2020), has been the perfect breeding ground for theories just like this to arise. Interestingly enough, however, there is not enough evidence to suggest that these theories provide as much psychological relief as one would hope. For instance, thinking that Bill Gates created the virus in order to implant microchips into every American is not necessarily a more calming alternative to the truth.

Conspiracy theories seem to be helping people to cope with the intense amounts of stress and anxiety brought on by the coronavirus pandemic. They downplay the severity and help people to feel more secure about being powerless. Despite all of this, evidence does not show that these theories help very much, since the theories themselves are usually equally alarming alternatives (Douglas et al., 2017).

Interim Summary

In summary, the novel coronavirus pandemic has brought with it much uncertainty. Conspiracy theories seem to provide people psychological relief from anxiety, uncertainty, and feelings of powerlessness, despite the lack of evidence for how well this actually works. The people who tend to believe these conspiracy theories are people with lower education, high need for cognitive closure, or people who are motivated by political factors. Despite political extremists on both sides tending to believe more conspiracy theories as a whole, it seems that coronavirus theories extend to those who are moderates as well, particularly those on the right. Additionally, it seems that theorists tend to largely reject science, either because of populist attitudes, undue suspicion, religious reasons, or political reasons. The same holds true for those who believe COVID-19 conspiracies as well, given that they largely ignore information coming

from official sources like the CDC or WHO. Regardless of all the things that are known, the coronavirus is still extremely new, meaning that there is much left to learn about the virus, the theories surrounding it, and how it all impacts people psychologically.

Overview of Current Study and Hypotheses

The present study aims to expand upon the limited research existing on the relationship between COVID-19 and conspiracy theories. Specifically, we sought to explore both possible predictors and consequences of belief in COVID conspiracy theories. To do this, a randomized sample was conducted among approximately 1,000 participants in the United States. We hypothesized that findings would be consistent with previous research. We expect to see significant positive correlations between distrust in science and COVID conspiracy belief based on Enders et al. (2020). Additionally, we expect to find a positive correlation between uncertainty and conspiracy beliefs (Enders, 2020; Jolley & Douglas, 2017). We also expect to see a significant correlation between powerlessness and conspiracy beliefs (Jolley & Douglas, 2017). We expect to find a significant positive correlation between right-leaning political beliefs and COVID conspiracy beliefs (Enders et al., 2020). We also expected to see some significant consequences of COVID conspiracy belief, such as a strong negative correlation between conspiracy beliefs and the willingness to follow the recommendations of public health officials (e.g. wearing masks, social distancing) (Imhoff & Lamberty, 2020). We expect to see a significant negative correlation between distrust in science and vaccination intentions based on research by Jolley and Douglas (2017). Also based on research by Enders et al. (2020) and Jolley and Douglas (2017), we expect to find significant negative correlations between COVID conspiracy beliefs and vaccination intentions.

Methods

Participants

The initial sample included 1,011 American participants. Of these participants, 27 were excluded due to taking more than 50 minutes to complete the survey, being under the age of 18, or providing logically impossible answers (e.g., eating indoors at a restaurant more than 2,000 times in a month). The remaining 984 participants were all between the ages of 18 and 94, with the mean age being around 46 (*SD* = 17.33). Of these participants, 469 were male, 509 were female, and six identified as something else. While a majority of the sample was Caucasian (69.5%), 12.1% were African American, 9.4% were Hispanic/Latino, 6.4% of participants were Asian American, 0.2% were West Indian, and 2.4% identified as some other race, such as Native American or Pacific Islander. The survey distributed also asked participants to identify their political party. The data showed 29.2% of participants were Republicans, 41.4% were Democrats, 24.0% were Independents, and 5.5% of participants identified with some other political party.

Procedure

Participants were asked to complete a 36-question survey between February 25, 2021 and March 1, 2021 via Lucid Theorem. Lucid supplies a quota sample (using U.S. Census benchmarks) of respondents who have agreed to participate in scientific research (See Appendix A for a comparison of sample characteristics with the 2018 Current Population Survey benchmarks for education, income, gender, race, and ethnicity). Included in this survey were questions regarding trust in science, pandemic behaviors, and conspiracy theories about the coronavirus. The phrase “pandemic behavior” in this case refers to wearing a mask, social distancing, and refraining from eating in restaurants. Some of the conspiracy theories inquired

about include theories about the origins of the virus, malevolent plans involving the virus, and the involvement of technology such as 5G in the pandemic.

Measures

Demographics

Demographics such as age, race, and education level were measured using multiple choice questions. Some questions included a free response choice as well in case participants did not see the choice they most closely identified with.

Political Orientation, Political Affiliation, and Feelings Toward Donald Trump

Political orientation was measured using a 7-point Likert scale (1 = *extremely liberal,* 7 = *extremely conservative*).

Political affiliation was measured using a multiple-choice question, asking participants which political party they felt most closely affiliated with. The choices were Republican, Democrat, Independent, and none. If participants selected Republican or Democrat, they were then asked whether they were a strong (Republican/Democrat) or a not strong (Republican/Democrat). If participants selected Independent or none, they were asked whether they identified more with the Republican or Democrat party.

Feelings toward Donald Trump was measured using a 100 point "thermometer" scale (Enders, 2020). Participants were given a slider bar with the cursor sitting at 50 and were asked to drag the cursor one way or another in order to indicate how warmly (positively) they felt toward former president Trump (0 = *very cold/negative feelings*, 100 = *very warm/positive feelings).*

COVID-19 Conspiracy Beliefs

Participants were shown 10 popular COVID-related conspiracy theories (Enders, 2020) and were asked to rate how much they agreed or disagreed with each one using a 6-point Likert scale (1 = *strongly disagree,* 6 = *strongly agree).* A sample item in this category is "Dark forces want to use the coronavirus to take over the world."

Trust in Science

Trust in science was measured using a 6-point Likert scale (1= *strongly disagree,* 6 = *strongly agree).* Participants were asked to rate how strongly they agree or disagree with items such as "I trust doctors" and "I trust scientists." People who distrust science will strongly disagree with such items.

Perceived Threat of COVID-19

Perceived threat of COVID-19 was measured using a 6-point Likert scale (1 = *strongly disagree,* 6 = *strongly agree*). Participants were asked to rate how strongly they agreed or disagreed with statements such as "In the next month, it will be safe to relax social distancing guidelines." People who perceive the coronavirus as a higher threat would likely strongly disagree with this statement, since they would not feel comfortable relaxing social distancing guidelines. Due to the wording of the items that measured the perceived threat of COVID-19, higher numbers corresponded to participants who were not very worried about the coronavirus.

Feelings of Uncertainty and Powerlessness

Feelings for uncertainty and powerlessness were measured using a 6-point Likert scale (1=*strongly disagree*, 6= *strongly agree).* Participants were asked to indicate how strongly they agree or disagree with statements such as "I feel uncertain about what the media is telling me about the coronavirus" and "When it comes to COVID-19, I feel powerless." Participants high in uncertainty and powerlessness would likely strongly agree with both items.

Willingness to Follow Recommendations of Public Health Officials

Willingness to follow recommendations of public health officials was measured using a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree).* Participants were asked to indicate how strongly they agree or disagree with statements such as "I wear a mask in public settings" and "I would be willing to take the vaccine for COVID-19." Those who are unwilling to follow the recommendations of public health officials would likely strongly disagree with these items. Participants were also asked how many times they'd eaten indoors in a restaurant in the last month. This was an open question where participants could type in any response.

Results

Belief in Conspiracy-19 Conspiracy Theories

Participants were asked to rate their support of 10 conspiracy theories based on Enders et al. (2020) and Miller (2020). As shown in Table 1, these theories varied in support, but it seems that theories regarding China were the most endorsed by participants. Conversely, despite their supposed prevalence, theories about 5G internet and Bill Gates were the least widely endorsed.

Predictors of Beliefs in COVID-19 Conspiracy Theories

The means and standard deviations of the primary predictors and outcome variables are displayed in Table 2. This table also displays the Cronbach's alpha for indices that were formed by averaging of multiple items.

Hierarchical multiple regressions were conducted to see if each of the following variables predicted beliefs in COVID-19 conspiracy theories: trust in science, feelings of uncertainty about COVID-19, feelings of powerlessness about COVID-19, political orientation, feelings toward Donald Trump, and perceived threat of COVID-19. In each hierarchical multiple regression, demographic variables (age, gender, ethnicity, and education level) were entered in the first step

as control variables. In Step 2 of each hierarchical multiple regression, a predictor variable was added to the model. Table 3 displays the unstandardized beta weights and standard errors for each predictor in Step 2 of the models.

Consistent with predictions, after controlling for demographic variables, it was found that trust in science explained a significant amount of the variance in COVID conspiracy beliefs, $F(5, 951) = 38.114$, $p < .001$, For every one unit decrease in trust in science, COVID conspiracy beliefs increased by .439, , $t(956) = -11.944$, $p < .001$. We conducted an internal consistency analysis of these items. Cronbach's alpha was . The items were averaged to form a composite variable in subsequent analyses. We conducted an internal consistency analysis of these items: "I trust doctors," "I trust scientists," and "I trust public health officials." Crohnbach's alpha was .846. These items were averaged to form a composite variable, trust in science, in subsequent analyses.

As predicted, after controlling for demographic variables, it was found that uncertainty explained a significant amount of the variance in COVID conspiracy beliefs, $F(5, 944) = 123.460$, $p < .001$. For every one unit increase in uncertainty, COVID conspiracy beliefs increased by .609, $t(949) = 23.570$, $p < .001$. We conducted an internal consistency analysis of these items: "I feel uncertain about what the media is telling me about the coronavirus," "I feel uncertain about what the government is telling me about the coronavirus," and "I feel uncertain about the motives of the pharmaceutical companies involved in COVID-19 vaccines." Crohnbach's alpha was .825. These items were averaged to form a composite variable, uncertainty, in subsequent variables.

The hypothesis that feelings of powerlessness about COVID-19 would predict COVID conspiracy beliefs was supported. After controlling for demographic variables, it was found that

feelings of powerlessness explained a significant amount of the variance in COVID conspiracy belief, $F(5 , 952) = 9.715$, $p < .001$. For every one unit increase in powerlessness, COVID conspiracy beliefs increased by .085, $t(957)= 2.958$, $p < .001$. We attempted to combine the following variables into a composite variable: "When it comes to COVID-19, I feel powerless," "I feel that my actions can help reduce the spread of the coronavirus," and "I feel that the coronavirus pandemic is too big for my actions to have an impact," however the Crohnbach's alpha was very low. Due to the low internal consistency of these items, these items were not combined to form an average, so the only item used in this variable is "When it comes to COVID-19, I feel powerless."

Also consistent with predictions, after controlling for demographic variables, it was found that conservative political beliefs explained a significant amount of the variance in belief in COVID conspiracy theories, $F(5 , 955) = 41.415$, $p < .001$. Higher numbers on the political orientation measure corresponded to higher levels of conservative political beliefs. For every one unit increase in conservative political beliefs, COVID conspiracy beliefs increased by .294, $t(960)= 12.663$, $p < .001$.

As predicted, after controlling for demographic variables, it was found that positive feelings toward Donald Trump explained a significant amount of the variance in COVID conspiracy beliefs, $F(5, 955) = 107.386$, $p < .001$. For every one unit increase in feelings for Donald Trump, COVID conspiracy belief increased by .020, $t(960) = 21.839$, $p < .001$.

Finally, a hierarchical multiple regression was conducted to see if threat perception predicted belief in COVID conspiracy theories. Demographic variables (age, gender, ethnicity, and education level) were entered in the first step as control variables. It was found that demographic variables explained a significant amount of variance in COVID conspiracy belief

($F(4, 949) = 9.769$, $p < .001$, $R^2_{Adjusted} = .035$). In the second step, threat perception was entered into the model. As previously mentioned, due to the wording of the items that measured the perceived threat of COVID-19, higher numbers corresponded to participants who were not very worried about the coronavirus. After controlling for demographic variables, it was found that threat perception explained a significant amount of the variance in COVID conspiracy beliefs, $F(5 , 948) = 97.628$, $p < .001$, $R^2_{Adjusted} = .336$, R^2 change = .300. For every one unit increase in threat perception, COVID conspiracy beliefs increased by .558, ($b = .558$, $t(953) = 20.769$, $p < .001$.)

Consequences of Beliefs in COVID-19 Conspiracy Theories

A hierarchical multiple regression was conducted to see if COVID conspiracy beliefs predicted intention to take the COVID vaccine. Demographic variables (age, gender, ethnicity, and education level) were entered in the first step as control variables. It was found that demographic variables explained a significant amount of variance in vaccination intentions ($F(4, 951) = 15.759$, $p < .001$, $R^2_{Adjusted} = .058$). In the second step, COVID conspiracy beliefs were entered into the model. After controlling for demographic variables, it was found that COVID conspiracy beliefs explained a significant amount of the variance in vaccination intentions, $F(5 , 950) = 60.043$, $p < .001$, $R^2_{Adjusted} = .236$, R^2 change = .178. For every one unit increase in COVID conspiracy belief, vaccination intentions decreased by .593, ($b = -.593$, $t(955) = -14.916$, $p < .001$.) For a complete list of all items combined for this variable, see Table 1. Crohnbach's alpha was .930, and these items were averaged to form a composite variable in subsequent analyses.

A hierarchical multiple regression was conducted to see if COVID conspiracy beliefs predicted willingness to follow recommendations of public health officials. Demographic

variables (age, gender, ethnicity, and education level) were entered in the first step as control variables. It was found that demographic variables explained a significant amount of variance in willingness to follow recommendations of public health officials ($F(4, 952) = 10.049$, $p < .001$, $R^2_{\text{Adjusted}} = .036$). In the second step, COVID conspiracy beliefs were entered into the model. After controlling for demographic variables, it was found that COVID conspiracy beliefs explained a significant amount of the variance in willingness to follow recommendations of public health officials, $F(5 , 951) = 42.801$, $p < .001$, $R^2_{\text{Adjusted}} = .179$, R^2 change = .143. For every one unit increase in COVID conspiracy belief, willingness to follow recommendations of public health officials decreased by .347, ($b = -.47$, $t(956) = -12.915$, $p < .001$.) For a complete list of all 10 items included in the composite variable "COVID Conspiracy Belief," see Table 1. For "Willingness to Follow Recommendations of Public Health Officials," we conducted an internal consistency analysis of these items: "I wear a mask in indoor public settings" and "I stay at least six feet away from others in public settings." Crohnbach's alpha was .848.

A hierarchical multiple regression was conducted to see if trust in science predicted intention to take the COVID vaccine. Demographic variables (age, gender, ethnicity, and education level) were entered in the first step as control variables. It was found that demographic variables explained a significant amount of variance in vaccination intentions ($F(4, 968) = 15.328$, $p < .001$, $R_{2\ \text{Adjusted}} = .056$). In the second step, trust in science was entered into the model. After controlling for demographic variables, it was found that trust in science explained a significant amount of the variance in vaccination intentions, $F(5, 967) = 103.307$, $p < .001$, $R^2_{\text{Adjusted}} = .345$, R^2 change = .289. For every one unit increase in trust in science, vaccination intentions increased by .911, ($b = .911$, $t(953) = 20.769$, $p < .001$.)

Discussion

The purpose of this study was to find both predictors and consequences of belief in COVID-19 conspiracy theories. To do so, a survey was administered to approximately 1,000 US participants. The survey included items about pandemic behaviors (e.g. wearing a mask), trust in science, threat perception, uncertainty, and COVID-19 conspiracy beliefs.

All of the hypotheses regarding the predictors of COVID-19 conspiracy beliefs were supported. The study provides evidence that uncertainty, distrust in science, threat perception, powerlessness, conservative political beliefs, and feelings toward Donald Trump are all predictors of belief in COVID conspiracy theories. Those who are feeling more uncertain about the coronavirus are significantly more likely to believe in conspiracy theories about it (Enders et al., 2020). Those who feel that doctors, scientists and public health officials cannot be trusted are also more likely to believe conspiracy theories about COVID (Enders et al., 2020). Consistent with the research of Enders et al. (2020) and Imhoff and Lamberty (2020), those who perceive the coronavirus as less of a threat are also more likely to believe COVID conspiracy theories. Those who feel very powerless when it comes to COVID, meaning that they feel there is nothing they can do to help solve the problem, are also more likely to believe these conspiracy theories. This finding is also consistent with the findings of Enders et al. (2020). Finally, those with more right-leaning, conservative political beliefs are more likely to believe conspiracy theories about the coronavirus. This, too, is consistent with research conducted by Enders et al. (2020) as well as Miller (2020).

The results also shed light on one of the consequences of beliefs in COVID-19 conspiracy theories: intentions to take a COVID vaccine. Respondents who believe in conspiracy theories about the coronavirus are less likely to plan to take the COVID vaccine than those who do not believe those theories. The current research adds to the growing body of literature about

the negative impact that conspiracy beliefs have on vaccination intentions. For example, the results of the current research, complement those of Jolley and Douglas (2014), who found that participants who held stronger anti-vaccine conspiracy beliefs were less likely to intend to vaccinate a fictitious child.

The results also revealed another predictor of lower COVID vaccination intentions: distrust in science. People who feel that doctors, scientists, and public health officials cannot be trusted are less likely to take the COVID vaccine than those who feel they can trust science. This finding parallels the results of Lewandowsky et al. (2013), who found that people who engage in conspiratorial thinking are more likely to reject established scientific findings (e.g., climate science, smoking causes lung cancer, HIV causes AIDS).

Another consequence worth noting is the unwillingness to following public health recommendations. The data in the current study show that those who believe in conspiracy theories and those who perceive COVID-19 as less of a threat are less likely to wear masks and social distance. These results are consistent with research done by Imhoff and Lamberty (2020).

The key contributions of this research are the results about vaccination intentions. Although there has been extensive research done on the predictors of conspiracy theories, very little research exists on the consequences of high belief in COVID-related conspiracy theories. The data shows significant evidence that those who strongly believe COVID theories are significantly less likely to take the COVID vaccine than those who do not. This has serious implications for the future, since the goal of scientists is to vaccinate as many people as possible. The data shows that a significant amount of people believe these theories, meaning that there is a significant amount of people who are highly unlikely to get vaccinated. This, in turn, means that

more people will be put at risk of catching COVID-19, which could then lead to the loss of more lives.

There were several limitations to this study. The survey was administered during late February and early March of 2021, almost a year after the coronavirus pandemic reached the United States. Had the data been collected earlier on in the pandemic, the results may have been even more significant. The average levels of variables such as belief in conspiracy theories, uncertainty, and powerlessness may have decreased as more scientific research about the coronavirus has accumulated and been made public. A second limitation of the study is the way the data were collected. The survey was completed online, and it was done by self-report. Some participants completed the survey in a very short time (i.e. less than five minutes), meaning they may not have read the questions well and the answers may not have been reliable. Future research could perhaps implement preventative measures to keep participants from rushing through the survey just to receive payment.

Future research could seek to find ways to decrease overall adherence to conspiracy theories. A study by Bonetto et al. (2018) provided evidence that priming participants by having them assess their own resistance to persuasion decreased their adherence to conspiracy theories overall. That said, the study is not practical for everyday settings. Future research should explore ways to prime resistance to persuasion in more naturalistic settings. Additionally, future research should further explore the effects of strong belief in COVID-19 conspiracies on vaccination intentions, since this is a very timely and pressing issue.

In sum, there are a variety of predictors and consequences of conspiracy theories, some of which are more harmful than others. Distrust in science, for instance, can be very dangerous. It seems that the abundance of conspiracy theories brought about by these predictors are related to

the astronomical amount of coronavirus cases in the United States (Petterson et al., 2021). This means that thousands of people died due to the nonchalant attitudes of a few. This research aims to create more understanding about both the causes and the consequences of conspiracy beliefs so that the issues can potentially be improved moving forward. If the motives and mindsets of the theorists can be understood, it may be possible to reach them and, in turn, help educate them. Having fewer people buying into these theories could potentially lead to more people following CDC recommendations, which could help to reduce the spread.

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Table 1

Mean Levels of Beliefs in COVID-19 Conspiracy Theories

Conspiracy Belief Question	*M*
The coronavirus was accidentally released by China.	3.24
The coronavirus is a bioweapon intentionally released by China.	3.06
The media are exaggerating the seriousness of the coronavirus to make former President Trump look bad.	3.02
Experts are intentionally misleading us for their own benefit, even though the coronavirus is no worse than the flu.	2.84
The coronavirus was intentionally created to reduce the world's population.	2.82
Scientists are exaggerating the seriousness of the coronavirus to make former president Trump look bad.	2.80
The coronavirus is being used to force a dangerous vaccine on people.	2.72
Dark forces want to use the coronavirus to rule the world.	2.65
Bill Gates is creating a tracking device to be injected with the coronavirus vaccine.	2.54
5G is causing the coronavirus to spread faster.	2.08

Note. Respondents indicated their agreement with each conspiracy belief on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*).

Table 2

Means, Standard Deviations, and Cronbach's Alpha for Primary Predictor and Outcome Variables

Variable	*M*	*SD*	*a*
Conspiracy Beliefs	2.77	1.35	.93
Trust in Science	4.36	1.11	.85
COVID-related uncertainty	3.79	1.35	.83
COVID-related powerlessness	3.31	1.52	
Intention to Take COVID vaccine	4.33	1.86	
Willingness to Follow Public Health Recommendations	5.05	1.23	.85
Political Orientation	4.00	1.75	
Feelings Toward Trump	42.25	38.48	

Note. The first five measures were on 6-point Likert scales (1 = *strongly disagree*, 6 = *strongly agree*). Political orientation was measured on a 7-point Likert scale (1 = *very liberal*, 7 = *very conservative*). Feelings toward Trump was measured on 101-point feeling thermometer (0 = *very*

cold (negative) feelings, 100 = *very warm (positive) feelings*). Cronbach's alpha is provided for indices involving multiple items.

Table 3

Predictors of Conspiracy Beliefs

	1	2	3	4	5
Trust in Science	-.439*** (.038)	----------	----------	----------	----------
COVID-related Uncertainty	----------	.609*** (.026)	----------	----------	----------
COVID-related Powerlessness	----------	----------	.085** (.029)	----------	----------
Political Orientation	----------	----------	----------	.558*** (.027)	----------
Feelings toward Trump	----------	----------	----------	----------	.020*** (.001)
Gender	-.209** (.079)	-.217 (.068)	-.221 (.085)	-.142 (.079)	-.076 (.070)
Age	-.012 (.002)	-.006 (.002)	-.013*** (.003)	-.019*** (.002)	-.018*** (.002)
Race	.043 (.042)	-.020 (.036)	.063 (.044)	.011 (.041)	-.021 (.037)
Education	-.027 (.033)	-.034 (.029)	-.067 (.035)	-.055 (.033)	-.044 (.029)
Constant	5.509*** (.281)	1.274*** (.231)	3.431*** (.274)	2.801*** (.033)	3.068*** (.211)
Total R^2 (Step 2)	.167	.395	.049	.178	.360
R^2 Change	.125	.356	.009	.138	.320

Note. Gender, Age, Race, and Education Level were entered as control variables in Step 1 of the hierarchical multiple regressions. Unstandardized beta weights from Step 2 are presented. Standard errors are in parentheses.

*p<0.10; **p<0.05; ***p<0.01

Table 4

Consequences of Conspiracy Belief

Vaccination Intentions	-.593 (.040)**	----------
Willingness to Follow the Recommendations of Public Health Officials	----------	-.347 (.027)
Gender	-.203 (.015)	.130 (.071)
Age	.007 (.003)***	.008 (.002)***
Race	.069 (.055)*	-.013 (.037)
Education	.238 (.044)**	.013 (.030)
Constant	4.951 (.349)	5.455 (.236)

Note. Gender, Age, Race, and Education Level were entered as control variables in Step 1 of the hierarchical multiple regressions. Unstandardized beta weights from Step 2 are presented. Standard errors are in parentheses.

*p<0.10; **p<0.05; ***p<0.01

Appendix

Comparison of Raw Data to Current Population Survey (U.S. Census 2018) Benchmarks

	Raw Data	CPS 2018
Female	53%	51%
College Degree	44%	31%
Black/Non-Hispanic	11%	13%
White/Non-Hispanic	69%	62%
Hispanic	11%	18%
Age (mean)	46	37
Income (median)	$45,-49,999	$55-59,999

All Survey Items

Question
I trust doctors.
I trust scientists.
I trust public health officials.
I would be willing to take the vaccine for COVID-19.
I wear a mask in indoor public settings.
I stay at least six feet away from others in public settings.
Approximately how many times have you eaten indoors at a restaurant in last month? (Do not include times that you ordered carryout or ate on an outdoor patio at a restaurant.)
In the next month, it will be safe to leave the house more often.
In the next month, it will be safe to relax social distancing guidelines.
In the next month, the risk of me, or those close to me, catching the virus will be low.
When it comes to COVID-19, I feel powerlessness.
I feel that my actions can help reduce the spread of the coronavirus.
I feel that the coronavirus pandemic is too big for my actions to have an impact.
I feel uncertain about what the media is telling me about the coronavirus.
I feel uncertain about what the government is telling me about the coronavirus.
I feel uncertain about the motives of the pharmaceutical companies involved in COVID-19 vaccines.
The coronavirus was accidentally released by China
The coronavirus is a bioweapon intentionally released by China.

Bill Gates is creating a tracking device to be injected with the coronavirus vaccine.

The media is exaggerating the seriousness of the coronavirus to make former President Trump look bad.

The coronavirus is being used to force a dangerous vaccine on people.

5G is causing the coronavirus to spread faster.

Scientists are exaggerating the seriousness of the coronavirus to make former President Trump look bad.

The coronavirus was intentionally created to reduce the world's population.

Experts are intentionally misleading us for their own benefit, even though the coronavirus is no worse than the flu.

Dark forces want to use the coronavirus to rule the world.