

University of New Hampshire

## University of New Hampshire Scholars' Repository

---

Honors Theses and Capstones

Student Scholarship

---

Spring 2022

### Predicting COVID-19 Vaccination Status and Rule Following and Violating: Psychosocial Measures, Coping Styles, and Vaccine Myth Beliefs

Paxton Morley

*University of New Hampshire - Main Campus*

Follow this and additional works at: <https://scholars.unh.edu/honors>



Part of the [Social and Behavioral Sciences Commons](#)

---

#### Recommended Citation

Morley, Paxton, "Predicting COVID-19 Vaccination Status and Rule Following and Violating: Psychosocial Measures, Coping Styles, and Vaccine Myth Beliefs" (2022). *Honors Theses and Capstones*. 663.  
<https://scholars.unh.edu/honors/663>

This Senior Honors Thesis is brought to you for free and open access by the Student Scholarship at University of New Hampshire Scholars' Repository. It has been accepted for inclusion in Honors Theses and Capstones by an authorized administrator of University of New Hampshire Scholars' Repository. For more information, please contact [Scholarly.Communication@unh.edu](mailto:Scholarly.Communication@unh.edu).

**Predicting COVID-19 Vaccination Status and Rule Following and Violating: Psychosocial  
Measures, Coping Styles, and Vaccine Myth Beliefs**

Paxton D. Morley

University of New Hampshire

Dr. Ellen Cohn

May 2022

### **Abstract**

Since the beginning of 2020, the whole world has been significantly impacted by COVID-19. People have been asked to be vaccinated, wear masks and maintain social distance. The purpose of this research is to predict COVID-19 rule-following, rule-violating, and vaccination status behaviors (yes, no) from the following variables: psychosocial factors, coping styles, and belief in COVID-19 vaccine myths. It was predicted that Psychosocial factors will negatively impact vaccination status, but these effects will be mediated by belief in vaccine myths. Psychosocial factors will negatively impact the COVID-19 rule following, but these effects will be mediated by coping strategies. Lastly, psychosocial factors will negatively impact COVID-19 rule violating, but these effects will be mediated by coping strategies. Two studies were conducted to test these hypotheses. In study 1 participants came from the 12-wave longitudinal New Hampshire Youth Study (NHYS). In the second study, participants came from a community sample on Amazon M Turk. In both studies, anger symptoms increased belief in vaccine myths which decreased the likelihood of being vaccinated. Depression increased social support coping which decreased the COVID-19 rule following. Finally, the NHYS data found increases in coping social support leading to rule violation whereas the Mturk data found increases in negative coping leading to rule violation. Future studies could focus on traditional rule following and rule breaking as it related to COVID-19 vaccination status and belief in COVID-19 myths.

### **Predicting COVID-19 Vaccination Status and Rule Following and Violating: Psychosocial Measures, Coping Styles, and Vaccine Myth Beliefs**

On November 1, 2021, there were 2,300 New York City Firefighters who called out sick. (Moshtagian, 2021). This is a common type of reaction caused by state and federal departments mandating vaccines in an attempt to slow the spread of COVID-19. The Coronavirus Disease 2019 (COVID-19) is a virus that has spread across the world beginning in the spring of 2020 (Center for Disease Control and Prevention, 2021). In March of 2020 most stores, restaurants, and schools closed abruptly due to the deathly spread of the virus COVID-19 further causing a worldwide shutdown (CDC, 2021). Due to the rapid spread of the disease, the Center for Disease Control and Prevention (CDC) implemented several guidelines to help stop the spread of COVID-19. Some of these guidelines included wearing a face covering when indoors and around other public spaces, maintaining six feet from others, as well as disinfecting hands and surfaces regularly (CDC, 2021). As one can expect, several individuals were choosing not to comply with these regulations. Certain individuals, when placed in isolation, would break the rules of their lockdown, and then try and justify it (Harris, 2020).

The current research looks at the impact of psychosocial measures, coping styles, and belief in vaccine myths on vaccine hesitancy and rule following (RFB) and rule violating behavior (RVB). Given that certain individuals have already been dismissing the guidelines recommended by the CDC this research aims to discover if those same individuals are also against getting the COVID-19 vaccines. Further, this research will also consider the effects of mental health on whether or not one will get the vaccine. Given that there has been so much isolation throughout this pandemic as well as so much stress over contracting the virus, this

research aims to further discover if anxiety, anger, depression, and coping styles will also prevent or persuade one's vaccine intentions.

### **Mental Health**

An individual's mental health can be a prominent issue at any point in one's life, however, these issues became more prominent as the COVID-19 pandemic worsened. Anxiety disorders affect over 40 million adults in the United States every year (ADAA, 2021). Further nearly half of those individuals who are suffering from an anxiety disorder are also suffering from depression. In the United States, during the years 2020- 2021, 41% of adults were experiencing some form of anxiety and/or depressive symptoms (CDC, 2021). This percentage is an increase of 36% from December 2020 to August 2020 (Stephenson, 2021). College students, in particular, have been the most vulnerable group regarding experiencing rising mental health symptoms as the pandemic worsened (De Man et al., 2021). Anxiety relating to COVID-19 might stem from the concern of contracting the virus. This type of concern is likely to lead to the individual following the CDC guidelines as well as making efforts to get the COVID-19 vaccines. An individual could also be experiencing depressive symptoms resulting from the COVID-19 pandemic. These symptoms could include feelings of isolation due to quarantine or feelings of nothing getting better. Depressive symptoms, along with anxiety, might also cause one to follow CDC guidelines to aid in slowing the spread of the virus. This loneliness may further prompt them to receive the vaccine to prevent going into quarantine again and help slow the pandemic (Hans et al., 2021). One study conducted by Gloster et al., (2020) found that people without social support and with a worsening financial burden have worse mental health during the pandemic. Additionally, anger towards COVID-19 may further lead to worsening mental health. Anger, along with anxiety and depression can all influence an individual's

perception of the COVID-19 pandemic as well as affect their decision on whether or not they should get the vaccine.

### *Anxiety*

Anxiety is defined as excessive and recurring feelings of tension as well as worried and concerned thoughts (5th ed.; DSM–5; American Psychiatric Association, 2013). The COVID-19 pandemic has caused significant increases in anxiety symptoms throughout the United States among the entire population (Hans et al., 2021). This pandemic has become one of the central health crises in the whole world as of March 2020 (Shanafelt, 2020). The virus has affected every single individual around the world. Anxiety surrounding COVID-19 involves fear of contracting the virus, social isolation, and the closing of schools. Increases in anxiety-related disorders, since the beginning of the pandemic, have been seen the most in individuals between the ages of 18-29 years (Vahratian, 2021). In 2021, throughout the months of January and February, researchers found that more than two in five adults were experiencing some form of anxiety and/or depressive-related symptoms (Vahratian, 2021). Previous research has shown that uncertain situations pose a risk of elevated anxiety levels (Shiina et al., 2020). Further, the COVID-19 pandemic is an uncertain situation with a potential risk for mortality which would increase anxiety levels more.

Reporting greater anxiety levels during the COVID-19 pandemic has led to individuals engaging in more rule following behaviors as a result (Shiina et al., 2020). However, prior research has found that normal anxiety tends to result in rule violating behaviors rather than rule following behaviors (Lee et al., 2018). This type of anxiety caused by the pandemic is much different as described by Shiina and colleagues (2020). Anxiety rising from health crises has been found to lead to more rule following behaviors.

### *Depression*

Depression is defined as a persistent depressed mood and loss of interest in activities that result in an impairment of one's daily life (5th ed.; DSM-5; American Psychiatric Association, 2013). Depressive symptoms are another mental health concern that has risen since the pandemic in 2020 began. Stressors that are resulting in depressive symptoms include fear of being infected, perceived academic stress, as well as institutional dissatisfaction (De Man, 2021).

College students in particular have been impacted the hardest throughout this whole pandemic, with their spring 2020 semester completely moved online, events being canceled, and isolation (De Man, 2021). In one study, by Fodjo et al., (2021), researchers found that depressive symptoms were more prevalent in those individuals who have already experienced some form of quarantine and/or lockdown. Aside from depression researchers have further found that increasing levels of anger have been corresponding to whether individuals follow or break the CDC recommendations. Research from Ettman et al. (2020) also found that depression symptoms increased during the COVID-19 pandemic. Individuals with lower income and socioeconomic status were at greater risk for increases in depressive symptoms throughout the pandemic. Since the pandemic began there have been significant job losses leading to families suffering. Already being in a low-income household and then suffering a job loss would cause significant stress and could be construed as a traumatic event. Researchers also found that depression significantly increases after traumatic events (Ettman, et al., 2020)

### *Anger*

Anger is defined as an emotion characterized by negative feelings and feelings of antagonism toward another person or something (5th ed.; DSM-5; American Psychiatric Association, 2013). Anger can also result in physical changes such as increased blood pressure.

Feelings of anger have been increasing as a result of the COVID-19 pandemic. The experience of feeling uncertain about the future as well as being intolerant have both been identified as a result of anger due to the COVID-19 pandemic (Hamama-Raz, 2021). Concerning this research and COVID-19, those who have developed increased anger may choose not to wear a mask, not to social distance, and essentially ignore all the recommendations put in place by the CDC.

Additionally, these feelings of anger could also result in feelings of injustice which would potentially cause an individual to break rules (Woods, 2008). Individuals may further perceive that the government and CDC officials are creating these guidelines on an unfair basis. These feelings of anger could result in believing myths about COVID-19. Additional studies have found that expressions of anger caused by the COVID-19 pandemic are typically expressed via social media (Stella, 2020).

### *Coping Styles*

The pandemic has been very hard on the entire world, both physically and mentally. With all the different news updates, increasing and decreasing cases, as well as new strains of COVID evolving, individuals need to find ways to cope with the pandemic. Recent studies have found that individuals are experiencing increased stress and anxiety during this worldwide pandemic; they are worried about their safety, family members, and the probability of transmitting COVID-19 (Rose et al., 2021). These research colleagues conducted a study to identify ways of relieving this stress. This research found different coping strategies used by health care workers. One significant strategy that was effective in reducing stress and anxiety about the pandemic was taking proactive measures such as wearing the proper PPE equipment and staying updated on the COVID-19 data.



Additional research from Gurvich and colleagues (2021) has found that when experiencing psychological distress during the pandemic, coping strategies such as positive emotion-focused coping was found to be positively associated with declining psychological symptoms. In the current research, the focus will be on three different coping strategies as they pertain to COVID-19. These strategies include proactive coping, social support coping, and negative strategy coping. Proactive coping is defined as taking measures in advance before stressors takeover, for instance always sanitizing and wearing masks. Social support coping is when an individual's seeks support from friends or family. Lastly, negative coping is when individuals use harmful methods such as substance use and avoidance techniques.

This research utilizes Carver's (1997) coping research. Carver's basic research focused on emotion-focused coping styles (i.e. social support), problem-focused coping (i.e. proactive), and dysfunctional coping styles (i.e. negative). His research found several gender differences in coping styles. For instance, females tended to be more emotion-focused when coping whereas males tended to be more dysfunctional in their coping styles (Carver, 1997).

## **COVID-19**

### *Vaccination Status*

After living with this frightening pandemic for a year, a vaccine was created. The hope is to stop the spread of COVID-19. However, there is a lot of controversy surrounding whether or not one should receive the vaccine, with the main concerns being the safety of the vaccine and the long-term effects of the vaccine (Alabdulla, et al., 2021). The effectiveness of the vaccine has been called into question by many, for example, Polack et al., (2020) have conducted a study on the safety and efficacy of the vaccine. In their study researchers administered either a placebo or the BNT162b2mRNA vaccine. The results indicated that the vaccine was effective in lowering

the number of individuals to contract the virus compared to those who received the placebo. There were only eight positive cases of COVID-19 in the group that received the vaccine whereas there were 162 positive cases in the placebo group (Polack et al., 2020).

Additional research found individuals may be getting misinformation from online platforms regarding COVID-19 which could be leading to vaccine hesitancy (Pierri et al., 2022). Nevertheless, there are still several individuals who are willing and who are hesitant about getting the vaccine today.

#### *COVID-19 Vaccine Myths*

Since the start of the COVID-19 pandemic, there have been several myths regarding the virus itself as well as the vaccine. These myths about the actual virus are mostly regarding how one can or cannot contract the virus. For example, some may believe that injecting, swallowing, or breathing in bleach will help prevent you from contracting COVID-19 (Maragakis, 2021). This is entirely untrue, and this type of belief could potentially result in an individual violating the CDC guidelines. Additionally, there are several myths regarding the COVID-19 vaccine that have become prominent. One, for example, is “I have already had COVID-19 and therefore I do not need the vaccine”, this type of opinion could result in additional rule violating behavior. Individuals might assume they can prevent contracting COVID-19 in their ways regardless of what the CDC officials are recommending.

Belief in COVID-19 myths as well as belief in the vaccine myths might lead to rule following behavior. Individuals could be experiencing anxiety and/or depressive symptoms from the pandemic which could in turn result in paranoia surrounding the virus and the vaccine. This paranoia could therefore lead to people becoming scared to receive the vaccine which could

force them to carefully follow all the CDC guidelines. In addition, belief in these types of myths can have an overall increase in one's anxiety, anger, and/or depressive symptoms.

#### *COVID-19 Rule Following Behavior & Rule Violating Behavior*

As the pandemic worsened throughout 2020, the CDC provided many guidelines for individuals to follow. Some of these guidelines include social distancing of at least six feet between individuals, wearing face masks when inside buildings, or when staying six feet apart is not doable. When vaccines for COVID finally came out in 2021, certain organizations were putting in place vaccine mandates with hopes that it would slow the spread of the virus.

Many people have not been convinced by the CDC that staying 6 feet apart is necessary. They believe CDC officials cannot be that precise as to how many feet one must stay away from another person and further state that officials cannot even explain the circumstances surrounding the need for the 6-foot separation. Therefore, these individuals opposing the guidelines argue that it is not truly an issue to stand within 6 feet next to someone else or be within 6 feet when passing by (Harris, 2020). Research conducted by Boylan and colleagues (2021) found that proneness to boredom represents a strong risk factor for non-compliance with social-distancing mandates during the pandemic. Results from this research indicated that isolation and quarantine restricted daily activities so much that boredom-prone individuals would still break the rules even if it put their self-interest or the interest of others at risk (Boylan et al., 2021).

There have been several ways of getting news about the COVID-19 virus and the updates throughout the pandemic. Some of these sources of information tend to be more trustworthy than others, however. In a study conducted by Latkin et al. (2020), researchers found a rapid decline in trust in certain news sources. The lowest level of trust found was information given from the White House whereas the highest level of trust came from the CDC as well as the state health

department (Latkin et al., 2020). Even though the CDC has been identified as a trustful source some individuals still disregard its recommendations. For example, people residing in rural areas showed a lot less mask-wearing compared to those residing in urban or suburban areas (Haischer, et al., 2020). Further, it has been found that women wear masks more frequently than men despite the CDC concerns. Another fact regarding mask-wearing is that if one resides in a country or place that pays more attention to healthy behaviors, then those individuals will be more likely to wear a mask (Cunningham & Nite, 2021). Additionally, those that do wear masks have found that it results in continuously testing negative for COVID-19, this shows people how effective mask-wearing can be as well as how masks truly can slow the spread of the virus (Cherry, et al., 2021).

### **The Present Studies**

Participants from both the New Hampshire Youth Survey and the Amazon Mturk Study answered online surveys reporting their COVID-19 rule-following and rule-violating behaviors as well as their likelihood to get the vaccine. Wave 12 of these surveys utilized questions regarding the participants' behaviors during the COVID-19 pandemic and their attitudes toward the legal system as well as authority figures who were involved in the creation of COVID-19 guidelines. Additionally, this research examined the presence of anxiety, anger, or depressive-related symptoms, as well as coping styles and how those play a role in vaccination status and COVID-19 vaccine myth beliefs.

1. Psychosocial factors will negatively impact vaccination status, but these effects will be mediated by belief in vaccine myths.
2. Psychosocial factors will negatively impact the COVID-19 rule following, but these effects will be mediated by coping strategies.

3. Psychosocial factors will negatively impact COVID-19 rule violating, but these effects will be mediated by coping strategies.
4. Psychosocial factors, coping strategies, belief in vaccine myths and vaccination status will negatively impact COVID-19 rule violating behavior.

### **Study 1**

The first study examined psychosocial measures, coping styles, and belief in vaccine myths as they affect rule following and rule violating behavior along with how they affect vaccination status in individuals who are mostly between the ages of 22 and 29 years old. The purpose of this first study was to test the above hypotheses as they pertain to wave 12 of the New Hampshire Youth Survey.

### **Method**

#### **Participants**

The present study included data from 289 participants, primarily from New Hampshire schools, between the ages of 18 to 30 years old,  $M=27.5$ . The gender breakdown was 34.5% male and 57.6% female. Of the 289 participants, 13.9% indicated earning less than \$20,000 as their yearly household income in 2019. Many individuals during the COVID-19 pandemic were considered “essential workers”, of the participants in this study 40.3% ( $n=96$ ) were considered essential workers and were required to continue working in person during the pandemic.

#### **Participant Selection**

Participants from the New Hampshire Youth Study (NHYS) were selected from eight middle schools and five high schools in 2006. At this time participants' age ranged from 11 to 14. For the first six waves, researchers collected data in school libraries, cafeterias, as well as auditoriums. For the next waves, 7 through 12, data was collected online through Qualtrics. The

current study focuses on wave 12. The NHYS is a longitudinal study 12 wave that primarily collects data from students who attended public schools in southern New Hampshire. The NHYS has been collecting data since 2006.

### **Measures**

**COVID-19 Rule-Following and Rule-Violating Behaviors.** Participants from this study completed the COVID-19 Rule Violating and Rule Following scale which measured the extent to which participants followed and/or violated the CDC guidelines throughout the COVID-19 pandemic. This scale allowed participants to answer the questions on a range of how many times they had completed each behavior, between 0 and 10+ times. The questions in this scale were constructed based on the present guidelines enforced by the CDC. Some examples of rule-following behavior include “Stayed home if you felt as if you were getting sick” as well as “Cleaned and disinfected surfaces that are frequently touched in your house or vehicle (i.e., doorknobs, countertops, steering wheel)”. Examples of rule-violating behavior include “Came in contact with relatives over the age of 60 or immunocompromised relatives you do not live with (30)” and “Did not wear a mask when leaving your house (25)”. (M=7.37, SD=2.15, alpha=.424).

**COVID-19 Vaccine Myths.** Participants from the present study answered questions regarding factual knowledge about COVID-19. This scale allowed the participants to answer questions based on facts and myths of COVID-19 on a range of strongly disagree to strongly agree. Examples of the fact statements include “you can recover from COVID-19” whereas examples of myths about COVID-19 include “only older people are at risk of contracting COVID-19”. The study also asked participants to answer questions regarding COVID-19 vaccine knowledge. This section used the same range of answers as the general COVID-19 questions;

strongly disagree to strongly agree. Some examples from this section include “The vaccines will not change your DNA” and “the COVID-19 vaccine can give me COVID-19”. Reliability for the overall scale is .829.

**COVID-19 Vaccine Likelihood.** To analyze whether participants were likely or unlikely to get the vaccine, this study asked participants to answer yes, or no questions based on their vaccine intentions. Some examples from this section include “have you received a COVID-19 vaccine” as well as “do you plan to get the vaccine”. ( $M=.764$ ,  $SD=.426$ ).

**Coping Styles (Carver 1997).** To find out an individual’s coping style, a scale was created, and coping styles were split into three groups having social support, being proactive, and having negative/harmful strategies. An example item of social support from this study is “I’ve been getting emotional support from others”, an example item of proactive coping mechanism is “I’ve been trying to come up with a strategy about what to do” and lastly, an example item of a negative/harmful coping style is “I’ve been criticizing myself”. ( $M=1.96$ ,  $SD=.556$ ,  $\alpha=.884$ ).

**Generalized Anxiety Disorder Scale-7 (GAD-7).** This scale is used to measure anxiety, it involves participants answering 7 questions and self-reporting their feelings (Spitzer, et al., 2006). The reliability of this scale is .95. The scale collected data on how often each participant felt anxious on a scale of 0, being not at all, to 3, being nearly every day. The total scores could range from 0 to 21 with 21 indicating high anxiety. An example item from this scale would be “Not being able to stop or control worrying”. ( $M= 1.98$ ,  $SD= .885$ ,  $\alpha=.950$ ).

**Center for Epidemiological Studies-Depression (CESD) Scale.** The CESD Scale (Radloff, 1977) is a 20-item measure aimed at assessing depressive symptoms in participants. The current study used 7 of the original 20 items. Those who complete the survey responses to a 7-item measure that asks how often they feel certain emotions with responses ranging from 0

(Rarely or none of the time) to 3 (Most or almost all of the time). Example items from the CESD Scale include “I felt fearful” and “I felt lonely”. The reliability of the CESD Scale is .90.

**Scheiman (2010) Anger Scale.** This anger scale measures the severity of how one experiences anger (Schieman, et al., 2010). The scale consists of six items, allowing participants to answer how many days they had participated in certain behaviors that would reflect their feelings of anger. The reliability of this scale is .88. An example from Scheiman’s scale is “getting irritated easily”. (M= 2.68, SD= 1.57, alpha=.871).

### **Procedure**

The participants from the 12<sup>th</sup> wave of the NHYS study were contacted over the phone to gauge if they would participate in this survey. They were asked to complete an online survey on Qualtrics lasting approximately forty minutes. The link for the online Qualtrics survey was sent to participants via email allowing them to complete it while at home, completion of the follow-up survey allowed them to receive a \$20 Amazon Gift Card.

### **Results**

The main goal of this study was to analyze the effects of belief in COVID-19 vaccine myths, depression, anxiety, anger, and different coping mechanisms on the likelihood of one getting the vaccine and/or following CDC guidelines in participants from the New Hampshire Youth Survey. A correlational analysis was conducted to test any correlations between all variables (see table 1). A binary logistic regression was used for the full models and ordinary least squares regression was used to predict paths to continuous variables, such as vaccine myths. As for vaccination status, which is a dichotomous variable, a counterfactual approach as espoused by Steen and Judea Pearl using a Natural Effects Model was applied. A couple of



significant findings to note include social support coping positively correlated with anxiety at 0.280. Vaccine status negatively correlated with belief in myths -0.699.

Correlation Matrix

	Depression_12	Anger_12	Anxiety_12	CopingSocialSupport	CopingProactive	CopingNegative	VaccineMyths_12	CovidRuleFollowingSUM_12	CovidRuleViolatingSUM_12	Age_12	Race_12	Gender_12	Vaccinated_12
Depression_12	—												
Anger_12	0.62** 4 *	—											
Anxiety_12	0.76** 2 *	0.6* 57 *	—										
CopingSocialSupport	0.29** 8 *	0.1* 50 *	0.2** 80 *	—									
CopingProactive	0.13* 5	0.0 53	0.1* 43	0.734***	—								
CopingNegative	0.46** 7 *	0.3* 44 *	0.4** 77 *	0.501***	0.391***	—							
VaccineMyths_12	0.13* 7	0.0 55	0.1* 40	0.381***	0.263***	0.02 5	—						
CovidRuleFollowingSUM_12	0.17** 1	0.1* 92 *	0.2** 54 *	0.243***	0.362***	0.23*** 3	0.171**	—					
CovidRuleViolatingSUM_12	0.12 6	0.0 40	0.1 02	0.106	0.115	0.04 7	0.136*	-0.123*	—				
Age_12	0.13* 7	0.1 16	0.1* 47	0.088	0.125	0.11 6	0.167*	-0.100	-0.118	—			
Race_12	0.09 3	0.0 09	0.0 32	0.042	0.027	0.02 2	0.126	-0.041	-0.065	0.11 8	—		
Gender_12	0.06 5	0.0 50	0.1 25	0.168**	0.135*	0.03 3	0.014	-0.074	0.033	0.00 59	0.0 6	—	
Vaccinated_12	0.08 5	0.0 36	0.0 58	0.383***	0.288***	0.08 5	0.699***	0.176**	-0.051	0.19 26	0.0 9	0.09 8	—

Note. \* p < .05, \*\* p < .01, \*\*\* p < .001

**Table 1.** Correlations Between All Variables

*Hypothesis 1*

The first hypothesis aimed to predict that psychosocial factors will negatively impact vaccination status, but these effects will be mediated by belief in vaccine myths. Results showed that anger negatively predicts belief in vaccine myths (see table 2). There is an indirect effect between anger, belief in myths and whether or not one is vaccinated of - .30 and a direct effect of .04 (see table 2).

Indirect and Total Effects							
Type	Effect	Estimate	SE	%Mediated	z	p	
Indirect	Anger ⇒ Myth Belief ⇒ Vax Status	- 0.30	0.10	98%	2.85	.004	
Direct	Anger ⇒ Vax Status	.01	.11	2%	.04	.965	
Total	Anger ⇒ Vax Status	<u>-.29</u>	.12	100%	-2.33	.019	

**Table 2.** *Effects Between Anger*

*Hypothesis 2*

Psychosocial factors will negatively impact the COVID-19 rule following, but these effects will be mediated by coping strategies. Proactive Coping predicted the COVID rule following (1.26). Anxiety directly predicted the COVID-19 rule following (.33) but it was not mediated by proactive coping. The effect of depression on COVID rule following was nearly mediated by social support (.30, .31, .08). As for negative coping, anxiety directly predicted negative coping (.19) and directly predicted COVID rule following (.33) but no mediation was detected.

Parameter Estimates

Names	Estimate	SE	exp(B)	95% Exp(B) Confidence Interval		z	p
				Lower	Upper		
(Intercept)	32.11159	1.035	8.83e+13	1.16e+13	6.71e+14	31.01981	< .001
Race_12	-3.89134	4.124	0.0204	6.31e0-6	66.089	-0.94365	0.346
Gender_12	-2.38456	2.220	0.0921	0.00119	7.147	-1.07410	0.284
Age_12	-0.00199	0.259	0.9980	0.60090	1.658	-0.00768	0.994
Depression_12	-1.50826	2.479	0.2213	0.00172	28.533	-0.60834	0.544
Anger_12	1.25221	0.927	3.4981	0.56887	21.510	1.35124	0.178
<b>Anxiety_12</b>	<b>2.93384</b>	<b>2.017</b>	<b>18.7997</b>	<b>0.36066</b>	<b>979.945</b>	<b>1.45441</b>	<b>0.147</b>
<b>CopingSocialSupport</b>	<b>-4.35890</b>	<b>2.136</b>	<b>0.0128</b>	<b>1.94e0-4</b>	<b>0.842</b>	<b>-2.04070</b>	<b>0.042</b>
<b>CopingProactive</b>	<b>9.64322</b>	<b>2.069</b>	<b>15416.8836</b>	<b>267.46025</b>	<b>888656.554</b>	<b>4.66187</b>	<b>&lt; .001</b>
CopingNegative	2.38781	2.321	10.8896	0.11526	1028.844	1.02894	0.305

**Table 3. Predicting Rule Following**

*Hypothesis 3*

Psychosocial factors will negatively impact COVID-19 rule violating, but these effects will be mediated by coping strategies. There were no mediation effects detected with proactive coping, however, depression was nearly negatively affected by COVID rule breaking (.38). As for social support depression is positively associated with social support seeking (.30). Lastly, anxiety was positively associated with negative coping (.19) and same with depression (.22).

Parameter Estimates

Names	Estimate	SE	exp(B)	95% Exp(B) Confidence Interval		z	p
				Lower	Upper		
(Intercept)	2.3529	0.0946	10.516	8.736	12.659	24.8701	< .001
Race_12	-0.3401	0.3769	0.712	0.340	1.490	-0.9025	0.368
Gender_12	0.1236	0.2029	1.132	0.760	1.684	0.6091	0.543
Age_12	-0.0635	0.0237	0.938	0.896	0.983	-2.6858	0.008
Depression_12	-0.3237	0.2266	0.723	0.464	1.128	-1.4287	0.154
Anger_12	0.0108	0.0847	1.011	0.856	1.193	0.1275	0.899
Anxiety_12	-0.0894	0.1844	0.914	0.637	1.312	-0.4850	0.628
<b>CopingSocialSupport</b>	<b>0.4024</b>	<b>0.1952</b>	<b>1.495</b>	<b>1.020</b>	<b>2.192</b>	<b>2.0612</b>	<b>0.040</b>

Parameter Estimates

Names	Estimate	SE	exp(B)	95% Exp(B) Confidence Interval		z	p
				Lower	Upper		
CopingProactive	0.0578	0.1890	1.060	0.731	1.535	0.3059	0.760
CopingNegative	-0.0144	0.2121	0.986	0.650	1.494	-0.0680	0.946

**Table 4.** *Predicting Rule Violating*

*Hypothesis 4*

Psychosocial factors, coping strategies, belief in vaccine myths and vaccination status will negatively impact COVID-19 rule violating behavior. When the full model was tested to predict rule violating behavior, social support coping predicted RVB (.007) and was predicted by vaccine myths (.015). Findings are presented in table 6.

Parameter Estimates

Names	Estimate	SE	exp(B)	95% Exp(B) Confidence Interval		z	p
				Lower	Upper		
(Intercept)	49.133	1.985	2.18e+21	4.45e+19	1.07e+23	24.7537	< .001
Depression_12	-6.849	4.756	0.00106	9.49e0-8	11.842	-1.4402	0.151
Anger_12	0.326	1.779	1.38562	0.04241	45.275	0.1833	0.855
Anxiety_12	-1.768	3.880	0.17070	8.50e0-5	342.897	-0.4556	0.649
Race_12	-7.092	7.957	8.31e0-4	1.40e-10	4927.754	-0.8914	0.374
Gender_12	2.376	4.320	10.76346	0.00226	51173.281	0.5501	0.583
<b>Age_12</b>	<b>-1.359</b>	<b>0.499</b>	<b>0.25691</b>	<b>0.09662</b>	<b>0.683</b>	<b>-2.7236</b>	<b>0.007</b>
Vaccinated_12	-0.225	6.863	0.79812	1.15e0-6	554926.783	-0.0329	0.974
<b>CopingSocialSupport</b>	<b>8.966</b>	<b>4.134</b>	<b>7833.79529</b>	<b>2.37152</b>	<b>2.59e0+7</b>	<b>2.1688</b>	<b>0.031</b>
CopingProactive	0.965	3.967	2.62548	0.00110	6248.121	0.2433	0.808
CopingNegative	-0.910	4.451	0.40271	6.55e0-5	2475.074	-0.2044	0.838
<b>VaccineMyths_12</b>	<b>5.147</b>	<b>2.089</b>	<b>171.97427</b>	<b>2.86549</b>	<b>10321.143</b>	<b>2.4639</b>	<b>0.015</b>

**Table 5.** *All variables predicting RVB*

**Discussion**

The main goal of this study was to examine factors involved in whether one receives the COVID-19 vaccine and whether one follows or breaks the CDC guidelines throughout the pandemic. Control variables included age, gender and race and were included across all analyses. The only significant control variable was age, where the older participants were, the less likely they were to be vaccinated.

Hypothesis one stated psychosocial factors would negatively impact vaccination status, but effects would be mediated by belief in vaccine myths. Each psychosocial factor, anger, depression, and anxiety were tested in each model. Results showed increases in anger decreased the likelihood of being vaccinated, which was mediated by belief in vaccine myths. Further, increases in depression increased the likelihood of getting vaccinated and this effect was nearly mediated by belief in vaccine myths. One possible reasoning for these findings could be isolation may have increased anger symptoms in individuals which could have led to a rejection of COVID mandates. Additionally, depressed individuals could fear being placed in lockdown again which could have led to the increased vaccine status. More research would need to be done on this topic to gain a further understanding.

Hypothesis two predicted psychosocial factors would negatively impact COVID-19 rule following, but these effects would be mediated by coping strategies. The different coping strategies tested were proactive coping, social support coping, and negative coping. Results showed that anxiety directly affected COVID rule following and similarly, social support coping directly affected COVID rule following. Depression symptoms were found to be associated with increased social support coping whereas anxiety symptoms were found to be associated with increased negative coping. And lastly, these results showed that social support was nearly a mediator in the effects between depression and rule following. Analyses were also conducted to

teste whether coping styles had an impact on belief in vaccine myths. These results showed negative coping styles positively predict belief in myths whereas social support coping strategies negatively predict belief in myths.

The third and final hypothesis predicted that psychosocial factors would negatively impact COVID-19 rule violating and would be mediated by coping strategies. Results showed depression was associated with increased social support coping and increased negative coping. Social support coping was found to be a near mediator in the effect between depression and rule breaking. One possible explanation could be depressed people are seeking social support from individuals who believe in vaccine myths. Again, more research would need to be conducted in this area as well.

## **Study 2**

The second study replicated study 1 using a more representative sample of the United States population. I hypothesized that the relations observed in study 1 would largely hold in study 2.

## **Method**

### **Participants**

Participants from Amazon Mturk were recruited, totaling 231 participants. The racial breakdown of the participants was approximately 83.3% White/Caucasian, the gender breakdown was 56.9% female, and the ages of the participants ranged from 18 to 99 years old ( $M=45.1$ ).

### **Measures**

**COVID-19 Rule-Following and Rule-Violating Behaviors.** Participants completed the COVID-19 Rule Violating and Rule Following scale which measured the extent to which

participants followed and/or violated the CDC guidelines throughout the COVID-19 pandemic. ( $M=7.37$ ,  $SD=2.15$ ,  $\alpha=.424$ ).

**COVID-19 Vaccine Myths.** Participants answered questions regarding factual knowledge about COVID-19 vaccines. Reliability for overall scale is .829. Reduced scale reliability .9 ( $M=3.11$ ,  $SD=1.12$ ).

**COVID-19 Vaccine Likelihood.** In order to analyze whether participants were likely or unlikely to get the vaccine, this study asked participants to answer yes, or no questions based on their vaccine intentions. ( $M=.764$ ,  $SD=.426$ ).

**Coping Styles (Carver, 1997).** Participants completed 28-item scale regarding how they cope with the pandemic ( $M=1.96$ ,  $SD=.556$ ,  $\alpha=.884$ ).

**Generalized Anxiety Disorder Scale-7 (GAD-7).** Participants completed the 7-item anxiety scale (Spitzer, et al., 2006). The reliability of this scale is .95. ( $M= 1.98$ ,  $SD= .885$ ,  $\alpha=.950$ ).

**Center for Epidemiological Studies-Depression (CESD) Scale.** The CESD Scale (Radloff, 1977) is a 20-item measure aimed at assessing depressive symptoms in participants. The current study used 7 of the original 20 items. The reliability from the CESD Scale is .90.

**Scheiman (2010) Anger Scale.** Participants completed this anger scale in order to detect levels of anger over a certain number of days (Schieman, et al., 2010). The reliability of this scale is .88. An example from Scheiman's scale is "getting irritated easily". ( $M= 2.68$ ,  $SD= 1.57$ ,  $\alpha=.871$ ).

## Procedure

The participants from the Amazon Mturk study were recruited using the Amazon Mturk's online interface. They were given the link to the survey through Amazon Mturk and asked



completed an online survey through Qualtrics taking approximately forty minutes. Completion of the survey allowed them to receive four dollars paid through Amazon Mturk. No identifying information was collected in any way and participants received a unique completion code form Qualtrics which was needed to receive the compensation.

### **Results**

This second study was conducted to test the hypotheses in a community sample with a wider range of ages. The Amazon Mturk Study analyzed the effects of belief in COVID-19 vaccine myths, depression, anxiety, anger, and different coping mechanisms on the likelihood of one getting the vaccine and/or following CDC guidelines in participants from the general public. This study yielded similar results. Again, we conducted a correlational analysis in order to detect any correlations between all the variables (see table 7).

Correlation Matrix

	Depression	Anger	Anxiety	Coping Social Support	Coping Proactive	Coping Negative	Vaccine Myths	Covid Rule Following SUM	Covid Rule Violating SUM	Age	Race	Gender	Vaccination Status
Depression	—												
Anger	0.62*	—											
Anxiety	0.812*	0.735*	—										
Coping Social Support	-0.002	0.007	-0.006	—									
Coping Proactive	0.047	0.061	0.017	0.637**	—								
Coping Negative	0.324*	0.297*	0.344*	0.148	0.180*	—							
Vaccine Myths	0.112	0.046	0.063	0.101	0.084	0.306*	—						
Covid Rule Following SUM	0.062	0.009	0.089	0.222**	0.289*	-0.010	-0.124	—					
Covid Rule Violating SUM	-0.032	0.079	-0.009	0.035	0.026	0.251*	0.346*	0.286**	—				
Age	0.111	0.031	0.041	0.067	0.016	0.326*	0.055	0.002	0.140*	—			
Race	0.138	0.108	0.080	0.074	0.103	0.061	0.056	0.009	0.085	0.198*	—		
Gender	-0.142	0.047	0.036	0.148*	0.054	0.074	0.049	0.132	0.123	0.173*	0.057	—	
Vaccination Status	-0.176*	0.209*	0.169*	0.132	0.083	0.167*	0.610*	0.146	0.247**	0.100	0.076	0.048	—

Note. \* p < .05, \*\* p < .01, \*\*\* p < .001

Table 7. Correlational analysis

*Hypothesis 1*

The first hypothesis aimed to predict that psychosocial factors will negatively impact vaccination status, but these effects will be mediated by belief in vaccine myths. Similar to study 1, these analyses showed anger negatively predicted vaccine myths (see table 8).

Parameter Estimates

Names	Estimate	SE	exp(B)	95% Exp(B) Confidence Interval		z	p
				Lower	Upper		
(Intercept)	0.6875	0.2011	1.989	1.350	2.983	3.4188	< .001
gender	0.5025	0.4379	1.653	0.708	3.987	1.1477	0.251
depression	-0.0646	0.5963	0.937	0.291	3.042	-0.1083	0.914
anxiety	0.0243	0.5598	1.025	0.352	3.192	0.0434	0.965
age	0.0149	0.0178	1.015	0.980	1.052	0.8358	0.403
<b>Anger</b>	<b>-0.3950</b>	<b>0.2167</b>	<b>0.674</b>	<b>0.430</b>	<b>1.012</b>	<b>-1.8227</b>	<b>0.068</b>
race	-0.5642	0.5800	0.569	0.170	1.697	-0.9728	0.331
<b>vaccinemyths</b>	<b>-1.5211</b>	<b>0.2548</b>	<b>0.218</b>	<b>0.127</b>	<b>0.347</b>	<b>-5.9700</b>	<b>&lt; .001</b>

**Table 8.** *Predicting Vaccination Status*

*Hypothesis 2*

Psychosocial factors will negatively impact COVID-19 rule following, but these effects will be mediated by coping strategies. When predicting rule following behaviors anxiety (.085) and proactive coping strategies (<.001) were most significant (see table 9).

Parameter Estimates

Names	Estimate	SE	exp(B)	95% Exp(B) Confidence Interval		z	p
				Lower	Upper		
(Intercept)	32.0681	1.031	8.45e+13	1.12e+13	6.38e+14	31.104	< .001
Race_12	-5.3517	3.946	0.00474	2.07e0-6	10.84	-1.356	0.176
Gender_12	-1.9435	2.199	0.14320	0.00192	10.67	-0.884	0.378
Age_12	-0.0859	0.254	0.91768	0.55738	1.51	-0.338	0.736
Depression_12	-1.0791	2.467	0.33990	0.00270	42.81	-0.437	0.662
Anger_12	0.9049	0.905	2.47180	0.41958	14.56	1.000	0.318

Parameter Estimates

Names	Estimate	SE	exp(B)	95% Exp(B) Confidence Interval		z	p
				Lower	Upper		
<b>Anxiety_12</b>	<b>3.4440</b>	<b>1.994</b>	<b>31.31084</b>	<b>0.62876</b>	<b>1559.21</b>	<b>1.727</b>	<b>0.085</b>
CopingSocialSupport	-3.1336	2.016	0.04356	8.38e0-4	2.26	-1.555	0.121
<b>CopingProactive</b>	<b>9.6040</b>	<b>2.068</b>	<b>14824.37766</b>	<b>257.32159</b>	<b>854037.05</b>	<b>4.644</b>	<b>&lt; .001</b>
CopingNegative	1.3248	2.229	3.76158	0.04762	297.11	0.594	0.553

**Table 9.** *Predicting Rule Following*

*Hypothesis 3*

Psychosocial factors will negatively impact COVID-19 rule violating, but these effects will be mediated by coping strategies. Unlike results from study 1, the most significant coping strategy from the Mturk data was negative coping when predicting RVB.

Fixed Effects Parameter Estimates

Names	Estimate	SE	95% Confidence Interval		$\beta$	df	t	p
			Lower	Upper				
(Intercept)	0.95087	0.07007	0.8125	1.08926	0.0000	159	13.570	< .001
Race	-0.31419	0.21112	-0.7311	0.10277	-0.1148	159	-1.488	0.139
Gender	0.02271	0.15329	-0.2800	0.32546	0.0120	159	0.148	0.882
Age	-0.00999	0.00671	-0.0232	0.00326	-0.1287	159	-1.489	0.138
Anxiety	-0.07941	0.21073	-0.4956	0.33678	0.0617	159	-0.377	0.707
Depression	-0.20722	0.20647	-0.6150	0.20056	-0.1417	159	-1.004	0.317
Anger	0.08024	0.08314	-0.0839	0.24444	0.1180	159	0.965	0.336
CopingSocialSupport	-0.14424	0.11129	-0.3640	0.07555	-0.1288	159	-1.296	0.197
CopingProactive	0.06592	0.14214	-0.2148	0.34665	0.0456	159	0.464	0.643
<b>CopingNegative</b>	<b>0.50343</b>	<b>0.18539</b>	<b>0.1373</b>	<b>0.86958</b>	<b>0.2392</b>	<b>159</b>	<b>2.716</b>	<b>0.007</b>

**Table 10.** *Predicting Rule Violating Behavior*

*Hypothesis 4*

Psychosocial factors, coping strategies, belief in vaccine myths and vaccination status will negatively impact COVID-19 rule violating behavior. When all factors were added into the analyses the most significant one to note is belief in vaccine myths.

Fixed Effects Parameter Estimates

Names	Estimate	SE	95% Confidence Interval		$\beta$	df	t	p
			Lower	Upper				
(Intercept)	0.9554	0.06633	0.8244	1.08642	0.0000	156	14.403	< .001
Race	-0.2603	0.20051	-0.6564	0.13571	0.0952	156	-1.298	0.196
Gender	0.0762	0.14551	-0.2113	0.36359	0.0403	156	0.523	0.601
Age	-0.0106	0.00643	-0.0233	0.00209	0.1368	156	-1.651	0.101
Anxiety	-0.0448	0.19970	-0.4393	0.34965	0.0349	156	-0.224	0.823
Depression	-0.2498	0.19523	-0.6355	0.13579	0.1711	156	-1.280	0.203
Anger	0.0949	0.07998	-0.0631	0.25283	0.1398	156	1.186	0.237
CopingSocialSupport	-0.0872	0.10689	-0.2983	0.12395	0.0776	156	-0.816	0.416
CopingProactive	0.0880	0.13549	-0.1797	0.35561	0.0602	156	0.649	0.517
CopingNegative	0.2306	0.18628	-0.1374	0.59856	0.1096	156	1.238	0.218
<b>VaccineMyths</b>	<b>0.2542</b>	<b>0.07426</b>	<b>0.1076</b>	<b>0.40092</b>	<b>0.3335</b>	<b>156</b>	<b>3.424</b>	<b>&lt; .001</b>
VaccinationStatus	-0.0552	0.18789	-0.4264	0.31592	0.0283	156	-0.294	0.769

**Table 11.** *Predicting Rule Violating Behavior with All Variables*

### Discussion

The main goal of this second study was to examine factors involved in study 1 would be replicated in a more generalized population. Control variables included, same as study 1, age, gender and race and were included across all analyses. Vaccine myths predicted rule violating behavior which can be inferred as not believing in the pandemic in general and therefore not needing to follow any CDC guidelines. Additionally, anxiety and proactive coping were found to be predictors of rule following behaviors. A possible reason for this could be that the pandemic

is causing elevated anxiety and fear of contracting the virus therefore people are taking proactive measures to ensure they do not need to be isolate and are therefore following all COVID guidelines. More research would have to be conducted to see if these psychosocial measures are a direct cause of the pandemic.

Hypothesis one stated psychosocial factors would negatively impact vaccination status, but effects would be mediated by belief in vaccine myths. Each psychosocial factor, anger, depression, and anxiety were tested in each model. Results showed that anger was the most significant psychosocial factor when predicting vaccination status. Similar to study 1, as anger increased the individual's vaccination status decreased. This was also mediated by belief in vaccine myths.

Hypothesis two predicted psychosocial factors would negatively impact the COVID-19 rule following, but these effects would be mediated by coping strategies. The different coping strategies tested were proactive coping, social support coping, and negative coping. Results showed that anxiety and proactive coping were predictors of rule following behavior. A possible explanation for this finding could be anxious people fear contracting the virus and fear isolation therefore they are taking proactive measures and following CDC guidelines to ensure they do not encounter COVID-19.

The third and final hypothesis predicted that psychosocial factors would negatively impact COVID-19 rule violating and would be mediated by coping strategies. Results showed no significance in psychosocial factors. However, there were significant findings in negative coping styles with COVID-19 rule violating. A possible explanation for these findings could be these individuals simply do not believe in COVID-19 and do not care to listen to government officials

therefore are breaking rules and similarly using avoidance techniques and substance use as a way to ignore the pandemic. More research would need to be conducted in these areas.

### **General Discussion**

In this paper, I addressed the question of what role psychosocial measures, coping strategies, and beliefs in vaccine myths play a role in vaccination status and COVID rule following rule breaking behaviors. The purpose of conducting the two studies was to include a more general population and gain findings from a wide array of age groups. In study 1 the participants were ages 18 to around 28 years old whereas in study 2 the participants' ages went up to 99 years old with the mean age being 45.1. As expected, the results found in study 1 from the NHYS data were mostly held in results found in study 2 from the Amazon Mturk data. In both studies, it was hypothesized that psychosocial measures would negatively impact vaccine status. It was found that increased levels of anger were negatively affecting vaccination status and were further influenced by vaccine myths. Hypotheses two and three focused on psychosocial measures and coping strategies related to COVID rule following and rule breaking. Data from the NHYS found that proactive and social support coping strategies were more significant when predicting rule following and there were no significant results from coping strategies to rule violating. However, Amazon Mturk data yield results that showed negative coping strategies were the most significant when predicting rule violating behavior. Additionally, belief in vaccine myths is a strong predictor of whether one receives the vaccine. As seen in the results there were some differences between the NHYS data and the Amazon Mturk data, reasonings for these differences could be the age differences between the data sets. Again, there were great age differences between these two studies for example, in study 1 with the younger participants, individuals engaged in more social support coping whereas in study 2, with the

older participants, individuals engaged in more negative coping. Possible explanations for these differences could be that younger individuals, in general, spend more time with friends than older individuals.

Research surrounding coping strategies and rule following and rule violating behavior is somewhat inconclusive. However, research from Rose et al., (2021) found individuals have been experiencing increased stress levels since the pandemic began. The most significant coping strategy identified in previous literature has been proactive coping. This research found that proactive coping was indeed linked to COVID-19 rule following. Previous literature showed that anger often led to predictions of rule violating behavior (Woods, 2008). This is concurrent with findings from the current research. Vaccination status was found to decrease as levels of anger increased. Further, previous research has found that anxiety when related to health crises leads to rule following behavior (Shiina et al., 2020). Again, these previous findings were replicated in this research. While these previous findings are mostly replicated in this research and while well conducted there are some limitations.

### **Limitations & Future Research Directions**

There are limitations of this research to be noted. For example, the limited sample size of the NHYS data. However, this was countered by also analyzing data from the Amazon Mturk study as this second study involved many more participants allowing the results to become more generalizable. A second limitation could be the self-reporting nature of the study, this could lead to misinterpretations as well as underreporting by participants. Lastly, an obvious limitation of this study is the continuously changing pandemic that we are still in. Factors labeled as rule violating or rule following at one point in time could have changed at another point.



Future studies could examine traditional rule following and rule violating behaviors about COVID vaccine status and COVID myth beliefs. This research solely focused on rule following and rule breaking behaviors of CDC guidelines so examining how traditional rules play a role would be interesting. It would further be interesting to see if the rise in psychosocial measures in participants is due to COVID-19. Both studies utilized data from wave 12, future research could examine data from earlier waves to determine the change in psychosocial measures as well as coping styles as a factor of the COVID-19 pandemic. Additionally, the present research controlled for age, race, and gender future research could also control for socioeconomic status (SES) as well as whether individuals were employed during this time. Unemployment and low SES could be factors leading to poor coping styles as well as higher levels of psychosocial measures.

### **Conclusion**

This honors thesis aimed to investigate which factors are predictors of vaccination status and COVID-19 rule following and rule violating behaviors. We hoped to show that psychosocial measures such as anxiety, depression, or anger would predict vaccination status and RVBs and RFBs. Further, we hoped to show that coping strategies and belief in vaccine myths would predict RVBs RFBs, and vaccination status. The two studies conducted in this research had significant age differences (NHYS  $M=27.5$ , Amazon Mturk  $M=45.1$ ), this could be possible explanations for the differences found in the results.

### References

- Alabdulla, M., Reagu, S. M., Al, K. A., Elzain, M., & Jones, R. M. (2021). COVID-19 vaccine hesitancy and attitudes in Qatar: A national cross-sectional survey of a migrant-majority population. *Influenza & Other Respiratory Viruses*, *15*(3), 361–370.  
<https://doi.org/10.1111/irv.12847>.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- American Psychiatric Association. (2013). Anxiety disorders. *Diagnostic and Statistical Manual of Mental Disorders*, 5<sup>th</sup> Edition. <https://dsm-psychiatryonline-org.unh.idm.oclc.org/doi/full/10.1176/appi.books.9780890425596.dsm05>
- American Psychiatric Association. (2013). Depressive disorders. *Diagnostic and Statistical Manual of Mental Disorders*, 5<sup>th</sup> Edition. <https://dsm-psychiatryonline-org.unh.idm.oclc.org/doi/full/10.1176/appi.books.9780890425596.dsm04>
- Bailey, L., Grupac, M., & Sosedova, J. (2021). COVID-19 Vaccine risk beliefs, perceptions, attitudes, and intentions. *Review of Contemporary Philosophy*, *20*, 81–92.  
<https://doi.org/10.22381/RCP2020214>.
- Boylan, J., Seli, P., Scholer, A. A., & Danckert, J. (2021). Boredom in the COVID-19 pandemic: Trait boredom proneness, the desire to act, and rule-breaking. *Personality and Individual Differences*, *171*, 110387. <https://doi.org/10.1016/j.paid.2020.110387>
- Center for Disease Control and Prevention. (2021). CDC COVID Data Tracker. Center for Disease Control and Prevention. [https://covid.cdc.gov/covid-data-tracker/#cases\\_casesper100klast7days](https://covid.cdc.gov/covid-data-tracker/#cases_casesper100klast7days).
- Centers for Disease Control and Prevention. (2021, April 1). Symptoms of anxiety or depressive

- disorder and use of mental health care among adults during the COVID-19 pandemic - United States, August 2020–February 2021. Centers for Disease Control and Prevention. <https://www.cdc.gov/mmwr/volumes/70/wr/mm7013e2.htm>.
- Center for Disease Control and Prevention. (2021). Things to know about the COVID-19 pandemic. Center for Disease Control and Prevention. <https://www.cdc.gov/coronavirus/2019-ncov/your-health/need-to-know.html>.
- Carver, C. (1997). Cope Scale (complete version). Department of Psychology - Cope. Retrieved from <http://local.psy.miami.edu/faculty/ccarver/availbale-self-report-instruments/cope/>
- Cherry, T. L., James, A. G., & Murphy, J. (2021). The impact of public health messaging and personal experience on the acceptance of mask wearing during the COVID-19 pandemic. *Journal of Economic Behavior and Organization*, 187, 415–430.
- Cunningham, G. B., & Nite, C. (2021). Demographics, politics, and health factors predict mask wearing during the COVID-19 pandemic: A cross-sectional study. *BMC Public Health*, 21(1), 1–9. <https://doi.org/10.1186/s12889-021-11424-1>.
- Davis, R. E., Sharma, M., Simon, K. E., & Wilkerson, A. H. (2021). Conceptualization of college students' COVID-19 related mask-wearing behaviors using the multi-theory model of health behavior change. *Health Promotion Perspectives*, 11(2), 194–201. <https://doi.org/10.34172/hpp.2021.24>.
- De Man, J., Buffel, V., van de Velde, S., Bracke, P., Van Hal, G. F., & Wouters, E. (2021, January 7). Disentangling depression in Belgian higher education students amidst the first COVID-19 lockdown (April-May 2020). *Archives of Public Health*. <https://link.springer.com/article/10.1186/s13690-020-00522-y>.
- Ellemers, N., Pagliaro, S., & Barreto, M. (2013). Morality and behavioural

regulation in groups: A social identity approach, *European Review of Social Psychology*, 24:1, 160-193, DOI: [10.1080/10463283.2013.841490](https://doi.org/10.1080/10463283.2013.841490).

Ettman CK, Abdalla SM, Cohen GH, Sampson L, Vivier PM, Galea S. (2020). Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic. *Journal of American Medical Association Network Open*,(9):e2019686.  
doi:10.1001/jamanetworkopen.2020.19686

Facts & statistics: anxiety and depression association of America, ADAA. Facts & statistics | anxiety and depression association of America, ADAA. (2021).  
<https://adaa.org/understanding-anxiety/facts-statistics>.

Gadarian, S. K., Goodman, S. W., & Pepinsky, T. B. (2021). Partisanship, health behavior, and policy attitudes in the early stages of the COVID-19 pandemic. *PLoS ONE*, 16(4), 1–13.  
<https://doi.org/10.1371/journal.pone.0249596>.

Graupensperger, S., Abdallah, D. A., & Lee, C. M. (2021). Social norms and vaccine uptake: College students' COVID vaccination intentions, attitudes, and estimated peer norms and comparisons with influenza vaccine. *Vaccine*, 39(15), 2060–2067.  
<https://doi.org/10.1016/j.vaccine.2021.03.018>.

Gurvich, C., Thomas, N., Thomas, E. H. X., Hudaib, A.-R., Sood, L., Fabiato, K., Sutton, K., Isaacs, A., Arunogiri, S., Sharp, G., & Kulkarni, J. (2020). Coping styles and mental health in response to societal changes during the COVID-19 pandemic. *International Journal of Social Psychiatry*, 67(5), 540–549. <https://doi.org/10.1177/0020764020961790>

Haischer, M. H., Beilfuss, R., Hart, M. R., Opielinski, L., Wrucke, D., Zirgaitis, G., Uhrich, T.

- D., & Hunter, S. K. (2020). Who is wearing a mask? Gender-, age-, and location-related differences during the COVID-19 pandemic. *PLoS ONE*, *15*(10), 1–12.  
<https://doi.org/10.1371/journal.pone.0240785>.
- Hamama-Raz, Y., Goodwin, R., Leshem, E., & Ben-Ezra, M. (2021). Intolerance of uncertainty and mental health during the COVID-19 pandemic: The role of anger as a moderator. *Journal of Psychiatric Research*, *138*, 50–52.  
<https://doi.org/10.1016/j.jpsychires.2021.03.032>
- Harris, L. C. (2020). Breaking I during lockdown: A neutralization theory evaluation of misbehavior during the covid 19 pandemic. *Deviant Behavior*, 1–15.  
<https://doi.org/10.1080/01639625.2020.1863756>.
- Joan Stephenson, P. D. (2021, April 6). CDC study finds worsening anxiety and depression, especially in young adults, during COVID-19 pandemic. *Journal of American Medical Association Network Health Forum*. <https://jamanetwork.com/journals/jama-health-forum/fullarticle/2778458>.
- Latkin, C. A., Dayton, L., Strickland, J. C., Colon, B., Rimal, R., & Boodram, B. (2020). An assessment of the rapid decline of trust in US sources of public information about COVID-19. *Journal of Health Communication*, *25*(10), 764–773.  
<https://doi.org/10.1080/10810730.2020.1865487>.
- Lee, S.-M., Kim, Y. A., Park, I.-J., & Sohn, Y. W. (2018). The effects of anxiety on attention problems and rule-breaking behavior: The moderating effect of work adjustment in the workplace. *Current Psychology* *37*(3), 602-611. <https://doi-org.unh.idm.oclc.org/10.1007/s12144-016-9541-0>

Maragakis, L., & Kelen, G. (2021). Covid-19 - myth versus fact. Johns Hopkins Medicine.

<https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus/2019-novel-coronavirus-myth-versus-fact>.

Moshtaghian, A. (2021, November 1). 2,300 NYC Firefighters Call Out Sick as vaccine mandate begins, but mayor says public safety not disrupted.

<https://www.cnn.com/2021/11/01/us/new-york-city-vaccine-mandate-first-responder-shortage/index.html>.

Number of people reporting anxiety and depression nationwide since start of pandemic hits all-time high in September, hitting young people hardest. Mental Health America. (2020, October 20). <https://www.mhanational.org/number-people-reporting-anxiety-and-depression-nationwide-start-pandemic-hits-all-time-high>.

Oh, H., Marinovich, C., Rajkumar, R., Besecker, M., Zhou, S., Jacob, L., Koyanagi, A., & Smith, L. (2021, June 7). Covid-19 dimensions are related to depression and anxiety among US college students: Findings from the Healthy Minds Survey 2020. *Journal of Affective Disorders*.

<https://www.sciencedirect.com/science/article/pii/S0165032721005759?via%3Dihub>.

Pierri, F., Perry, B. L., DeVerna, M. R., Yang, K.-C., Flammini, A., Menczer, F., & Bryden, J. (2022). Online misinformation is linked to early COVID-19 vaccination hesitancy and refusal. *Scientific Reports*, *12*(1), 1–7. <https://doi-org.unh.idm.oclc.org/10.1038/s41598-022-10070-w>

Prosser, A. M. B., Judge, M., Bolderdijk, J. W., Blackwood, L., & Kurz, T. (2020). “Distancers”

- and “non-distancers”? The potential social psychological impact of moralizing COVID-19 mitigating practices on sustained behavior change. *British Journal of Social Psychology*, 59(3), 653–662. <https://doi.org/10.1111/bjso.12399>.
- Rose, S., Hartnett, J., & Pillai, S. (2021). Healthcare worker’s emotions, perceived stressors, and coping mechanisms during the COVID-19 pandemic. *PLoS ONE*, 16(7). <https://doi.org.unh.idm.oclc.org/10.1371/journal.pone.0254252>
- Salari, N., Hosseini-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., Rasoulpoor, S., & Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression, among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Globalization and Health*, 16(1), 57. <https://doi.org.unh.idm.oclc.org/10.1186/s12992-020-00589-w>
- Schieman S. (2010) The sociological study of anger: Basic social patterns and contexts. In: Potegal M., Stemmler G., Spielberger C. (eds) International Handbook of Anger. Springer, New York, NY. [https://doi.org/10.1007/978-0-387-89676-2\\_19](https://doi.org/10.1007/978-0-387-89676-2_19)
- Shanafelt, T, Ripp J., Trockel M. (2020). Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *Journal of American Medical Association Network*. 2020;323(21):2133–2134. doi:10.1001/jama.2020.5893
- Shiina, A., Niitsu, T., Kobori, O., Idemoto, K., Hashimoto, T., Sasaki, T., Igarashi, Y., Shimizu, E., Nakazato, M., Hashimoto, K., & Iyo, M. (2020). Relationship between perception and anxiety about COVID-19 infection and risk behaviors for spreading infection: A national survey in Japan. *Brain, Behavior, & Immunity – Health*, 6, 100-101. <https://doi.org.unh.idm.oclc.org/10.1016/j.bbih.2020.100101>
- Siewe Fodjo, J. N., Ngarka, L., Njamnshi, W. Y., Nfor, L. N., Mengnjo, M. K., Mendo, E. L.,

- Angwafor, S. A., Atchou Basseguin, J. G., Nkouonlack, C., Njit, E. N., Ahidjo, N., Chokote, E. S., Dema, F., Fonsah, J. Y., Tatah, G. Y., Palmer, N., Seke Etet, P. F., Palmer, D., Nsagha, D. S., ... Njamnshi, A. K. (2021). Fear and depression during the COVID-19 outbreak in Cameroon: A nation-wide observational study. *Biomed Central. Psychiatry, 21*. <https://doi.org/10.1186/s12888-021-03323-x>
- Stella, M. (2020). Social discourse and reopening after COVID-19: A post-lockdown analysis of flickering emotions and trending stances in Italy. *First Monday, 25*(11), 1-?. <https://doi-org.unh.idm.oclc.org/10.5210/fm.v25i11.10881>
- Woods, R. (2008). When Rewards and Sanctions Fail: A Case Study of a Primary School Rule-Breaker. *International Journal of Qualitative Studies in Education, 21*(2), 181-196.