Psychological Responses and Behaviors During the Initial Stages of COVID-19 Among General US Population

By

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ABSTRACT

Background: The novel coronavirus, COVID-19, has posed a major public health risk across the world. The threat of the virus and the resulting quarantine or "stay-home-orders," likely impacted physical and mental health across the US population. The purpose of this study was to examine the psychological responses and behaviors during the initial stages of the COVID-19 epidemic in a US sample, applying the Common-Sense Model of illness to encourage a more comprehensive conceptualization of psychological and behavioral response to COVID-19.

Methods: This study used Amazon Mechanical Turk (MTurk), a widely used data-sourcing tool, to assess the psychological impact of COVID-19 and quarantine for a large sample (N = 584) of US citizens, applying the Common-Sense Model of Illness as a way of predicting cognitive and emotional representations of the virus, engagement in precautionary and self-care behaviors, and appraisals of control.

Conclusions: These results suggested that US citizens felt knowledgeable about COVID-19 and confident in precautionary behaviors to control the spread of COVID-19. However, while most US citizens reported normative levels of emotional distress in response to COVID-19, about 19-30% reported scores that indicated moderate to severe distress. Greater distress predicted

decreased engagement in self-care behaviors and certain precautionary behaviors. People who engaged in both precautionary and self-care behaviors felt that they were helpful. While the results of this study are preliminary and further study is needed, these results suggest that Leventhal's Common-Sense Model of Illness may be applicable to understanding the US citizen experience of COVID-19.

Psychological Responses and Behaviors During the Initial Stages of COVID-19 Among General US Population

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I. Synopsis

In December 2019, Chinese health officials noticed a string of cases of an atypical pneumonia, unresponsive to antibiotics. The virus was eventually recognized as a beta-strain of the coronavirus, similar to that of SARS-CoV in 2002-2003, and it was named COVID-19. Public health authorities in China declared COVID-19 a public health crisis on January 20, 2020 (Li, Wang, Xue, Zhao, & Zhu, 2020). The first case of COVID-19 in the United States was diagnosed January 21, 2020 (Center for Disease Control and Prevention (CDC), 2020). Around this time, most states adopted "stay-at-home" orders, forcing many businesses to close and schools to adopt virtual course administration methods. Guidelines for social distancing and regular hand washing to reduce the spread of the virus had also been put in place (CDC, 2020).

By April 2020, the literature on the psychological impacts of COVID-19 and "stay-at-home," or quarantine, orders was largely studied in Chinese samples. The Chinese literature suggested high levels of anxiety and psychological impact in the general public, but particularly for women, healthcare workers, and individuals living in areas with high rates of infection (Li et al., 2020; Lai et al., 2020; Wang et al., 2020). However, the Chinese literature also suggested protective factors, including perceptions of specific, accurate, and up-to-date health information related to the virus, as well certain precautionary behaviors such as avoiding the sharing of utensils and washing hands after coughing, sneezing or nose rubbing (Wang et al., 2020).

At this time, there were an abundance of editorials and commentaries in the US literature related to possible mechanisms for psychological care during the COVID-19 outbreak, however, the psychological impacts of COVID-19 and quarantine for US citizens was unknown. This

study explored the psychological impact of COVID-19 and quarantine in a large US sample, applying Leventhal's Common-Sense Model of Illness in order to understand the relationships between cognitive and emotional representations of the health threat and self-care behaviors in quarantine.

II. Introduction

COVID-19

Origin. In December of 2019, health officials in Wuhan, China became aware of an atypical pneumonia with unknown etiology (Lake, 2020). Patients were experiencing a range of symptoms, primarily including respiratory distress and fever, that was not resolved with 3-5 days of treatment with antibiotics. The illness was eventually identified as a beta strain of coronavirus. Coronaviruses are common strains of ribonucleic acid (RNA) viruses that infect a wide range of animals and less commonly humans; there are alpha, beta, gamma and delta strains of coronavirus (Velavan & Meyer, 2020). Similar to the severe acute respiratory syndrome (SARS-CoV) in 2002-2003, the current coronavirus has been identified as a beta strain and has been officially named SARS-CoV2, better known as COVID-19. COVID-19 is believed to infect the lung alveolar epithelial cells via receptor mediated endocytosis. While early in the pandemic it was theorized that an antiretroviral regimen may help to stop the progression of the virus, there is still no identified *cure* to date (Velavan & Meyer, 2020). The introduction of vaccines that were rapidly formulated has been the primary advance in the management of COVID-19 internationally.

Initial cases of the virus have been linked to a possible source, a South China Seafood Market, also known as a "wet" market, where a range of different animals were sold including chickens, rats, and snakes (Lake, 2020; Velavan & Meyer, 2020). Similar to SARS-CoV, COVID-19 is believed to have been transmitted to humans from common mammalian hosts, specifically bats (Velavan & Meyer, 2020). It is possible that the transmission occurred directly via exposure to bats or by transmission from bats to other animals that humans are more commonly exposed to, such as raccoon dogs, which were also sold at the "wet" market (Lake, 2020).

***Prevalence in the United States*.** Since its initial presentation in Wuhan, China, COVID-19 has been identified by the World Health Organization (WHO) as a global health emergency, spreading quickly across the continents, with numbers of infections and associated deaths increasing exponentially by the day (Velevan & Meyer, 2020). At the time of this study, according to the CDC, since the first confirmed US case on January 21, 2020, there had been over 200,000 confirmed cases of COVID-19 in the United States, with over 4,500 deaths and cases in every state (CDC, April 4, 2020). This number has continued to increase exponentially with increased testing capabilities and continued transmission. More recent reports indicate at total of 30, 492, 334 confirmed cases in the United States with over 553, 681 deaths in the United States alone (CDC, April 5, 2021). While experts are now hopeful these numbers will start to decrease with the roll-out of several vaccines, at the time of this study, there were no vaccines and no indication of when the pandemic would end.

Clinical Presentation and Transmission. The clinical presentation of COVID-19 is complex and highly variable, with patients ranging from asymptomatic to severely symptomatic. For patients who are symptomatic, symptoms typically include fever, nasal congestion, fatigue, and respiratory symptoms (e.g. chest tightness; dyspnea) (Velavan & Meyer, 2020). Less commonly, patients experience gastrointestinal symptoms, such as diarrhea (Lake, 2020). While most patients recover, some patients progress to severe respiratory distress, some experience secondary infection, and some sustain virus-associated myocardial injury, all leading to possible death.

The virus is transmitted human-to-human via respiratory transmission or contact with infected secretion (e.g. sneeze); contact with fomites, or surfaces with traces of the virus is also a concern (Lake, 2020). The WHO has estimated that the rate of transmission is 1.4-2.5, meaning

each person who has the virus transmits the virus to 1.4-2.5 others; comparatively, the rate of transmission for the seasonal flu is 1.28 and for the measles is 12-18 (Lake, 2020). Once the virus has been contracted, the median incubation period has been estimated at 5.2 days with a range of 0-24 days, meaning symptoms will present within 5 days for most people, however, there is variability (Velavan & Meyer, 2020). In February 2020, the estimated fatality rate of COVID-19 was 2.2%, compared to 9.6% during the SARS-CoV pandemic in 2002-2003 (Velavan & Meyer, 2020). However, it was difficult to make accurate estimations at the time of this study due to likely biases in identification and lack of testing accessibility; there was likely a bias toward individuals with the most severe cases, as individuals who were asymptomatic or only mildly symptomatic likely went unidentified (Lake, 2020). Current estimates of fatality rates are closer to 1%, likely due to improvements in access to testing, guidelines around getting tested and treatment (CDC, 2020).

High Risk Groups. While all persons are susceptible to the viruses, there are trends with regards to symptomology and progression. For example, children are susceptible to the virus but most commonly are asymptomatic and pose greater risk to others as carriers (Lake, 2020). The CDC has announced that groups at highest risk for serious illness with COVID-19 are individuals 65 years of age and older and individuals with chronic lung disease, moderate to severe asthma, cardiovascular conditions, immunocompromising conditions (e.g. HIV), severe obesity (i.e. BMI $\geq$ 40), diabetes, chronic kidney disease, and liver disease (CDC, 2020). Individuals who are pregnant or homeless have also been identified as members of high-risk groups (CDC, 2020).

Public Health Recommendations. The CDC made several recommendations to minimize the spread of COVID-19 in the United States. Recommendations include cleaning

hands often by washing them or using hand sanitizer with 60% alcohol, avoid touching eyes, nose, and mouth, avoiding close contact with individuals who are sick, staying home, maintaining a 6-foot distance from people in public, covering mouth and sneezes with a tissue rather than hand or elbow, and cleaning household surfaces with disinfectants frequently (CDC, 2020). At the time of this study, it was recommended that individuals avoid gatherings of 10 or more people when possible (CDC, 2020) and universities had asked that students return home and finish their semester courses virtually (e.g. WebEx, Zoom, other online forums). Restaurants and other businesses were temporarily closed, posing financial concerns for individuals working hourly-wage jobs, as well as the global economy.

In order to ensure individuals were following guidelines to minimize the spread of the virus, most states put "stay-at-home" orders in place, instructing individuals to not leave home except to go to the grocery store, pharmacy, vet, or doctor. Individuals under "stay-at-home" orders were advised that if they go outside to exercise or walk dogs, they maintain 6-feet of distance from others; CDC guidelines even suggested wearing masks when around other people, regardless of whether or not one was experiencing symptoms (CDC, 2020). Similar practices, referred to as "quarantines," or separation from others to prevent the possible spread of infectious disease, can be traced back to Italy in 1127 during leprosy outbreaks (Brooks et al., 2020). While rare, quarantines have been used in many countries to prevent spread of infectious disease such as the plague, Ebola, H1N1, and SARS-CoV (Brooks et al., 2020). While effective for reducing transmission of disease, there are likely psychological impacts to living in quarantine.

Psychological Impact of COVID-19

Psychological well-being is undoubtedly affected during viral outbreaks and should be explored and considered, due to associated behavioral changes and their effects on the success of public health strategies to manage pandemics (Brooks et al., 2020; Asmundson & Taylor, 2020).

Psychological Impact of a Pandemic. Based on research during previous pandemics, psychological function prior to outbreak is likely to impact function during and following outbreaks. For example, health anxiety, or hypervigilance to bodily sensations and perceived illness, is believed to exist on a continuum from low to high; within the context of a viral outbreak, some normative health anxiety is likely adaptive, however, there are negative consequences to existence on both ends of the health anxiety spectrum (Asmundson & Taylor, 2020). Based on research during the H1N1 epidemic, we know that individuals with low perceived risk and low health anxiety were less likely to follow public health recommendations for safety – such as washing hands frequently (Asmundson & Taylor, 2020). However, for people who are high risk or have higher levels of health anxiety, individuals may be hypervigilant to bodily sensations, causing overutilization and subsequent increased risk for exposures. Additionally, individuals with high health anxiety may engage in excessive handwashing (i.e. raw; risk for infection), avoidance of medical care for fear of contagion, and "panic purchasing" of essential items (e.g. hand sanitizer; toilet paper) that may have communal consequences.

Psychological Impact of Quarantine. With the novel and extreme "stay-at-home" guidelines in the majority of the states at the time of this study, enforcing business closures and quarantine for the general public, it was important to also consider the psychological impacts of quarantine. A review of historical quarantine literature identified 24-studies, assessing the psychological impacts quarantine during various infectious disease outbreaks including SARS-

CoV, Ebola, and H1N1 (Brooks et al., 2020). Results of this meta-analysis indicated some common psychological symptoms in response to living in quarantine and adjustment to life after quarantine. Stressors during quarantine periods include separation from loved ones, boredom, inadequate supplies, and inadequate information from public health authorities (Brooks et al., 2020). Common psychological symptoms include anxiety, anger, fear, loneliness, annoyance, post-traumatic stress symptoms, avoidance, guilt, and sadness. After a quarantine period, financial loss and stigma towards certain groups, particularly healthcare workers and minority populations (e.g. Asian Americans), are stressors that likely influence the persistence of consequential psychological symptoms such as anger, anxiety, and avoidance, that may persist months after quarantine is lifted (Brooks et al., 2020).

Results of this review also suggest that length of quarantine may predict greater psychological impacts, specifically 10 days or more (Brooks et al., 2020). Potential high-risk groups identified included younger age, individuals with pre-existing mental health problems, healthcare workers, and parents with 1-2 children; however, results related to high-risk groups were often noted to be inconsistent between studies (Brooks et al., 2020). It is possible that inconsistencies between studies reflect different disease states and associated risks; for example, H1N1 was known to affect children to a greater extent than other viruses, which may have increased the psychological impact for parents.

Early Psychological Impact of COVID-19. At the time of this study, literature regarding the psychological impacts of COVID-19 had investigated impacts on the Chinese general public and healthcare workers. Li and colleagues (2020) investigated the psychological impacts of COVID-19 on the general public in China, analyzing social media data from the week prior to declaration of a public health crisis in China, January 13-19, to the week after, January 20-26.

Data from 17,865 users of a social media site, Weibo, was collected and analyzed with linguistic categorization software. The sample included members of the general public, 25% male, ranging in age from 8-56 years, with a median of 33 years. Analysis of the data indicated significant differences in the emotional valence of social media posts, between the two weeks. Specifically, in the week following declaration of a public health crisis, there was an increase in negative emotional terms (e.g. anxiety, worry, depression) and a decrease in positive emotional terms (e.g. happy). Additionally, analysis of the data indicated significant increases in terms that express concern for health and family and decreases in terms of concern for leisure and friends (Li et al., 2020). The authors suggested that uncertainty and low predictability surrounding COVID-19 and perceived risk led to the increase in negative emotions, sensitivity to social risk, and a decrease in positive emotions and life satisfaction (Li et al., 2020).

Healthcare workers and COVID-19. Based on research from the 2003 SARS-CoV outbreak of 2002-2003, Lai and colleagues (2020) hypothesized that healthcare workers may be at heightened risk for psychological distress in response to COVID-19 due to exposure, overwhelming workload, limited personal protection equipment, media coverage, lack of specific treatments, and feelings of inadequate support that were present in the early stages of the COVID-19 outbreak (Lai et al., 2020). In order to assess the psychological impacts of COVID-19 on healthcare workers in China at this time, researchers administered a survey battery to 1,257 healthcare professionals at 34 hospitals in China between January 29 and February 3, 2020 (Lai et al., 2020). Participants included 764 nurses and 593 physicians, 522 (42%) of which were identified as frontline healthcare workers, working in fever clinics or wards for COVID-19. The survey battery included the Patient Health Questionnaire (PHQ-9) as a measure of depression, Generalized Anxiety Disorder – 7 (GAD-7) as a measure of anxiety, Insomnia

Severity Index (ISI) as a measure of insomnia, and the Impact of Events Scale – Revised (IES – R) as a measure of COVID-19 specific distress. Results suggested that a high number of participants endorsed psychological symptoms; 634 (50%) endorsed symptoms of depression, 560 (44%) endorsed symptoms of anxiety, 427 (34%) endorsed symptoms of insomnia, and 899 (72%) endorsed distress (Lai et al., 2020). Median scores were 5 (2-8) on the PHQ-9, indicating mild depressive symptoms, 4 (1-7) on the GAD-7, indicating mild to moderate anxious symptoms, 5 (2-9) on the ISI, suggesting normative sleep, and 20 (7-31) on the IES – R, indicating normative to partial concern for PTSD. Results also indicated that groups with the most severe psychological symptoms on all scales were women, nurses, frontline healthcare workers, and those working in Wuhan hospitals (Lae et al., 2020). These numbers suggest groups that may be at particular risk in the US include women, healthcare workers, and those working in high-risk regions (e.g. New York).

General Public and COVID-19. Prior to the current study, the only one that assessed psychological impact on the general public was based in China (Wang et al., 2019). Wang and colleagues (2020) explored that psychological impact of COVID-19 outbreak in the general public of China, between January 31 and February 2, 2020. This study administered anonymous online surveys via a "snowballing" technique; specifically, they sent the survey to university students in China and encouraged them to send the survey to others. The final sample consisted of 1,120 participants (67.3% female, 53.1% aged 21.4-30.8, 53% married, 67.4% with children, 88% educated) living on mainland China during the outbreak (Wang et al., 2020). The anonymous survey battery included the National University of Singapore Questionnaire on COVID-19, IES-R, and Depression, Anxiety, and Stress Scale -21 (DASS-21). The National University of Singapore Questionnaire on COVID-19 consists of items assessing demographic

information (gender, age, education, marital status, etc.), as well as specific information regarding knowledge of COVID-19, perceived contact with COVID-19, perceived risk of contracting COVID-19, engagement in specific precautionary measures (e.g. handwashing, not sharing utensils), and specific physical symptoms over the past 14 days (e.g. fever, cough, difficulty breathing); it also includes a qualitative component, inquiring participant specific desires for knowledge on COVID-19 (Wang et al., 2020). The DASS-21 is a measure of psychological symptoms on three subscales of stress, anxiety, and depression. Major findings from this study are presented in Table 1.

Table 1. Major Findings of Wang and Colleagues (2020)

Measure	**Average Score (SD)**	**Minimal Psychological Impact n (%)**	**Mild Psychological Impact n (%)**	**Moderate to Severe Psychological Impact n (%)**
Impact of Events Scale Revised	32.98 (15.42)	296 (24.5%) **(Score ≤23)**	263 (21.7%) **(Score 24-32)**	651 (53.8%) **(Score ≥33)**
	Normal Score n (%)	**Mild Symptoms n (%)**	**Moderate Symptoms n (%)**	**Severe or Extremely Severe Symptoms n (%)**
DASS-21 Depression Subscale	843 (69.7%) **(Score 0-9)**	167 (13.8%) **(Score 10-12)**	148 (12.2%) **(Score 13-20)**	52 (4.3%) **(Score 21-42)**
DASS-21 Anxiety Subscale	770 (63.6%) **(Score 0-6)**	91 (7.5%) **(Score 7-9)**	247 (20.5%) **(Score 10-14)**	102 (8.4%) **(Score 15-42)**
DASS-21 Stress Subscale	821 (67.9%) **(Score 0-10)**	292 (24.1%) **(Score 11-18)**	66 (5.5.%) **(Score 19-26)**	102 (8.4%) **Score (27-42)**

Overall, correlational analyses indicated that women, students, and individuals who experienced specific physical symptoms over the prior 14-days (i.e. chills, myalgia, cough, dizziness, coryza, and sore through) experienced greater psychological impact related to the outbreak, as well as higher levels of stress, anxiety, and depression (Wang et al., 2020).

Interestingly, participants who indicated that they felt they had up-to-date, specific, and accurate health information indicated lower psychological impact, as well as lower levels of stress, anxiety, and depression (Wang et al., 2020). Additionally, lower psychological impact, stress, anxiety, and depression was associated with engagement in specific precautionary behaviors including avoiding the sharing of utensils with others and washing hands immediately after coughing sneezing, and rubbing nose (Wang et al., 2020).

The Chinese literature suggested the psychological impacts of COVID-19 and associated public health measures may be vast. Groups identified as those that may be particularly at risk for psychological distress include those with existing mental health conditions, healthcare workers, women, students, and those with physical symptoms (Li et al., 2020; Lai et al., 2020; Wang et al., 2020). Protective factors included accurate and specific health information, as well as engagement in specific precautionary behaviors (Wang et al., 2020). While there were a vast number of editorials and commentaries suggesting the utility of Telehealth and remote psychotherapy, protocol for psychological treatment during a quarantine and pandemic had not been established at the time of this study. While studies have since investigated psychologic impact on the general public, at this time, the specific psychological impacts of COVID-19 on citizens of the United States were not well-known, nor was there a model for understanding the specific psychological impacts and associated behavioral consequences, or self-care coping behaviors, related to threat of illness and living in quarantine. The current study proposed that the psychologic and behavioral impacts might be explained by Leventhal's Common-Sense Model of Illness. To our knowledge, this has still not been explored in the literature.

Leventhal's Common-Sense Model of Illness

Leventhal's Common-Sense Model of Illness Representation was developed after a series of studies indicating that health behavior change (e.g. smoking cessation) was best predicted by fear messages presented in combination with an action plan for change, only when the two occurred together, regardless of the salience of the "fear" message (Leventhal, Meyer, Norenz, 1980). Leventhal and colleagues (1980) interpreted this as being reflective of a change in thinking with regards to health threat. In other words, health threat, in combination with an action plan for change, determined coping behaviors and led to the development of the Common-Sense Model of Illness Representation (Diefenbach & Leventhal, 1996).

The Common-Sense Model of Illness Representation posits that there are two parallel processes involved in the development of perceptions related to health threat, a cognitive process and an emotional process. The model posits that internal or external cues for illness, such as mass media or physician discussions of illness or somatic sensations, evoke cognitive representation of the illness based on prior illness and treatment experiences (Diefenbach & Leventhal, 1996; Leventhal, Phillips, & Burns, 2016). Cognitive representation of illness influences the emotional representation of the illness, further influencing "action" in terms of treatment seeking or adherence to treatment regimens, and subsequent perceptions of the helpfulness of those actions.

The cognitive perception of health threat is determined by five core attributions: identity, timeline, causality, controllability, and consequences (Diefenbach & Leventhal, 1996; Leventhal et al., 2016). Illness identity refers to the label of the illness and associated symptoms; for example, when an individual experiences physical symptoms such as runny nose and a cough, "prototypes" or past experiences are activated, and the individual identifies the symptoms as a reflection of having contracted the "common cold" (Leventhal et al., 2016). Timeline refers to an

individual's perceptions and experiences of rates of onset, duration, and decline; causality refers to an individual's perception or awareness of contributors to contraction or diagnosis; consequences refer to an individual's perceptions, experiences, or awareness of possible or likely physical, cognitive, and even social disruptions resulting from the diagnosis or illness; and control refers to an individual's perception of the ability to treat or be treated for the diagnosis or illness (Leventhal et al., 2016.

Emotionally, internal and external cues for illness, paired with cognitive perceptions of risk, evoke emotional reactions to health threat. According to the model, these cognitive and emotional representations of health threat influence an individual's degree of engagement in preventative or treatment seeking and coping behaviors (Diefenbach & Leventhal, 1996). For example, if a person is exposed to material on the importance of regular mammograms for early detection of breast cancer and perceive themselves to be at risk, provoking a level of anxiety, they will likely start scheduling regular mammograms. The final step in the model is appraisal of the helpfulness of these behaviors (e.g. seeking regular mammograms allowed for early detection and treatment of breast cancer) (Diefenbach & Leventhal, 1996; Leventhal et al., 2016).

In order to evaluate illness perception and apply Leventhal's Common-Sense Model of Illness to various disease states, the Illness Perception Questionnaire (IPQ) was developed (Weinman et al., 1996). This measure was later revised, and a briefer measure was created, the Brief Illness Perception Questionnaire (BIPQ), with since established validity and reliability in various samples across many disease states (Broadbent et al., 2006).

Leventhal's Common-Sense Model of Illness has been applied to both acute and chronic health threats including but not limited to the flu, tetanus, asthma, cardiovascular disease (i.e.,

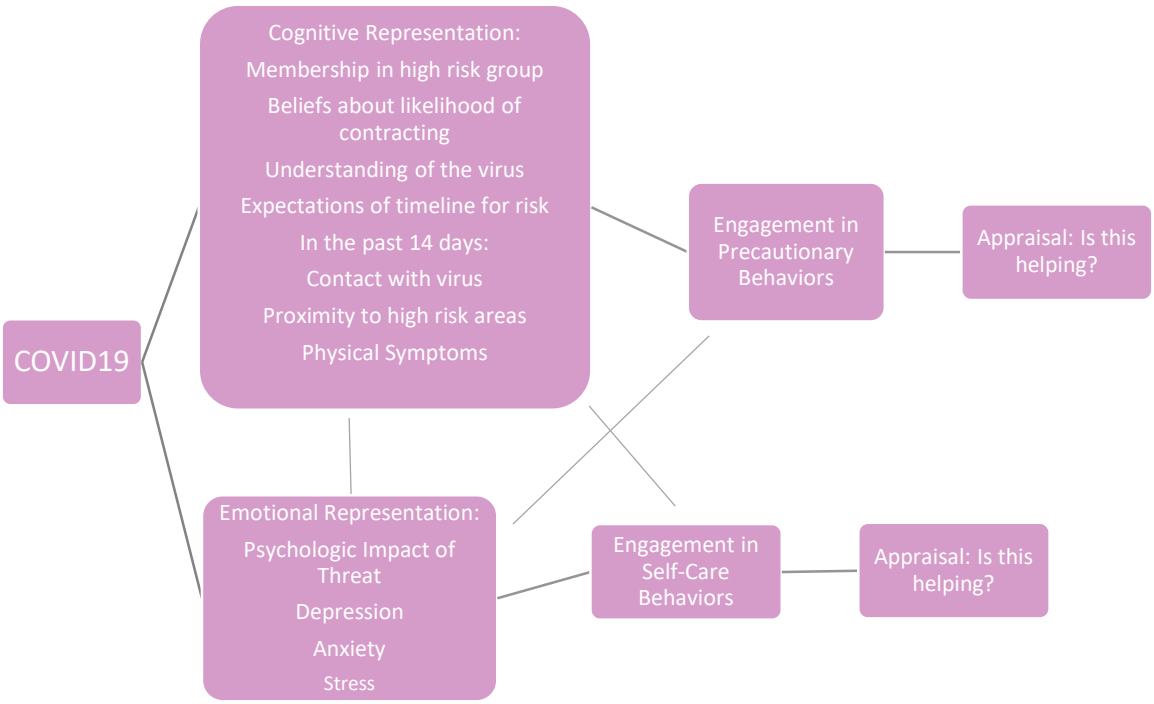
myocardial infarction and heart failure), diabetes, and traumatic brain injury (Leventhal et al., 2016; Snell et al., 2013). Overall, studies suggests that "action" or health behavior is dependent upon a person's representations of both the diagnosis/illness and treatments, as well as their past experiences. For example, while most professionals and laypersons recognize common symptoms of cardiovascular disease, many people who present with myocardial infarction or heart failure are delayed in seeking treatment due to the experience of atypical symptoms, such as fatigue, swelling, and shortness of breath, versus the more typical symptoms of chest and shoulder pain (Leventhal et al., 2016).

Further research examining the role of health threat messages has supported preliminary work in this area, highlighting that threat messages, regardless or salience, predict health behaviors, but only when accompanied by a concrete and specific action plan, requiring perception of personal health threat (e.g., proximity to environmental origin of infection) in the absence of somatic symptoms (Leventhal et al., 2016).

The Common-Sense Model Applied to COVID-19. The current study proposed that Leventhal's Common-Sense Model of illness can be applied to COVID-19, explaining individual cognitive and emotional representations of COVID-19, as well engagement in precautionary and self-care behaviors, and the perceived helpfulness of these behaviors. The results of Wang and colleagues (2020) provided preliminary support, suggesting that perceptions of adequate health information and knowledge about the virus (e.g. identity; cause) and engagement in precautionary behavior (e.g. controllability) were associated with decreased psychological symptoms in response to the virus. Other important factors to consider in exploring this model include the incongruence between symptom experience for individuals diagnosed with COVID-19, with some being extremely symptomatic, mildly symptomatic, or asymptomatic, as well as

perceptions related to threat messages from the media and inconsistencies in action plans created by the CDC due to the novelty of the virus and perceived uncertainty around best modes of prevention.

Figure 1. Common-Sense Model



This model proposed that individual cognitive representations of COVID-19 would be influenced by knowledge and understanding of the virus, membership in a CDC prescribed high-risk group (e.g. 65+ years of age, asthma, lung disease), beliefs about likelihood of contracting the virus, possible contact with COVID-19 in the past 14 days, the experience of physical symptoms (e.g. fever, coughing) in the past 14 days, and beliefs about how long the virus will pose a threat to health.

Emotional representations of COVID-19 could be influenced by psychologic impact of the outbreak, perceived risk, and "stay-at-home" orders, and may include symptoms of anxiety,

depression, and stress. This model also suggested that cognitive and emotional representations of COVID-19 likely influence an individual's engagement in CDC suggested precautionary measures (e.g. cleaning surfaces frequently, staying home), as well as self-care behaviors (e.g. maintaining contact with close friends, physical activity), and consequential appraisals of the helpfulness of these behaviors.

Specific Aims:

1. This study aimed to describe attitudes related to COVID-19 and engagement in precautionary behaviors in response to COVID-19 for US citizens [i.e., USA Revised-National University of Singapore COVID-19 Questionnaire (NUSCQ)].
2. This study aimed to describe the psychological impact of COVID-19 and quarantine on US citizens (i.e., IES-R).
3. This study aimed to describe psychological symptoms in response to COVID-19 and quarantine for US citizens (i.e., DASS-21).
4. This study aimed to describe engagement self-care behaviors within the context of COVID-19 and quarantine, and develop a measure of self-care behaviors, specific to quarantine situations in response to pandemic [i.e., Self-Care Behavior Inventory - Revised for Quarantine (SCBI-RQ)].
5. This study aimed to provide evidence for a Common-Sense Model of COVID-19 (i.e., USAR-NUSQ; questions from BIPQ, revised for COVID-19 and added to USAR-NUSQ; IES-R; DASS-21; SCBI-RQ).

Hypotheses:

Aims 1-3 represent descriptive analyses designed to describe the reported impact across psychological functioning indices. Aim 4 described specific self-care behaviors. Qualitative

information provided with this measure was coded and analyzed, descriptively to form a more comprehensive measure of self-care behaviors within the context of quarantine. No specific hypotheses were offered for these analyses.

Aim 5 assessed the utility of the Common-Sense Model for predicting engagement in precautionary and self-care behaviors, within the context of COVID-19 and quarantine. It was hypothesized that cognitive and emotional representations of COVID-19 and quarantine would predict engagement in precautionary and self-care behaviors. It was further hypothesized that engagement in precautionary and self-care behaviors will predict appraisals of helpfulness of these behaviors for reducing threat.

III. Methods and Materials

Method

This study used a well-established data sourcing program, Amazon Mechanical Turk (MTurk), to examine the psychological and behavioral impacts of the COVID-19 virus and quarantine on the general US population. Four measures were entered into Qualtrics and administered to 1,200 US participants enrolled in the MTurk system as survey takers.

Sample size estimates were approximated using multiple considerations. First, we sought a sample that would be comparable to what was at the time the most recent, similar study of the psychological impact of COVID-19 on the general population in China (Wang et al., 2020). Second, we considered a sample large enough to complete the factor analysis of the new COVID behavioral scales. Third, we completed a statistical power analysis for linear bivariate regression analyses, which indicated a necessary sample size of 472 to reach 95% power for aim 5. Participants were paid $.50 for their participation in this project. Surveys took about 20 minutes to complete.

Measures

USA -Revised – National University of Singapore Questionnaire of COVID-19 (Appendix 1): This is a 56-item assessment of demographic information, knowledge about COVID-19, engagement in precautionary behaviors, amount of concern related to COVID-19, and perceived risk of contracting COVID-19. It was developed for use in similar projects (Wang et al., 2020), but has been revised for this project for US citizens and to include more recently established information related to COVID-19, including assessment of membership in CDC identified high-risk groups and engagement in more recently prescribed CDC precautionary behaviors.

The measure was also revised to include questions that were adapted for COVID-19 from the Brief Illness Perception Questionnaire (BIPQ), related to perceptions of control and perceptions of the timeline of risk (i.e. "How much control do you feel you have over contraction of COVID-19?," "If you have been diagnosed, how much control do you feel you have in managing COVID-19?," "How long do you feel COVID-19 will pose a risk to you?," and "If you have been diagnosed with COVID-19, how long do you think the virus will last?."

Impact of Events Scale – Revised: This is a 22-item, reliable and well-validated (α = 0.96) measure of traumatic reactions to stressful life events (Creamer, Bell, & Failla, 2003), also used in similar studies assessing the impact of COVID-19 (Wang et al., 2020).

DASS-21: This is a 21-item assessment of psychological function, with reliable and well-validated measures of general psychological distress (α = 0.93), as well as three subscales of depression (α = 0.88), anxiety (α = 0.82) and stress (α = 0.90) (Henry, & Crawford, 2005), also used in similar studies assessing the impact of COVID-19 (Wang et al., 2020).

Self-Care Behavior Inventory – Revised for Quarantine (Appendix 2): This is a 19-item, researcher-revised assessment of current self-care behaviors, within the context of a quarantine. This measure was revised from a brief measure of self-care behaviors for doctoral students in psychology (Santana & Fouad, 2017), that was based off of a 60-item, comprehensive worksheet of self-care behaviors developed for clinician reflection when working with patients with extensive trauma histories (Saakvitne, Pearlman, & Abrahamson, 1996). The original 19-item SCBI has demonstrated good preliminary

reliability and validity (Santana & Fouad, 2017). However, due to the novelty of the COVID-19 virus and quarantine recommendations in the United States this assessment was revised, removing items that are not possible during quarantine (e.g. "take vacations"), adding items that are possible during quarantine (e.g. "virtually connect with others you enjoy"), separating "pray" and "meditate," and adding a qualitative component to allow individuals to describe their own self-care behaviors during quarantine. The qualitative component will hopefully aid in the development of a more valid tool and better understanding of how people are coping with the novel experience of living in quarantine within the context of a pandemic.

Due to the possibility that participants may have been experiencing significant psychological distress at the time of the survey, the following information was provided to each participant at the end of the survey:

Thank you for your participation in this study. We understand that this is a difficult time, and some may be experiencing significant distress. If you find yourself in crisis, here are some 24-hour hotlines available for support.

For Crisis Text Line, text HOME to 741741.

For the National Suicide Prevention Lifeline, call 1-800-273-8255.

For LGBTQ Support, visit the Trevor Project website at www.thetrevorproject.org or call 1-866-488-7386.

Statistical Analyses

Aim 1: Descriptive statistics were used to describe the sample (i.e. demographic information) and attitudes related to risk for contracting COVID-19, experience of specific, symptoms over the past 14-days, healthcare utilization over the past 14-days, COVID-19 testing status, self-rated

health status, related self-reported comorbidities, and engagement in precautionary behaviors during COVID-19 and "stay-at-home" orders, using USAR-NUSCQ self-report.

Aim 2: Descriptive statistics were used to describe the psychological impact of COVID-19, using averages and percentiles of scores of the IES-R. Categorical frequencies were provided to describe psychological impact with regards to specific demographic variables (e.g. gender, age, educational attainment, marital status, parental status, occupational status, etc.).

Aim 3: Descriptive statistics were used to describe psychological symptomology during COVID-19 and "stay-at-home" orders, using averages and cut off scores across subscales of the DASS-21. Categorial frequencies were provided to describe psychological symptomologies (i.e. depressive, anxious, and stress-related) with regards to specific demographic variables.

Aim 4: Descriptive statistics were used to describe engagement in self-care behaviors during COVID-19 and "stay-at-home" orders, using self-reported averages on the SCBI-RQ. Additionally, qualitative information provided by participants was coded, analyzed, and provided descriptively in order to inform the development of a more comprehensive measure of self-care behaviors within the context of quarantine.

Aim 5: Principal Components analysis were used to establish a measure of the *cognitive representation* of COVID-19, using specific questions from the US-NUSCQ related to identity, timeline, causality, controllability, and consequences of the virus per the Common-Sense Model of Illness. Items from this measure were used to represent the cognitive representation of COVID-19 in the final model. Questions for this analysis included those related to membership in a high-risk group, experience of symptoms in the last 14-days, self-rated health status, contact with the virus, knowledge of transmission, perceived likelihood of contracting the virus, perceptions of control, and timeline of risk.

Principal Components analysis was used to further develop the SCBI-RQ to represent engagement in self-care behaviors in the final model. A factor structure was developed and to use in subsequent analyses.

Regression analyses were used to examine the proposed Common-Sense Model of Illness as it relates to COVID-19, specifically assessing fit of the model as it relates to the predictability between cognitive and emotional representations of the virus (i.e. IES-R; DASS-21), engagement in self-care behaviors and specific precautionary behaviors, and appraisals of helpfulness. Appraisals of helpfulness will be represented by responses to the Likert-scale question on the US-NUSCQ: “How confident do you feel the precautionary measures you are taking will help prevent you from contracting or spreading COVID -19?”

IV. Results

Aim 1. Demographic Information and USA – Revised NUSQC Responses

Sample. Data was collected between April 21 to April 29, 2020. A total of 1,159 participants completed the survey. Upon examining survey responses, several participant surveys were removed from the study for various reasons. Participant responses were disregarded if the participant provided an answer other than "Never" on any of the three validity questions. Additionally, one case was removed for indicating age under 18, one case was removed for suspicious answers on demographic questions (i.e. reported no children, pregnant, child under 16 and child over 16), twelve cases were removed for not providing responses on the IES-R, DASS-21, and SCBI, and 114 were removed for indicating they were from countries other than the United States [e.g. China (n = 6, .9%), Brazil (n = 20, 2.7%), and India (n = 33, 3.6%)].

After removing questionable responses, the final sample size was N = 584, with a 50.39% rate of exclusion. Gender was approximately evenly distributed (n = 309, 52.9% female). The mean age of the sample was 41.14 years (SD ± 13.49), with a median of 38. The youngest participant was 18 years of age and the oldest was 78 years of age. Participants were categorized by age group to describe the experience of young adults aged 18-44 (n = 378, 65.7%), middle-aged adults aged 45-64 (n = 164, 28.1%), and older adults aged 65 and older (n = 42, 7.2%). Other sociodemographic information for the sample is provided in Table 2.

Table 2. Sociodemographic Information

Variable	n (%)
Employment Status	
Employed	443 (75.9)
Homemaker	18 (3.1)
Retired	42 (7.2)

Student	31 (5.3)
Unemployed	50 (8.6)
Marital Status	
Divorced/Separated	43 (7.4)
Married	287 (49.1)
Single	243 (41.6)
Widowed	11 (1.9)
Parental Status	
No children	215 (36.8)
Has child 16 years or younger	147 (25.2)
Has child older than 16 years	99 (17)
Has child 16 years or under and has child older than 16 years	31 (5.3)
Pregnant and has child 16 years or under	5 (.9)
Pregnant	3 (.5)

Self-reported health information, including membership in one or more of the CDC identified high-risk groups for serious illness with COVID-19, is provided in Table 3. Of note, most of the participants reported that they had medical insurance (n = 501, 85.8%).

Table 3. Health Information

Variable	n (%)
Current Health Status	
Poor	8 (1.4)
Fair	107 (18.3)
Good	309 (52.9%)
Very Good	160 (27.4)
Chronic Medical Conditions/CDC High-Risk Groups	
Suffer from chronic illness	118 (20.2)
65 years or older	46 (7.9)
Moderate to Severe Asthma	42 (7.2)
Chronic Lung Disease, other than Asthma	10 (1.7)
Cardiovascular Disease	21 (3.6)
Currently Pregnant	9 (1.5)
Human Immunodeficiency Virus (HIV)	3 (.5)

COVID-19 Symptoms, Healthcare Utilization, and Perceptions. Participants were asked to indicate specific physical symptoms they had experienced over the past 14-days. Most

participants reported that they had not experienced symptoms (n = 443, 75.9%), however, some experienced one or a range of symptoms (n = 141, 24.1%) (Table 4).

Table 4. Physical Symptom Experience

Symptom(s)	n (%)
One symptom endorsed	69 (11.82%)
Two symptoms endorsed	31 (5.31%)
Three or more symptoms endorsed	41 (7.02%)

Despite frequencies of chronic illness and symptom endorsement, only 45 (7.7%) participants reported that they had seen a doctor in the previous 14-days and only 5 (.9%) reported having been admitted to the hospital in the previous 14-days. Interestingly, 58 (9.9%) of participants reported that avoided seeking acute or emergency health care when they thought they might need it, due to fear of COVID-19, and 170 (29.1%) reported that they avoided attendance of regularly scheduled healthcare appointments, due to fear of COVID-19. However, 16 (2.7%) participants reported that they had been tested for COVID-19 over the previous 14-days, 2 (3%) reported that they had been diagnosed with COVID-19, and 54 (9.2%) participants reported that they had been under quarantine by a "health authority" in the previous 14-days. Interestingly, 43 (7.4%) participants reported that they felt discrimination by other countries due to the virus while over half reported feeling like too much "fuss" had been made about COVID-19 at some point (Table 5).

Related to risk perception, individuals were asked about known contact with COVID-19, confidence in their doctor's ability to diagnose COVID-19, perceptions of individual risk, and beliefs about how long the virus will pose a threat (Table 5). Overall, 25 (4.3%) participants indicated that they had either directly or indirectly had contact with patients suffering from

COVID-19. Participants mostly reported indirect contact with a confirmed case (n = 20, 3.4%) or contact with a suspected case (n = 12, 2.1%).

Table 5. Risk Perception

Variables	n (%)
Contact with COVID-19	
No known contact	535 (91.6)
Close contact with a confirmed case	4 (.7)
Contact with a suspected case	12 (2.1)
Contact with infected materials	1 (.2)
Indirect contact with a confirmed case (‘contact of a direct contact)	20 (3.4)
Close contact with a confirmed case, contact with a suspected care	1 (.2)
Close contact with a confirmed case, no known contact	1 (.2)
Close contact with a confirmed case, contact with infected materials	1 (.2)
Close contact with confirmed case, indirect contact with a confirmed case (‘contact of a direct contact’)	1 (.2)
Indirect contact with a confirmed case (‘contact of a direct contact), contact with a suspected case	2 (.3)
Indirect contact with a confirmed case (‘contact of a direct contact), contact with infected materials	2 (.3)
Close contact with a confirmed case, contact with a suspected case, and close contact with infected materials	2 (.3)
Close contact with a confirmed case, indirect contact with a confirmed case (‘contact of a direct contact’), contact with a suspected case	1 (.2)
Close contact with a confirmed case, indirect contact with a confirmed case, contact with a suspected case, contact with infected materials	1 (.2)
Confidence in doctor’s ability to diagnose COVID-19	
Not at all confident	19 (3.3)
Not very confident	46 (7.9)
Somewhat confident	309 (52.9)
Very confident	161 (27.6)
Likelihood of contracting the virus	
Don’t know	27 (4.6)
Not likely at all	139 (23.8)
Not very likely	202 (34.6)
Somewhat likely	190 (32.5)
Very likely	26 (4.5)
Likelihood of surviving COVID-19 if infected	
Don’t know	25 (4.3)
Not likely at all	29 (5.0)
Not very likely	44 (7.5)
Somewhat likely	220 (37.7)
Very likely	266 (45.5)

Concerns of family members contracting the virus	
Don't have family member	9 (1.5)
Not worried at all	45 (7.7)
Not very worried	76 (13.0)
Somewhat worried	120 (20.5)
Very worried	92 (15.8)
Felt that too much "fuss" had been made about COVID-19	
Never	256 (43)
Occasionally	108 (18.5)
Sometimes	124 (21.2)
Most of the time	55 (9.4)
Always	41 (7.0)
How long do you feel COVID-19 will pose a risk to you?	
Days	27 (4.6)
Weeks	39 (6.7)
Months	273 (46.7)
1-3 years	195 (33.4)
3+ years	22 (3.8)
Forever	28 (4.8)
If you have been diagnosed, how long do you think the virus will last?	
Days	31 (5.3)
Weeks	163 (27.9)
Months	60 (10.3)
1-3 years	18 (3.1)
Forever	4 (.7)
I have not been diagnosed	308 (52.7)

Engagement in Precautionary Behaviors. Participants were asked about the frequency of their engagement in CDC recommended precautionary behaviors over the previous 14-days and their perceptions of control over the virus, as a result of engagement in these behaviors and in general (Table 6). Overall, most participants reported engaging in precautionary behaviors "always" or "most of the time," with the exception of wearing a mask regardless of symptom presence or absence. With regards to mask wearing, 86 (14.7%) reported never wearing a mask, 46 (7.9%) reported occasionally wearing a mask, 70 (12.0%) reported sometimes wearing a mask, 98 (16.8) reported wearing a mask most of the time, and 284 (48.6%) reported always

wearing a mask. Additionally, most felt somewhat confident or very confident that engagement in these precautionary behaviors would help prevent them from contracting COVID-19.

Table 6. Engagement in Precautionary Behaviors

Variables	n (%)
Covering mouth when coughing and sneezing	
Never	12 (2.1)
Occasionally	15 (2.6)
Sometimes	21 (3.6)
Most of the time	86 (14.7)
Always	450 (77.1)
Avoid sharing utensils	
Never	22 (3.8)
Occasionally	19 (3.3.)
Sometimes	25 (4.3)
Most of the time	84 (14.4)
Always	434 (74.3)
Washing hands with soap and water	
Never	5 (.9)
Occasionally	17 (2.9)
Sometimes	24 (4.1)
Most of the time	72 (12.3)
Always	466 (79.8)
Washing hands immediately after coughing, rubbing rose, or sneezing	
Never	19 (3.3)
Occasionally	26 (4.5)
Sometimes	71 (12.2)
Most of the time	127 (21.7)
Always	341 (58.4)
Wearing mask, regardless of presence or absence of symptoms	
Never	86 (14.7)
Occasionally	46 (7.9)
Sometimes	70 (12.0)
Most of the time	98 (16.8)
Always	284 (48.6)
Washing hand after touching contaminated objects	
Never	9 (1.5)
Occasionally	18 (3.1)
Sometimes	34 (5.8)

Most of the time	95 (16.3)
Always	428 (73.3)
Cleaning and disinfecting surfaces in your home	
Never	14 (2.4)
Occasionally	35 (6.0)
Sometimes	74 (12.7)
Most of the time	159 (27.2)
Always	302 (51.7)
Using hand sanitizer, with 60% alcohol	
Never	48 (8.2)
Occasionally	36 (6.2)
Sometimes	82 (14.0)
Most of the time	106 (18.2)
Always	312 (53.4)
Social distancing, as able	
Never	7 (1.2)
Occasionally	21 (3.6)
Sometimes	21 (3.6)
Most of the time	111 (19.0)
Always	424 (72.6)
Staying home, aside from essential purposes (i.e. grocery store, pharmacy, medical appointments, caregiving)	
Never	8 (1.4)
Occasionally	19 (3.3)
Sometimes	21 (3.6)
Most of the time	104 (17.8)
Always	432 (74.0)
Avoid touching eyes, nose, and mouth	
Never	14 (2.4)
Occasionally	41 (7)
Sometimes	93 (15.9)
Most of the time	190 (32.5)
Always	246 (42.1)
Extra hours per day at home to avoid COVID-19	
I don’t leave home	168 (28.8)
0-5 hours	76 (13)
5-10 hours	119 (20.4)
10-15 hours	71 (12.2)
15-20 hours	42 (7.2)
20+ hours	119 (20.4)

Confidence that engagement in precautionary measures will prevent contraction of COVID-19	
Not confident at all	9 (1.5)
Not very confident	20 (3.4)
Neutral	78 (13.4)
Somewhat confident	326 (55.8)
Very confident	151 (25.9)
Control felt over the contraction of COVID-19 (generally)	
No control at all	25 (4.3)
Very little control	93 (15.9)
Neutral	60 (10.3)
Some control	242 (41.4)
A lot control	135 (23.1)
Total Control	24 (4.1)
I have already been diagnosed	5 (.9)
If you have been diagnosed, how much control do you feel you have in managing COVID-19?	
Days	31 (5.3)
Weeks	163 (27.9)
Months	60 (10.3)
1-3 years	18 (3.1)
Forever	4 (.7)
I have not been diagnosed	308 (52.7)

COVID-19 Knowledge. Finally, as part of Aim 1, participants were asked about their knowledge of COVID-19, where they get information on the virus, satisfaction with information available, and desires for additional information (Table 7). Overall, participants appeared to be very knowledgeable about COVID-19, however, slightly less than half (n = 250, 42.8%) indicated that they would like to have additional information on COVID-19. While about 93% of people agreed that the virus was transmitted via droplets and contact with contaminated objects, only 71% agreed that airborne transmission was possible; it is notable to point out that the CDC was unsure of airborne transmission at the time of this survey. Most reported that their

main sources of information were the internet (53.6%), television (28.4%), or social media (9.6%).

Table 7. COVID-19 Knowledge and Desires for Additional Information

Variables	n (%)
Does COVID-19 transmit through *droplets?*	
Agree	547 (93.7)
Disagree	17 (2.9)
Does COVID-19 transmit through *contact via contaminated objects*?	
Agree	542 (92.8)
Disagree	22 (3.8)
Does COVID-19 transmit through *airborne*?	
Agree	414 (70.9)
Disagree	82 (14.0)
Heard information on the following:	
Number of infected cases	572 (97.9)
Number related deaths	574 (98.3)
Number of recovered cases	485 (83)
Main source of health information	
Family members	10 (1.7)
Internet	313 (53.6)
Newspaper	16 (2.7)
Radio	13 (2.2)
Social media	56 (9.6)
Television	166 (28.4)
How satisfied are you with the amount of health information available?	
Very dissatisfied	21 (3.6)
Dissatisfied	84 (14.4)
Satisfied	363 (62.2)
Very satisfied	103 (17.6)
Hours spent on social media to obtain COVID-19 health information per day	
0-5 hours	531 (90.9)
5-10 hours	40 (6.8)
10-15 hours	11 (1.9)
15-20 hours	2 (.3)
Desires for Additional Information	
Details on symptoms	211 (36.1)
Advice on prevention	200 (34.2)
Advice on treatment	241 (41.3)
Regular updates for latest information	282 (48.3)
Regular updates for the outbreaks	274 (46.9)

Advice for people who might need more tailored information, such as those with pre-existing illness	213 (36.5)
Availability and effectiveness of medicine/vaccines	306 (52.4)
How many people are affected and where it is affected	275 (47.1)
Travel advice	194 (33.2)
How COVID-19 is spread	208 (35.6)
What other countries are doing	230 (39.4)

Aim 2. IES-R

Participants scores on the IES-R, related to COVID-19 and quarantine, indicated an average score of 22.19 (SD = 18.49) with a median of 19. The lowest score on the measure was 0 and the highest was 88. Overall clinical categorizations of scores are presented in Table 8. It is notable that 156 (26.7%) of scores indicated moderate to severe psychological impact. Additionally, of participants who reported that they had avoided acute or emergency care due to fear of COVID-19, 17 (29.3%) indicated minimal psychological impact, 8 (13.8%) indicated mild psychologic impact, and 33 (56.9%) indicated moderate to severe psychological impact; of participants who reported that they had avoided regularly scheduled healthcare appointments due to fear of COVID-19, 81 (47.6%) indicated minimal psychological impact, 32 (18.8%) indicated mild psychologic impact, and 57 (33.5%) indicated moderate to severe psychological impact.

Table 8. IES-R Scores

	Average Score (SD)	**Minimal Psychological Impact n (%)**	**Mild Psychological Impact n (%)**	**Moderate to Severe Psychological Impact n (%)**
Total Sample	22.19 (18.49)	335 (57.4) **(Score ≤23)**	93 (15.9) **(Score 24-32)**	156 (26.7) **(Score ≥33)**
Gender				
Female gender		166 (53.7)	59 (19.1)	84 (27.2)
Male gender		168 (61.3)	34 (12.4)	72 (26.3)
Age				
Young Adults (18-44)		195 (51.6)	59 (15.6)	124 (32.8)
Middle Age (45-64)		106 (64.6)	28 (17.1)	30 (18.3)

Older Adults (65+)		34 (81.0)	6 (14.3)	2 (4.8)
Marital Status				
Single		132 (54.3)	41 (16.9)	70 (28.8)
Married		169 (58.9)	44 (15.3)	74 (25.8)
Divorced/Separated		26 (60.4)	6 (14.0)	11 (25.6)
Widowed		8 (72.7)	2 (18.2)	1 (9.1)
Parental Status				
No Children		116 (54.0)	40 (18.6)	59 (27.4)
Pregnant		1 (33.3)	1 (33.3)	1 (33.3)
Has child 16 years or under		82 (55.8)	20 (13.6)	45 (30.6)
Pregnant, has child 16 years or under		1 (20.0)	2 (40.0)	2 (40.0)
Has child older than 16 years		69 (69.7)	16 (16.2)	14 (14.1)
Has child 16 years or under, has child older than 16 years		21 (67.7)	2 (6.5)	8 (25.8)
Educational Status				
None/Kindergarten		1 (100.0)	0 (0.0)	0 (0.0)
Primary School (Grades 1-6)		0 (0.0)	0 (0.0)	1 (100.0)
Lower Secondary School (Grades 7-9)		3 (75.0)	0 (0.0)	1 (25.0)
Upper Secondary School (Grades 10-12)		38 (58.5)	10 (15.4)	17 (26.2)
College		111 (61.0)	30 (16.5)	41 (22.5)
University/Bachelor		116 (52.7)	34 (15.5)	70 (31.8)
University/Master or PhD		66 (59.5)	19 (17.1)	26 (23.4)
Occupational Status				
Unemployed		21 (42.0)	12 (24.0)	17 (34.0)
Student		10 (32.3)	10 (32.3)	11 (35.5)
Employed		261 (58.9)	62 (14.0)	120 (27.1)
Homemaker		10 (55.6)	3 (16.7)	5 (27.8)
Retired		33 (78.6)	6 (14.3)	3 (7.1)
Chronic Illness				
General (Any)		64 (54.2)	26 (22.0)	28 (23.7)
Moderate to severe asthma		15 (35.7)	10 (23.8)	17 (40.5)
Other lung disease		4 (40.0)	2 (20.0)	4 (40.0)
Cardiovascular disease		10 (47.6)	5 (23.8)	6 (28.6)
HIV		0 (0.0)	2 (66.7)	1 (33.3)

Aim 3. DASS-21

Participant scores on the DASS-21 indicated a mean depression subscale score of 8.33 (SD = 10.19) and median of 4; scores indicated a mean anxiety subscale score of 5.7 (SD = 8.54) and median of 2; scores indicated a mean stress subscale score of 9.28 (SD = 9.7) and median of 6. Frequencies of scores by categorization for the total sample on the DASS-21 subscales are presented in Table 9. Frequencies of scores by demographic variables for the DASS-21 depression, anxiety, and stress subscales are presented in Table 10, 11, and 12, respectively. Of participants who reported that they had avoided seeking acute or emergency care for COVID-19, 16 (27.6%) reported depressive symptoms in the severe to extremely severe range 18 (31%) reported anxiety symptoms in the severe to extremely severe range, and 17 (29.3%) reported stress in the severe to extremely severe range; of participants who reported they had avoided attendance of regularly scheduled appointments, 35 (20.6%) reported depressive symptoms in the severe to extremely severe range, 30 (17.6%) reported anxiety symptoms in the severe to extremely severe range, and 19 (11.2%) reported stress in the severe to extremely severe range.

Table 9. DASS-21 Scores

	Normal Score n (%)	**Mild Symptoms n (%)**	**Moderate Symptoms n (%)**	**Severe or Extremely Severe Symptoms n (%)**
DASS-21 Depression Subscale	376 (64.4) **(Score 0-9)**	50 (8.6) **(Score 10-12)**	75 (12.8) **(Score 13-20)**	83 (14.2) **(Score 21-42)**
DASS-21 Anxiety Subscale	426 (72.9) **(Score 0-6)**	22 (3.8) **(Score 7-9)**	42 (7.2) **(Score 10-14)**	94 (16.1) **(Score 15-42)**
DASS-21 Stress Subscale	438 (75.0) **(Score 0-10)**	37 (6.3) **(Score 11-18)**	60 (10.3) **(Score 19-26)**	49 (8.4) **Score (27-42)**

Table 10. DASS-21 Depression Subscale by Demographics

	Normal Score (Score 0-9) n (%)	Mild Symptoms (Score 10-12) n (%)	Moderate Symptoms (Score 13-20) n (%)	Severe or Extremely Severe (Score 21-42) n (%)
Gender				
Female gender	202 (65.4)	28 (9.1)	36 (11.7)	43 (13.9)
Male gender	174 (63.5)	22 (8.0)	39 (14.2)	39 (14.2)
Age				
Young Adults (18-44)	218 (57.7)	32 (8.5)	60 (15.9)	68 (18.0)
Middle Age (45-64)	122 (74.4)	15 (9.1)	13 (7.9)	14 (8.5)
Older Adults (65+)	36 (85.7)	3 (7.1)	2 (4.8)	1 (2.4)
Marital Status				
Single	144 (59.3)	21 (8.6)	33 (13.6)	45 (18.5)
Married	191 (66.6)	23 (8.0)	40 (13.9)	33 (11.5)
Divorced/Separated	33 (76.7)	4 (9.3)	2 (4.7)	4 (9.3)
Widowed	8 (72.7)	2 (18.2)	0 (0.0)	1 (9.1)
Parental Status				
No Children	128 (59.5)	24 (11.2)	28 (13.0)	35 (16.3)
Pregnant	2 (66.7)	0 (0.0)	0 (0.0)	1 (33.3)
Has child 16 years or under	95 (64.6)	11 (7.5)	21 (14.3)	20 (13.6)
Pregnant, has child 16 years or under	3 (60.0)	0 (0.0)	2 (40%)	0 (0.0)
Has child older than 16 years	76 (76.8)	9 (9.1)	8 (8.1)	6 (6.1)
Has child 16 years or under, has child older than 16 years	25 (80.6)	2 (6.5)	1 (3.2)	3 (9.7)
Educational Status				
None/Kindergarten	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Primary School (Grades 1-6)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)
Lower Secondary School (Grades 7-9)	3 (75.0)	0 (0.0)	0 (0.0)	1 (25.0)
Upper Secondary School (Grades 10-12)	42 (64.6)	2 (3.1)	9 (13.8)	12 (18.5)
College	120 (65.9)	16 (8.8)	17 (9.3)	29 (15.9)
University/Bachelor	137 (62.3)	19 (8.6)	33 (15.0)	31 (14.1)
University/Master or PhD	73 (65.8)	13 (11.7)	11 (13.5)	10 (9.0)
Occupational Status				
Unemployed	25 (50.0)	8 (16.0)	5 (10.0)	12 (24.0)

Student	15 (48.4)	5 (16.1)	4 (12.9)	7 (22.6)
Employed	289 (65.2)	32 (7.2)	61 (13.8)	61 (13.8)
Homemaker	13 (72.2)	0 (0.0)	3 (16.7)	2 (11.1)
Retired	34 (81.0)	5 (11.9)	2 (4.8)	1 (2.4)
Chronic Illness				
General (Any)	66 (55.9)	15 (12.7)	18 (15.3)	19 (16.1)
Moderate to severe asthma	19 (45.2)	7 (16.7)	8 (19.0)	8 (19.0)
Other lung disease	6 (60.0)	2 (20.0)	0 (0.0)	2 (20.0)
Cardiovascular disease	11 (52.4)	2 (9.5)	2 (9.5)	6 (28.6)
HIV	2 (66.7)	0 (0.0)	1 (33.3)	0 (0.0)

Table 11. DASS-21 Anxiety Subscale by Demographics

	Normal Score (Score 0-6) n (%)	**Mild Symptoms (Score 7-9) n (%)**	**Moderate Symptoms (Score 10-14) n (%)**	**Sever or Extremely Severe Symptoms (Score 15-42) n (%)**
Gender				
Female gender	225 (72.8)	12 (3.9)	21 (6.8)	51 (16.5)
Male gender	201 (73.4)	10 (3.6)	20 (7.3)	43 (15.7)
Age				
Young Adults (18-44)	250 (66.1)	18 (4.8)	29 (7.7)	81 (21.4)
Middle Age (45-64)	138 (84.1)	3 (1.8)	12 (7.3)	11 (6.7)
Older Adults (65+)	38 (90.5)	1 (2.4)	1 (2.4)	2 (4.8)
Marital Status				
Single	166 (68.3)	9 (3.7)	18 (7.4)	50 (20.6)
Married	218 (76.0)	10 (3.5)	18 (6.3)	41 (14.3)
Divorced/Separated	34 (79.1)	3 (7.0)	4 (9.3)	2 (4.7)
Widowed	8 (72.7)	0 (0.0)	2 (18.2)	1 (9.1)
Parental Status				
No Children	151 (70.2)	11 (5.1)	15 (7.0)	38 (17.7)
Pregnant	2 (66.7)	0 (0.0)	1 (33.3)	0 (0.0)
Has child 16 years or under	106 (72.1)	4 (2.7)	13 (8.8)	24 (16.3)
Pregnant, has child 16 years or under	4 (80.0)	1 (20.0)	0 (0.0)	0 (0.0)
Has child older than 16 years	84 (84.8)	2 (2.0)	5 (5.1)	8 (8.1)
Has child 16 years or under, has child older than 16 years	27 (87.1)	1 (3.2)	1 (3.2)	2 (6.5)

Educational Status				
None/Kindergarten	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Primary School (Grades 1-6)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)
Lower Secondary School (Grades 7-9)	2 (50.0)	1 (25.0)	0 (0.0)	1 (25.0)
Upper Secondary School (Grades 10-12)	50 (76.9)	3 (4.6)	6 (9.2)	6 (9.2)
College	128 (70.3)	8 (4.4)	18 (9.9)	28 (15.4)
University/Bachelor	153 (69.5)	8 (3.6)	15 (6.8)	44 (20.0)
University/Master or PhD	92 (82.9)	2 (1.8)	2 (1.8)	15 (13.5)
Occupational Status				
Unemployed	31 (62.0)	6 (12.0)	3 (6.0)	10 (20.0)
Student	17 (54.8)	2 (6.5)	4 (12.9)	8 (25.8)
Employed	325 (73.4)	13 (2.9)	31 (7.0)	74 (16.7)
Homemaker	13 (72.2)	0 (0.0)	4 (22.2)	1 (5.6)
Retired	40 (95.2)	1 (2.4)	0 (0.0)	1 (2.4)
Chronic Illness				
General (Any)	84 (71.2)	7 (5.9)	11 (9.3)	16 (13.6)
Moderate to severe asthma	22 (52.4)	5 (11.9)	3 (7.1)	12 (28.6)
Other lung disease	4 (40.0)	0 (0.0)	3 (30.0)	3 (30.0)
Cardiovascular disease	12 (57.1)	2 (9.5)	3 (14.3)	4 (19.0)
HIV	2 (66.7)	1 (33.3)	0 (0.0)	0 (0.0)

Table 12. DASS-21 Stress Subscale by Demographics

	Normal Score (Score 0-10) n (%)	**Mild Symptoms (Score 11-18) n (%)**	**Moderate Symptoms (Score 19-26) n (%)**	**Severe or Extremely Severe Symptoms (Score 27-42) n (%)**
Gender				
Female gender	229 (74.1)	22 (7.1)	30 (9.7)	28 (9.1)
Male gender	209 (76.3)	15 (5.5)	30 (10.9)	20 (7.3)
Age				
Young Adults (18-44)	262 (69.3)	27 (7.1)	48 (12.7)	41 (10.8)
Middle Age (45-64)	139 (84.8)	9 (5.5)	10 (6.1)	6 (3.7)
Older Adults (65+)	37 (88.1)	1 (2.4)	2 (4.8)	2 (4.8)

Marital Status				
Single	169 (69.5)	21 (8.6)	30 (12.3)	23 (9.5)
Married	224 (78.0)	13 (4.5)	27 (9.4)	23 (8.0)
Divorced/Separated	36 (83.7)	3 (7.0)	2 (4.7)	2 (4.7)
Widowed	9 (81.8)	0 (0.0)	1 (9.1)	1 (9.1)
Parental Status				
No Children	151 (70.2)	20 (9.3)	26 (12.1)	18 (8.4)
Pregnant	2 (66.7)	0 (0.0)	1 (33.3)	0 (0.0)
Has child 16 years or under	112 (76.2)	7 (4.8)	14 (9.5)	14 (9.5)
Pregnant, has child 16 years or under	3 (60.0)	0 (0.0)	2 (40.0)	0 (0.0)
Has child older than 16 years	84 (84.8)	7 (7.1)	3 (3.0)	5 (5.1)
Has child 16 years or under, has child older than 16 years	27 (87.1)	0 (0.0)	2 (6.5)	2 (6.5)
Educational Status				
None/Kindergarten	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Primary School (Grades 1-6)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Lower Secondary School (Grades 7-9)	3 (75.0)	0 (0.0)	0 (0.0)	1 (25.0)
Upper Secondary School (Grades 10-12)	49 (75.4)	4 (6.2)	5 (7.7)	7 (10.8)
College	140 (76.9)	11 (6.0)	16 (8.8)	15 (8.2)
University/Bachelor	157 (71.4)	15 (6.8)	28 (12.7)	20 (9.1)
University/Master or PhD	88 (79.3)	7 (6.3)	11 (9.9)	5 (4.5)
Occupational Status				
Unemployed	32 (64)	1 (2.0)	7 (14.0)	10 (20.0)
Student	22 (71.0)	2 (6.5)	2 (6.5)	5 (16.1)
Employed	331 (74.7)	33 (7.4)	48 (10.8)	31 (7.0)
Homemaker	14 (77.8)	0 (0.0)	2 (11.1)	2 (11.1)
Retired	39 (92.9)	1 (2.4)	1 (2.4)	1 (2.4)
Chronic Illness				
General (Any)	84 (71.2)	12 (10.2)	11 (9.3)	11 (9.3)
Moderate to severe asthma	26 (61.9)	5 (11.9)	2 (4.8)	9 (21.4)
Other lung disease	7 (70.0)	1 (10.0)	1 (10.0)	1 (10.0)
Cardiovascular disease	12 (57.1)	1 (4.8)	4 (19.0)	4 (19.0)
HIV	2 (66.7)	1 (33.3)	0 (0.0)	0 (0.0)

Aim 4: SCBI-RQ and other reported Self-Care Behaviors

Frequencies of engagement in self-care behaviors are presented in Table 13. Mean score on the SCBI-RQ was 30.8 (± 10), with the highest possible score being 57. When asked how helpful engagement in self-care behaviors had been, 134 (22.9%) indicated they were "Very helpful," 280 (47.9%) indicated they were "Somewhat helpful," 131 (22.4%) were "Neutral," 28 (4.8%) indicated they were "Not very helpful," and 11 (1.9%) indicated they were "Not helpful at all."

Table 13. Engagement in Self-Care Behaviors Over the Past Month

Self-Care Behavior	**n (%)**
Virtually connect with others you enjoy	
Never	49 (8.4)
Rarely	112 (19.2)
Occasionally	283 (48.5)
Frequently	140 (24.0)
Maintain deep interpersonal relationships	
Never	40 (6.8)
Rarely	122 (20.9)
Occasionally	247 (42.3)
Frequently	175 (30.0)
Stay in contact with important people	
Never	28 (4.8)
Rarely	85 (14.6)
Occasionally	248 (42.5)
Frequently	223 (38.2)
Seek out projects that are exciting or rewarding	
Never	67 (11.5)
Rarely	166 (28.4)
Occasionally	248 (42.5)
Frequently	103 (17.6)
Take time to chat with peers	
Never	44 (7.5)
Rarely	140 (24.0)
Occasionally	276 (47.3)
Frequently	124 (21.2)
Allow yourself to laugh	
Never	20 (3.4)

Rarely	70 (12.0)
Occasionally	251 (43.0)
Frequently	243 (41.6)
Quiet time to complete tasks	
Never	22 (3.8)
Rarely	83 (14.2)
Occasionally	269 (46.1)
Frequently	210 (36.0)
Seek out comforting activities	
Never	23 (3.9)
Rarely	92 (15.8)
Occasionally	269 (46.1)
Frequently	200 (34.2)
Be open to not knowing	
Never	90 (15.4)
Rarely	163 (27.9)
Occasionally	212 (36.3)
Frequently	119 (20.4)
Eat healthy	
Never	31 (5.3)
Rarely	133 (22.8)
Occasionally	254 (43.5)
Frequently	166 (28.4)
Exercise	
Never	59 (10.1)
Rarely	139 (23.8)
Occasionally	205 (35.1)
Frequently	181 (31.0)
Spend time in nature	
Never	91 (15.6)
Rarely	162 (27.7)
Occasionally	206 (35.3)
Frequently	125 (21.4)
Medical care	
Never	236 (40.4)
Rarely	184 (31.5)
Occasionally	115 (19.7)
Frequently	49 (8.4)
Take breaks from virtual work, class, or similar obligations	
Never	71 (12.2)
Rarely	157 (26.9)
Occasionally	255 (43.7)
Frequently	101 (17.3)
Pray	

Never	238 (40.8)
Rarely	105 (18.0)
Occasionally	116 (19.9)
Frequently	125 (21.4)
Meditate	
Never	255 (43.7)
Rarely	128 (21.9)
Occasionally	122 (20.9)
Frequently	79 (13.5)
Connect with spirituality	
Never	230 (39.4)
Rarely	115 (19.7)
Occasionally	141 (24.1)
Frequently	98 (16.8)
Contribute to causes	
Never	247 (42.3)
Rarely	182 (31.2)
Occasionally	115 (19.7)
Frequently	40 (6.8)
Advocate	
Never	297 (50.9)
Rarely	149 (25.5)
Occasionally	105 (18.0)
Frequently	33 (5.7)

Qualitative data was collected related to other self-care activities. A brief review of the data elicited 52 variables or other self-care behaviors. Two researchers independently coded the data. Initial comparisons indicated that researchers were in agreement on 546/581 (94%) responses. After these initial comparisons, researchers reviewed and discussed items on which they disagreed to ensure appropriate coding. The final list of variables and frequencies are provided in Table 14.

Table 14. Other Self Care Behaviors Reported During Quarantine

Self-Care Behavior	**Frequency**
Nothing (e.g. blank; none; n/a)	180 (30.8%)
Walking	48 (8.2%)
Home Spa Day (e.g. nails, facials)	12 (2.1%)
Watch news	2 (.3%)
Learning about COVID	2 (.3%)
Work/Studying	33 (5.7%)
Keeping mind busy	9 (1.5%)
Exercise (e.g. running; fitness training)	53 (9.1%)

Pets (e.g. dogs; cats; chickens)	27 (4.6%)
Cleaning	16 (2.7%)
Writing (e.g. journaling; music)	14 (2.4%)
Yard work/Gardening	40 (6.8%)
Precautionary Behaviors (e.g. washing hands; sanitizing; avoiding people; staying home)	43 (7.4%)
Video games	23 (3.9%)
Arts and Crafts	19 (3.3%)
Reading	51 (8.7%)
Solitary Activities (e.g. puzzles; LEGO; sewing/knitting; model trains)	24 (4.1%)
Watching TV/Streaming (e.g. Netflix; Hulu)	40 (6.8%)
Relaxing	13 (2.2%)
Learning new skills/hobbies/language	7 (1.2%)
Hot baths/showers	8 (1.4%)
Eating well/healthier	25 (4.3%)
Cooking	29 (5%)
Sleep (e.g. sleeping in; sleeping more)	19 (3.3%)
Self-Soothing/Positive Thoughts (e.g. singing/telling everything is okay)	22 (3.8%)
Listening to music	12 (2.1%)
Dancing	3 (.5%)
Being Productive	2 (.3%)
Family/Spouse/Friend Time (in person)	37 (6.3%)
Alcohol	4 (.7%)
Read bible/pray	4 (.7%)
Time outdoors	33 (5.7%)
Meditation	7 (1.2%)
Yoga/Stretching	12 (2.1%)
Exploring (e.g. short trips; travel)	5 (.9%)
New ways to make money	1 (.2%)
Routine/Keep normal schedule	12 (2.1%)
Sex (e.g. hooking up; sex; masturbation)	3 (.5%)
Marijuana	5 (.9%)
Tobacco	1 (.2%)
Home Repairs/Projects	12 (2.1%)
Online Shopping	1 (.2%)
Me-Time	7 (1.2%)
Avoiding News	7 (1.2%)
Teaching (e.g. children; grandchildren)	2 (.3%)
Caring for others	9 (1.5%)
Planning future activities (e.g. road trips)	1 (.2%)
Recovering from surgery	1 (.2%)
Avoiding thoughts of COVID (e.g. worry about family becoming sick)	6 (1.0%)
Social Media Events	1 (.2%)
Virtually Connecting with loved ones/friends	14 (2.4%)
Miscellaneous/Nonsensical Responses	8 (1.4%)

Aim 5. A Common-Sense Model of COVID-19

Measures

In order to efficiently test the applicability of the Common-Sense Model in understanding responses to COVID-19, different measures were used to represent Cognitive Representation, Emotional Representation, precautionary and self-care behavioral engagement, and perceived helpfulness of behavioral changes.

Cognitive Representation. In order to establish a measure of cognitive representation of COVID-19, items from the NUSQC-Revised USA (Appendix 1) were entered into a CFA. Items included in this analysis were hypothesized to represent the five core components of cognitive representation including identity, timeline, causes, consequences, control. The analysis included 37 items in total. Specifically, it included all items from Part B: Symptoms and physical health status excluding 5 and 17-21, as these items were discarded due to invalid responses or were related to behavior; in order to categorize item 1 from this section, responses were coded as either "no symptoms" or experiencing one or more symptoms over the past 14 days. Item 1 from Part C: Contact history, all items from Part D: Knowledge and beliefs about COVID-19, and items 13-18 from Part E: Precautionary measures in past 14 days were also included in this CFA. Hypothesized factors and associated items are presented in Table 15. Initially, in order to establish a measurement scale for each of the latent variables, a regression weight of 1 was set between each latent variable and one its indicator variables (Table 15). Results from the initial CFA are also provided in Table 15. In order to determine "fit" of the model, the comparative fit index (CFI) was considered. In this initial CFA, the CFI was calculated to be .484, suggesting poor fit.

Table 15. Initial CFA of Cognitive Representation Scales

Cognitive Representation	Unstandardized regression weight	Standardized regression weight
Identity		
Symptom experience in the past 14 days**	1.00	.360
Doctor visit in the past 14 days	.713	.413
Hospital visit in the past 14 days	.121	.202
Tested for COVID-19 in the past 14 days	.436	.412
Diagnosed with COVID-19	.154	.407
Quarantined by a Public Health Authority	.274	.146
Self-reported Health Status	2.100	.455
Chronic Illness	1.066	.409
Age over 65	.221	.126
Asthma	.576	.344
Lung Disease	.343	.408
CVD	.452	.374
Pregnant	.030	.038
HIV	.018	.038
Contact Specific (e.g., surface)	2.407	.299
Perceived likelihood of contracting	-1.908	-.307
Social Media Hours per day	.065	.025
Discrimination	-.231	-.137
Too much fuss	.936	.113
Causality		
Transmission via droplets**	1.00	.658
Transmission via contact with contaminated objects	1.107	.649
Airborne Transmission	1.072	.328
Satisfied with Information Available	-.039	-.006
Sources of Information	-.897	-.110
Controllability		
Medical Insurance	.000	.001
Confidence in doctor to diagnose	.000	-.002
Extra hours at home to avoid virus	.000	.000
Perceived control over contraction**	1.00	94.531
If diagnosed, perceived control to manage	.000	.001
Consequences		
Heard number of cases	1.613	.895
Heard number of deaths	1.506	.914
Heard number of recovered cases	1.519	.319
Perceived likelihood of surviving**	1.00	.075
Concern for family members contracting	.854	.080
Concern for children contracting	.770	.045
Timeline		
Timeline virus will pose a risk**	1.00	.030
If diagnosed, perception of how long virus will last	-4.415	-.104

** *regression weight set to 1.00*

A second CFA was conducted, using only indicator variables with AMOS calculated standardized regression loadings above .300 on each latent variable. These items are presented in Table 16. Notably, no items theorized to represent *Timeline* were retained in the model. Results of this new CFA are presented in Table 16. In this model, the CFI was calculated to be .814; while improved, it is slightly below the standard .95of acceptability, suggesting a misfit.

Table 16. Second CFA of Cognitive Representation Scales

Identity	**Standardized Regression Weight in Initial Model**	**Standardized Regression Weight in New Model**
Symptom experience in the past 14 days	.360	
Doctor visit in the past 14 days	.413	
Tested for COVID-19 in the past 14 days	.412	
Diagnosed with COVID-19	.407	
Self-reported Health Status	.455	
Chronic Illness	.409	
Asthma	.344	
Lung Disease	.408	
CVD	.374	
Perceived likelihood of contracting	-.307	
Causality		
Transmission via droplets	.658	
Transmission via Contact with contaminated Objects	.649	
Airborne Transmission	.328	
Controllability		
Control over Contraction	94.531	
Consequences		
Heard Number of Cases	.895	
Heard Number of Deaths	.914	
Heard Number Recovered Cases	.319	

Due to CFA results indicating a misfit of model based on theory, an exploratory factor analysis (EFA) was used to determine the number of components and items to be retained from this measure. The initial 37 items were entered into a principal components analysis with

varimax rotation. Preliminary analysis was set to identify components with an Eigenvalue greater than one. Results of this initial analysis yielded 13 components (Table 17).

Table 17. Preliminary PCA of Cognitive Representation Items

Components	Correlations
Component 1	
Doctor in the last 14 days	.513
Tested for COVID-19	.730
Diagnosed with COVID-19	.578
Quarantined by a public health authority	.508
Any Contact or Suspected Contact with Virus	.603
Timeline of Risk	-.359
Component 2	
Symptom experience in the last 14 days	.455
Self-Rated Health Status	.612
Chronic Illness	.715
Asthma	.594
Lung Disease	.443
Cardiovascular Disease	.392
Component 3	
Heard of Number of Cases	.879
Heard Number of Recovered Cases	.514
Heard Number of Deaths	.870
Component 4	
Perceived Likelihood of Contracting	.398
Concern for family members contracting	.775
Concerns for children contracting	.634
Too much “fuss” has been made	-.625
Component 5	
Confidence in Precautionary Measures to Prevent Contraction	.628
Perceived Control over Contraction	-.718
Component 6	
Transmission via Droplets	.760
Transmission via Contact with Contaminated Objects	.755
Airborne Transmission	.568
Component 7	
If diagnosed, control to manage	.714
If diagnosed, perceived time virus will last	.742
Component 8	
Hospital admission in the last 14 days	.599
Pregnant	.668

Component 9	
Satisfied with Available Information	.782
Confidence in Doctor to Diagnose COVID-19	.645
Component 10	
Perceived Discrimination due to the Virus	-.564
Extra hours spent at home to prevent spread	.660
Component 11	
Age over 65	.722
Source of Information	.439
Component 12	
HIV	.808
Component 13	
Medical Insurance	.636
Perceived Likelihood of Surviving	-.469

A second PCA was employed, with a specified extraction of 5 components, consistent with the core components of Cognitive Representation within the Common-Sense Model. After reviewing the results of this analysis, it was decided that variables with correlations of less than .300 would be excluded; excluded items included those related to age, pregnancy status, HIV status, perceived discrimination, and sources of information. The PCA was conducted again with these items removed to more clearly define the measure. Results of this final analysis are provided in Table 18.

Table 18. Cognitive Representation Components and Variable Correlations

Component or Variable	**Correlations**
Component 1: Identity Component	
Symptom experience in the last 14 days	.388
Doctor in the last 14 days	.594
Hospital in the last 14 days	.402
Tested for COVID-19	.685
Diagnosed with COVID-19	.563
Quarantined by a public health authority	.355
Asthma	.329
Lung Disease	.511
Cardiovascular Disease	.345
Any Contact or Suspected Contact with Virus	.539
Component 2: Causes	

Transmitted via droplets	.444
Transmitted via contact with contaminated objects	.484
Transmitted via airborne	.460
Self-rated Health Status	-.422
Chronic Illness	-.515
Social media hours per day seeking information	.500
If diagnosed, perceived control to manage	.538
If diagnosed, perceived time virus will last	.481
Component 3: Consequences	
Heard number of cases	.793
Heard number of deaths	.778
Heard number of recovered cases	.486
Perceived likelihood of surviving	.375
Component 4: Control	
Medical Insurance	-.327
Satisfaction with available information	.561
Confidence in doctor to diagnose	.681
Confidence in precautionary behaviors to prevent	.593
Perceived control over contraction	-.567
Perceived likelihood contracting	-.407
Component 5: Timeline	
Timeline think COVID presents risk for you	.431
Concern for family members contracting	-.719
Concerns for children contracting	-.534
Too much fuss has been made about risk	.640

Scores for each of the five components were calculated. The mean score on the Identity scale was .618 (SD = .982, min = 0, max = 9), with higher scores indicating symptom experience, medical care in the past 14 days, confirmed or suspected contact with the virus, and presence of a high-risk condition such as asthma, lung disease, or CVD. The mean score on the Causes scale was 4.319 (SD = 2.963, min = 0, max = 13), with higher scores indicating less knowledge related to transmission and course of virus, as well as worse self-rated health status and presence of chronic illness. The mean score on the Consequences scale was 3.640 (SD = 1.130, min = 0, max = 7), with higher scores indicating greater awareness of prevalence and

outcomes, as well as uncertainty or greater perceived likelihood of surviving. The mean score on the Control scale was 16.417 (SD = 2.918, min = 8, max = 23), with higher scores indicating presence of medical insurance, satisfaction with information available about the virus, greater confidence in the doctor to diagnose COVID, greater control over contraction, and uncertainty or lower perceived likelihood of contracting. The mean score on the Timeline scale was 9.926 (SD = 2.882, min = 1, max = 17), with higher scores indicating increased worry about family members and children contracting the virus before it is managed, belief that the virus will pose risk for greater amounts of time, and belief that there has not been "too much fuss" made about the virus.

Emotional Representation. Emotional representation of COVID-19 was assessed via scores on the IES-R and the DASS-21, previously established and validated measures.

Engagement in Self-Care Behaviors. Engagement in self-care behaviors was assessed via score on the SCBI-RQ, excluding qualitative data due to lack of ability to quantify frequency of engagement in these behaviors. In order interpret the revised measure, PCA with varimax rotation was employed to assess the validity of the measure, assessing the number of components with Eigenvalue equal to or greater than 1.

Results of this analysis indicated five principal components (Table 19); in order to establish reliability of each component, Cronbach's alpha was employed: maintaining connection (α = .854), maintaining efficiency (α = .759), maintaining mindfulness/spirituality (α = .854), outreach (α = .787), and maintaining physical health (α = .789). In order to assess the utility of a total score from the SCBI-RQ, a second PCA was run, specifying extraction of one component. Results of the second PCA supported the validity of using a total score, as all variable correlations were greater than .448 (Table 19). Cronbach's alpha results supported the reliability

of a total score on this measure (α = .881). The highest possible total score on this measure is 57. In this sample, the mean score on this measure was 30.759 (SD ± 10.03), with the lowest score being 0.00 and the highest score being 57.00.

Table 19. SCBI-RQ Factor Structure

Initial PCA (Eigenvalue ≥1)	**Correlations**
Component 1: Maintaining Connection	
Virtually connect with others you enjoy	.760
Maintain deep interpersonal relationships	.800
Stay in contact with important people	.800
Take time to chat with peers	.683
Component 2: Maintaining Efficiency	
Seek out projects that are exciting or rewarding	.542
Allow yourself to laugh	.520
Quiet time to complete tasks	.721
Seek out comforting activities	.696
Be open to not knowing	.635
Take breaks from virtual work, class, or similar obligations	.475
Component 3: Maintaining Mindfulness/Spirituality	
Pray	.872
Meditate	.698
Connect with spirituality	.870
Component 4: Maintaining Sense of Community	
Medical care	.716
Contribute to causes	.654
Advocate	.742
Component 5: Maintaining Physical Health	
Eat Healthy	.792
Exercise	.841
Spend time in nature	.713
Final PCA Extracting 1 Component for Total Score	**Correlations**
Virtually connect with others you enjoy	.551
Maintain deep interpersonal relationships	.561
Stay in contact with important people	.588
Seek out projects that are exciting or rewarding	.651
Take time to chat with peers	.659
Allow yourself to laugh	.569
Quiet time to complete tasks	.548
Seek out comforting activities	.574
Be open to not knowing	.448
Eat healthy	.594
Exercise	.602

Spend time in nature	.612
Medical care	.536
Take breaks from virtual work, class, or similar obligations	.495
Pray	.475
Meditate	.595
Connect with spirituality	.599
Contribute to causes	.571
Advocate	.552

Engagement in Precautionary Behaviors. Precautionary behavior engagement was assessed using individual items from the NUSCQ-Revised USA, 1-11 from Part E: Precautionary measures in past 14 days.

Appraisals of Helpfulness. Appraisals of helpfulness were assessed using individual items including item 12 from the NUSCQ Part E: Precautionary measures in the past 14 days, and item 21 from the SCBI-RQ.

Analysis of The Model

Predictability of Cognitive Representation and Emotional Representation. Simple linear regression analyses were run to determine if Cognitive Representation scales predicted Emotional Representation (IES-R, DASS-21 Stress, Anxiety, Depression, and Total Scores). Results of these analyses are provided in Table 20. Notably, all Cognitive Representation scales significantly predicted Emotional Representation scales, with the exception on Timeline which only significantly predicted IES-R scores.

Table 20. Cognitive Representation and Emotional Representation

	Regression Equation	**R**	**p value**
Identity Scale			
IES-R	19.120 + 4.971 (IES-R)	.264	≤ .001**
DASS-21 Stress	7.673 + 2.601 (DASS-21 Stress)	.263	≤ .001**
DASS-21 Anxiety	4.036 + 2.689 (DASS-21 Anxiety)	.309	≤ .001**
DASS-21 Depression	6.800 + 2.473 (DASS-21 Depression)	.238	≤ .001**
DASS-21 Total Score	9.255 + 3.882 (DASS-21 Total Score)	.288	≤ .001**
Cause Scale			

IES-R	13.841 + 1.639 (IES-R)	.266	≤ .001**
DASS-21 Stress	5.719 + .730 (DASS-21 Stress)	.226	≤ .001**
DASS-21 Anxiety	1.631 + .869 (DASS-21 Anxiety)	.311	≤ .001**
DASS-21 Depression	3.968 + .905 (DASS-21 Depression)	.267	≤ .001**
DASS-21 Total	5.659 + 1.253 (DASS-21 Total Score)	.286	≤ .001**
Consequences Scale			
IES-R	13.927 + 2.271 (IES-R)	.139	.001*
DASS-21 Stress	5.912 + .925 (DASS-21 Stress)	.108	.009*
DASS-21 Anxiety	2.351 + .920 (DASS-21 Anxiety)	.122	.003*
DASS-21 Depression	5.106 + .885 (DASS-21 Depression)	.098	.018*
DASS-21 Total	6.684 + 1.365 (DASS-21 Total)	.117	.005*
Control Scale			
IES-R	47.573 – 1.546 (IES-R)	.241	≤ .001**
DASS-21 Stress	26.890 – 1.065 (DASS-21 Stress)	.315	≤ .001**
DASS-21 Anxiety	19.847 - .857 (DASS-21 Anxiety)	.288	≤ .001**
DASS-21 Depression	25.577 – 1.059 (DASS-21 Depression)	.304	≤ .001**
DASS-21 Total	36.156 – 1.490 (DASS-21 Total)	.324	≤ .001**
Timeline Scale			
IES-R	16.002 + .624 (IES-R)	.097	.019*
DASS-21 Stress	7.176 + .212 (DASS-21 Stress)	.063	.129
DASS-21 Anxiety	5.377 + .032 (DASS-21 Anxiety)	.011	.792
DASS-21 Depression	6.726 + .161 (DASS-21 Depression)	.046	.270
DASS-21 Total	9.639 + .203 (DASS-21 Total)	.203	.286

Cognitive Representation and Precautionary Behaviors. Simple linear regression analyses were run to determine if Cognitive Representation scales predicted engagement in precautionary behaviors. Results are presented in Table 21. Notably, the Identity scale did not significantly predict frequency of engagement in any precautionary behaviors. The Cause scale predicted frequency of engagement in only two precautionary behaviors, the Consequences and Control scales predicted frequency of engagement in almost all precautionary behaviors, and the Timeline scale predicted frequency of engagement in all precautionary behaviors.

Table 21. Cognitive Representation and Precautionary Behaviors.

Cognitive Scale	Regression Equation	R	p value
Identity Scale	Covering mouth when coughing and sneezing = 3.607 + .024 (Identity) Avoid sharing utensils = 3.517 + .008 (Identity) Washing hands with soap and water = 3.666 + .011 (Identity)	.028 .008 .014	.496 .850 .737

	Washing hands after coughing, rubbing nose or sneezing = 3.289 - .022 (Identity)	.021	.615
	Wearing mask regardless of presence or absence of symptoms = 2.694 + .118 (Identity)	.078	.060
	Washing hands after touching contaminated objects = 3.537 + .049 (Identity)	.056	.177
	Cleaning and disinfecting surfaces in your home = 3.175 + .038 (Identity)	.036	.384
	Using hand sanitizer, with 60% alcohol = 3.037 - .021 (Identity)	.016	.703
	Social Distancing = 3.580 + .003 (Identity)	.004	.925
	Staying home, aside from essential purposes = 3.567 + .050 (Identity)	.060	.146
	Avoid touching eyes, nose, and mouth = 3.063 - .021 (Identity)	.020	.628
Cause Scale	Covering mouth when coughing and sneezing = 3.832 - .047 (Cause)	.170	≤.001**
	Avoid sharing utensils = 3.748 - .043 (Cause)	.137	.003*
	Washing hands with soap and water = 3.745 - .016 (Cause)	.065	.154
	Washing hands after coughing, rubbing nose or sneezing = 3.330 - .012 (Cause)	.033	.477
	Wearing mask regardless of presence or absence of symptoms = 2.619 + .029 (Cause)	.058	.207
	Washing hands after touching contaminated objects = 3.603 - ,014 (Cause)	.047	.305
	Cleaning and disinfecting surfaces in your home = 3.176 + .002 (Cause)	.006	.897
	Using hand sanitizer, with 60% alcohol = 2.938 + .027 (Cause)	.061	.180
	Social Distancing = 3.649 - .018 (Cause)	.064	.166
	Staying home, aside from essential purposes = 3.613 - .004 (Cause)	.015	.746
	Avoid touching eyes, nose, and mouth = 3.059 + .000 (Cause)	.001	.979
Consequences Scale	Covering mouth when coughing and sneezing = 3.526 + .026 (Consequence)	.035	.396
	Avoid sharing utensils = 3.724 - .056 (Consequence)	.063	.127
	Washing hands with soap and water = 3.339 + .092 (Consequence)	.136	.001*
	Washing hands after coughing, rubbing nose or sneezing = 2.880 + .109 (Consequence)	.117	.005*
	Wearing mask regardless of presence or absence of symptoms = 1.872 + .246 (Consequence)	.188	≤ .001**
	Washing hands after touching contaminated objects = 3.146 + .116 (Consequence)	.153	≤ .001**
	Cleaning and disinfecting surfaces in your home = 2.618 + .159 (Consequence)	.175	≤ .001
	Using hand sanitizer, with 60% alcohol = 2.461 + .155 (Consequence)	.135	.001*
	Social Distancing = 3.278 + .084 (Consequence)	.115	.005*
	Staying home, aside from essential purposes = 3.346 + .069 (Consequence)	.095	.021*
	Avoid touching eyes, nose, and mouth = 2.568 + .132	.144	≤ .001**
Control Scale	Covering mouth when coughing and sneezing = 3.172 + .032 (Control)	.124	.005*
	Avoid sharing utensils = 2.861 + .041 (Control)	.123	.005*
	Washing hands with soap and water = 3.338 + .023 (Control)	.099	.023*
	Washing hands after coughing, rubbing nose or sneezing = 2.533 + .049 (Control)	.146	.001*
	Wearing mask regardless of presence or absence of symptoms = 2.181 + .039 (Control)	.078	.075
	Washing hands after touching contaminated objects = 3.143 + .029 (Control)	.110	.012*
	Cleaning and disinfecting surfaces in your home = 2.987 + .016 (Control)	.048	.275
	Using hand sanitizer, with 60% alcohol = 2.283 + .049 (Control)	.116	.008*
	Social Distancing = 2.807 + .049 (Control)	.187	≤ .001**
	Staying home, aside from essential purposes = 3.026 + .037 (Control)	.147	.001*
	Avoid touching eyes, nose, and mouth = 2.574 + .033 (Control)	.097	.026*
Timeline Scale	Covering mouth when coughing and sneezing = 3.120 + .051 (Timeline)	.173	≤ .001**
	Avoid sharing utensils = 3.013 + .051 (Timeline)	.149	≤ .001**
	Washing hands with soap and water = 3.056 + .062 (Timeline)	.235	≤ .001**
	Washing hands after coughing, rubbing nose or sneezing = 2.270 + .101 (Timeline)	.278	≤ .001**

	Wearing mask regardless of presence or absence of symptoms = 1.349 + .143 (Timeline)	.278	≤ .001**
	Washing hands after touching contaminated objects = 2.875 + .070 (Timeline)	.234	≤ .001**
	Cleaning and disinfecting surfaces in your home = 2.306 + .090 (Timeline)	.252	≤ .001**
	Using hand sanitizer, with 60% alcohol = 2.003 + .103 (Timeline)	.230	≤ .001**
	Social Distancing = 2.658 + .093 (Timeline)	.326	≤ .001**
	Staying home, aside from essential purposes = 2.799 + .080 (Timeline)	.283	≤ .001**
	Avoid touching eyes, nose, and mouth = 1.992 + .107 (Timeline)	.296	≤ .001**

Emotional Representation and Precautionary Behaviors. Initial linear regression analyses were run to determine if Emotional Representation (IES-R, DASS-21 Stress, Anxiety, Depression, and Total Scores) predicted engagement in precautionary behaviors. Results are detailed in Table 22.

Table 22. Emotional Representation and Precautionary Behaviors.

Emotional Representation	Frequency Precautionary Behavior = a + b (x)	R	p
	Covering mouth when coughing and sneezing =		
IES-R	3.744 - .006 (IES-R)	.121	.003*
DASS-21 Stress	3.742 - .013 (DASS-21 Stress)	.149	≤ .001**
DASS-21Anxiety	3.720 - .017 (DASS-21 Anxiety)	.176	≤ .001**
DASS-21 Depression	3.719 - .012 (DASS-21 Depression)	.141	.001*
DASS-21 Total	3.745 - .011 (DASS-21 Total)	.166	≤ .001**
	Avoid sharing utensils =		
IES-R	3.660 - .006 (IES-R)	.116	.005*
DASS-21 Stress	3.629 – .012 (DASS-21 Stress)	.113	.006*
DASS-21 Anxiety	3.657 - .024 (DASS-21 Anxiety)	.203	≤ .001**
DASS-21 Depression	3.643 - .014 (DASS-21 Depression)	.149	≤ .001**
DASS-21 Total	3.66 - .012 (DASS-21 Total)	.164	≤ .001**
	Washing hands with soap and water =		
IES-R	3.698 - .001 (IES-R)	.028	.505
DASS-21 Stress	3.713 - .004 (DASS-21 Stress)	.055	.188
DASS-21 Anxiety	3.715 - .007 (DASS-21 Anxiety)	.082	.047*
DASS-21 Depression	3.714 - .005 (DASS-21 Depression)	.065	.115
DASS-21 Total	3.721 - .004 (DASS-21 Total)	.072	.084
	Washing hands immediately after coughing, rubbing nose or sneezing =		
IES-R	3.234 + .002 (IES-R)	.033	.429
DASS-21 Stress	3.330 - .006 (DASS-21 Stress)	.055	.188
DASS-21 Anxiety	3.295 - .003 (DASS-21 Anxiety)	.027	.508
DASS-21 Depression	3.350 - .009 (DASS-21 Depression)	.086	.038*
DASS-21 Total	3.333 - .005 (DASS-21 Total)	.062	.134

	Wearing mask regardless of presence or absence of symptoms =		
IES-R	2.534 + .011 (IES-R)	.131	.001*
DASS-21 Stress	2.751 + .002 (DASS-21 Stress)	.012	.778
DASS-21 Anxiety	2.710 + .010 (DASS-21 Anxiety)	.057	.167
DASS-21 Depression	2.765 + .000 (DASS-21 Depression)	.002	.959
DASS-21 Total	2.736 + .003 (DASS-21 Total)	.024	.569
	Washing hands after touching contaminated objects =		
IES-R	3.597 - .001 (IES-R)	.029	.484
DASS-21 Stress	3.628 - .006 (DASS-21 Stress)	.063	.128
DASS-21 Anxiety	3.620 - .008 (DASS-21 Anxiety)	.076	.066
DASS-21 Depression	3.638 - .009 (DASS-21 Depression)	.102	.014*
DASS-21 Total	3.632 - .006 (DASS-21 Total)	.087	.036*
	Cleaning and disinfecting surfaces in your home =		
IES-R	3.095 + .005 (IES-R)	.083	.044*
DASS-21 Stress	3.191 + .001 (DASS-21 Stress)	.007	.864
DASS-21 Anxiety	3.184 + .003 (DASS-21 Anxiety)	.021	.609
DASS-21 Depression	3.242 - .005 (DASS-21 Depression)	.052	.210
DASS-21 Total	3.208 - .001 (DASS-21 Total)	.011	.799
	Using hand sanitizer, with 60% alcohol =		
IES-R	2.916 + .005 (IES-R)	.070	.093
DASS-21 Stress	3.017 + .001 (DASS-21 Stress)	.006	.884
DASS-21 Anxiety	2.996 + .005 (DASS-21 Anxiety)	.032	.439
DASS-21 Depression	3.082 - .007 (DASS-21 Depression)	.055	.185
DASS-21 Total	3.034 - .001 (DASS-21 Total)	.009	.836
	Social distancing =		
IES-R	3.672 - .004 (IES-R)	.091	.028*
DASS-21 Stress	3.657 - .008 (DASS-21 Stress)	.095	.021*
DASS-21 Anxiety	3.649 - .012 (DASS-21 Anxiety)	.122	.003*
DASS-21 Depression	3.668 - .010 (DASS-21 Depression)	.127	.002*
DASS-21 Total	3.672 - .008 (DASS-21 Total)	.123	.003*
	Staying home, aside from essential purposes =		
IES-R	3.672 - .003 (IES-R)	.075	.070
DASS-21 Stress	3.641 - .005 (DASS-21 Stress)	.055	.185
DASS-21 Anxiety	3.641 – .008 (DASS-21 Anxiety)	.079	.055
DASS-21 Depression	3.646 - .006 (DASS-21 Depression)	.072	.082
DASS-21 Total	3.651 - .005 (DASS-21 Total)	.074	.076
	Avoid touching eyes, nose, and mouth =		
IES-R	2.979 + .003 (IES-R)	.057	.172
DASS-21 Stress	3.077 - .003 (DASS-21 Stress)	.028	.503
DASS-21 Anxiety	3.003 + .003 (DASS-21 Anxiety)	.024	.567
DASS-21 Depression	3.135 - .010 (DASS-21 Depression)	.101	.015*
DASS-21 Total	3.807 - .003 (DASS-21 Total)	.041	.320

Cognitive Representation and Self-Care Behaviors. Initial linear regression analyses were run to determine if Cognitive Representation variables predicted self-care behavior engagement (SCBI-RQ Total Scores). Results are detailed in Table 23. All Cognitive Representation scales significantly predicted self-care behavior engagement except Cause and Timeline scales.

Table 23. Cognitive Representation and Self-Care Behavior

Cognitive Representations	**Regression Equation**	**R**	**p value**
Identity Scale	SCBI-RQ = 30.161 + .967 (Identity)	.095	.022*
Cause Scale	SCBI-RQ = 31.307 - .177 (Cause)	.051	.263
Consequences Scale	SCBI-RQ = 27.652 + .853 (Consequence)	.096	.020*
Control Scale	SCBI-RQ = 18.952 + .753 (Control)	.224	≤ .001**
Timeline Scale	SCBI-RQ = 28.360 + .242 (Timeline)	.069	.094

Emotional Representation and Self-Care Behaviors. Regression analyses between Emotional Representation measures (IES-R, DASS-21) and self-care behavior engagement (SCBI-RQ) are detailed in Table 24. DASS-21 Stress, DASS-21 Depression, and DASS-21 Total Scores significantly predicted SCBI-RQ total scores. Participants who scored higher on these measures reported decreased self-care behavior engagement.

Table 24. Emotional Representation and Self-Care Behavior Engagement.

Emotional Representation	**SCBI-RQ Score = a + b (x)**	**R**	***p***
IES-R Score	30.251 + .023 (IES-R Score)	.042	.309
DASS-21 Stress	31.768 - .099 (DASS-21 Stress)	.096	.020*
DASS-21 Anxiety	30.765 - .001 (DASS-21 Anxiety)	.001	.981
DASS-21 Depression	32.081 - .159 (DASS-21 Depression)	.161	≤ .001**
DASS-21 Total	32.621 - .074 (DASS-21 Total)	.098	.018*

Precautionary Behavior Engagement and Perceived Helpfulness. Regression analyses between precautionary behavior engagement and perceived helpfulness of engagement in these behaviors are detailed in Table 25. Many of the independent variables were dichotomous or

ordinal, so dummy variables were used to create regression equations and t coefficients to determine significance of the regressions.

Table 25. Precautionary Behaviors and Helpfulness.

Precautionary Behavior	Mean engagement with perceived helpfulness a + b (x)	Increase in mean if perceived helpful	Coefficient t	p
Covering mouth when coughing and sneezing	2.009 + .286 (0/1)	.286	7.163	≤.001**
Avoid sharing utensils	2.569 + .125 (0/1)	.125	3.709	≤.001**
Washing hands after touching contaminated objects	2.110 + .245 (0/1)	.245	5.658	≤.001**
Washing hands immediately after coughing, rubbing nose or sneezing	2.336 + .206 (0/1)	.206	6.614	≤.001**
Wearing mask regardless of presence or absence of symptoms	2.785 + .082 (0/1)	.082	3.604	≤.001**
Washing hands after touching contaminated objects	2.137 + .245 (0/1)	.245	6.395	≤.001**
Cleaning and disinfecting surfaces in your home	2.438 + .179 (0/1)	.179	5.585	≤.001**
Using hand sanitizer, with 60% alcohol	2.583 + .141 (0/1)	.141	5.507	≤.001**
Social Distancing	1.824 + .331 (0/1)	.331	8.518	≤.001**
Staying home, aside from essential purposes	1.989 + .284 (0/1)	.284	7.168	≤.001**
Avoid touching eyes, nose, and mouth	2.424 + .192 (0/1)	.192	6.070	≤.001**

Self-Care Behaviors and Helpfulness. Simple regression analysis was run to assess the predictability of perceived helpfulness of self-care from self-care engagement. Results of this analysis indicated that greater engagement in self-care per the SCBI significantly predicted

perceived helpfulness [Perceived helpfulness self-care = 1.573 + .042(0/1), $t = 12.775$, $p \leq .001$, $R^2 = .219$].

Helpfulness of Precautionary Behaviors and Helpfulness of Self-Care Behaviors. Simple regression analysis was run to assess the predictability between perceived helpfulness of precautionary behaviors and perceived helpfulness of self-care engagement. Results of this analysis indicated that perceived helpfulness of engagement in precautionary behaviors significantly predicted perceived helpfulness of self-care engagement [Perceived helpfulness self-care = 1.696 + .384 (0/1), $t = 9.091$, $p \leq 001$, $R^2 = .124$].

Multiple Regression Analyses

After reviewing initial analyses of the relationships between individual cognitive representation scales, emotional representation scales, and precautionary and self-care behaviors, multiple regression analyses were conducted to more accurately describe the model. Each precautionary behavior was entered into multiple regression analyses, first with just Cognitive Representation Scales, then with Emotional Representation Scales, and finally with the full model including both Cognitive Representation and Emotional Representation Scales.

Covering mouth when coughing and sneezing. 8% of variance in frequency of engagement in this precautionary behavior was explained by the cognitive representation model, $F(4, 471) = 10.269$, $p \leq .001$, $R^2 = .080$, with only Cause and Timeline significantly contributing. 2.8% of variance in frequency of engagement in this precautionary behavior was explained by the emotional representation model, $F(2, 583) = 8.227$, $p \leq .001$, $R^2 = .028$, with only DASS Total score contributing significantly. Finally, 8% of variance in frequency of engagement in this precautionary behavior was explained by the full model, $F(7, 425) = 5.221$, $p \leq .001$, $R^2 = .080$, with only Cause, Timeline, and DASS- Total contributing significantly.

Avoiding the sharing of utensils. 4% of variance in frequency of engagement in this precautionary behavior was explained by the cognitive representation model, $F(5, 425) = 3.484$, $p = .004$, $R^2 = .040$, with only Cause and Timeline contributing significantly. 2.7% of variance was explained by the emotional representation model, $F(2, 583) = 8.103$, $p \leq .001$, $R^2 = .027$, with only DASS-Total contributing significantly. Finally, 5.4% of variance was explained by the full model, $F(7, 425) = 3.441$, $p = .001$, $R^2 = .054$, with only Cause, Timeline, and DASS-Total contributing significantly.

Washing hands with soap and water. 6.7% of variance in frequency of engagement in this precautionary behavior was explained by the cognitive representation model, $F(5, 425) = 6.603$, $p \leq .001$, $R^2 = .067$, with only Consequence and Timeline contributing significantly. The emotional representation model was not significantly associated with washing hands with soap and water. However, interestingly, 7.5% of variance was explained by the full model, $F(5, 425) = 4.830$, $p \leq .001$, $R^2 = .075$, with only Consequence and Timeline contributing significantly and DASS-Total contributing at $p = .087$.

Washing hands immediately after coughing, rubbing nose, or sneezing. 9.9% of variance in frequency of engagement in this behavior was explained by the cognitive representation model, $F(5, 425) = 9.272$, $p \leq .001$, $R^2 = .099$, with Consequence, Control, and Timeline contributing significantly. Only 1.8% of variance was explained by the emotional representation model, $F(2, 583) = 5.371$, $p = .005$, $R^2 = .018$, with both IES-R and DASS-Total contributing significantly. Finally, 11.2% of variance was explained by the full model, $F(7, 425) = 7.503$, $p \leq .001$, $R^2 = .112$, with Control, Timeline, DASS-21 Total, and IES-R contributing significantly.

Wearing a mask, regardless of presence or absence of symptoms. 10.7% of variance in frequency of engagement in this precautionary behavior was explained by the cognitive

representation model, $F(5,425) = 10.062$, $p \leq .001$, $R^2 = .107$, with Consequence, Control and Timeline Contributing significantly. 3% of variance was explained by the emotional representation model, $F(2, 583) = 8.977$, $p \leq .001$, $R^2 = .030$, with both IES-R and DASS-21 Total contributing significantly. 12.1% of variance was explained by the full model, $F(7, 425) = 8.252$, $p \leq .001$, $R^2 = .121$, with Consequence, Control, Timeline, IES-R, and DASS-21 Total contributing significantly.

Washing hands after touching contaminated objects. 7.7% of variance in frequency of engagement in this precautionary behavior was explained by the cognitive representation model, $F(5, 425) = 6.970$, $p \leq .001$, $R^2 = .077$, with Consequence, Control, and Timeline Scales contributing significantly.1.1% of variance was explained by the emotional representation model, $F(2, 583) = 3.094$, $p = .046$, $R^2 = .011$, with only DASS-21 Total score contributing significantly. 8.5% of variance was explained by the full model, $F(7,425) = 5.581$, $p \leq .001$, $R^2 = .085$, with Consequence, Control, and Timeline contributing significantly. Notably, this is an increase in variance from cognitive representation model alone, suggesting some contribution from emotional representation, however neither emotional representation scale contributing significantly (i.e., DASS-21 Total score p = .060).

Cleaning and disinfecting surfaces in your home. 9.4% of variance in frequency of engagement in this precautionary behavior was explained by the cognitive model, $F(5, 425) = 8.736$, $p \leq .001$, $R^2 = .094$, with only Consequence and Timeline contributing significantly. 1.9% of variance was explained by the emotional representation, $F(2, 583) = 5.664$, $p = .004$, $R^2 = .019$, with both IES-R and DASS-21 total contributing significantly. 10.8% of variance was explained by the full model, $F(7, 425) = 7.216$, $p \leq .001$, $R^2 = .108$, with Consequence, Timeline, IES-R, and DASS-21 Total scores contributing significantly.

Using hand sanitizer, with 60% alcohol. 10% of variance in frequency of engagement in this precautionary behavior was explained by the cognitive representation model, $F(5,425) = 9.364$, $p \leq .001$, $R^2 = .100$, with Consequence, Control, and Timeline contributing significantly. 1.3% of variance was explained by the emotional representation model, $F(2, 583) = 3.904$, $p = .021$, $R^2 = .013$, with both IES-R and DASS-21 Total. 11.2% of variance was explained by the full model, $F(7, 425)$, $p \leq .001$, $R^2 = .112$, with Control, Timeline, IES-R, and DASS-21 Total.

Social distancing, as able. 19.7% of variance in frequency of engagement in this behavior is explained by the Cognitive representation model, F (5, 425) = 20.547, p ≤ .001, R2 = .197, with Consequence, Control, and Timeline contributing significantly. 1.5% of variance was explained by the emotional representation model, $F (2, 583) = 4.412$, $p = .012$, $R^2 = .015$, with only DASS-21 Total contributing significantly. 20.6% of variance was explained by the full model, $F(7, 425) = 15.526$, $p \leq .001$, $R^2 = .206$, with Consequence, Control, and Timeline contributing significantly.

Staying home, aside from essential purposes. 14% of variance in frequency of engagement in this precautionary behavior was explained by the cognitive representation model, $F(5, 425) = 13.693$, $p \leq .001$, $R^2 = .140$, with Consequence, Control, and Timeline contributing significantly. 0.6% of variance was explained by the emotional representation model, however, the results were not significant. 14.9% of variance was explained by the full model, $F(7, 425) = 10.415$, $p \leq .001$, $R^2 = .149$, with Consequence, Control, and Timeline contributing significantly.

Avoid rubbing eyes, nose, and mouth. 10.6% of variance in frequency of engagement in this precautionary behavior was explained by the cognitive representation model, $F(5, 425) = 9.993$, $p \leq .001$, $R^2 = .106$, with Consequence, Control, and Timeline contributing significantly. 1.9% of variance was explained by the emotional representation model, $F(2, 583) = 5.674$, $p =$

.004, R^2 = .019, with both IES-R and DASS-21 Total contributing significantly. 12.2% of variance was explained by the full model, $F(7, 425) = 8.271$, $p \leq .001$, R^2 = .122, with Consequence, Timeline, IES-R, and DASS-21 Total contributing significantly.

Self-care behavior. Related to self-care behavior engagement, 7.1% of variance was explained by the cognitive representation model, $F(5, 425) = 6.443$, $p \leq .001$, R^2 = .071, with Identity, Consequence, and Control contributing significantly. 4.0% of variance was explained by the emotional representation model, $F(2, 583) = 12.055$, $p \leq .001$, R^2 = .040, with IES-R and DASS-21 Total contributing significantly. 10.1% of variance was explained by the full model, F (7, 425) = 6.729, p ≤ .001, R2 = .101, with Identity, Consequence, Control, IES-R, and DASS-21 Total contributing significantly.

These results suggest that a full model, including both Cognitive and Emotional Representation components, best explains the variance in frequency of precautionary behavior engagement in most instances. Related to self-care behavior engagement, a full model, including both cognitive representation and emotional representation, was also best for explaining the most variance in behavior.

V. Conclusions

Discussion

The current study aimed to describe the early US citizen response to COVID-19, with particular attention to cognitive and emotional perceptions of the virus, and how these perceptions contribute to psychological function and engagement in precautionary and self-care behaviors. Leventhal's Common-Sense Model of Illness was applied, and preliminary support was found for using this model to describe the US citizen response to COVID-19. This information may be useful to control the current pandemic (i.e., vaccines) and adjustment to life post-pandemic, considering potential challenges including financial loss and stigma toward healthcare providers and Asian American citizens.

Overall, this data, collected in the very early stages of the pandemic (April 21-29, 2020), suggested normative cognitive, psychologic, and behavioral adjustment to COVID-19 for the majority of respondents. The majority of this sample was mostly female (52.9%), employed (75.9%), married (49.1%) or single (41.6%), American citizens reported being in good (52.9%) or very good health (27.4%), with no known contact with COVID-19 (91.6%). Interestingly, the majority of respondents reported feeling somewhat confident (52.9%) or very confident (27.6%) in their doctor's ability to diagnose COVID-19. The majority of respondents indicated that they "always" or "most of the time" engage in all CDC recommended precautionary behaviors, with the exception of mask wearing, which had the lowest rates of adherence. While inconsistencies in mask wearing are concerning and may reflect negative attitudes about masks, it is possible that mask wearing was influenced by inconsistent guidance from the CDC with regards to mask wearing at the onset of the pandemic. Most felt somewhat confident (55.8%) or very confident (25.9%) in precautionary behaviors to prevent the spread of COVID-19 and most reported

accurate knowledge of ways the virus can be spread, getting their information from the internet or TV and feeling satisfied overall with the information available to them.

Related to psychological function in response to COVID-19 and "stay-at-home" orders, most obtained scores in the normative range on the IES-R and DASS-21 subscales; 75.9% of IES-R scores were in the normative or mild psychological impact range, 64.4% of scores on the DASS-21 Depression range were in the normative range, 72.9% of DASS-21 Anxiety scores were in the normative range, and 75% of DASS-21 Stress scores were in the normative range. However, it is notable that 27.6% of individuals obtained scores in the moderate to severe range on the IES-R, suggesting high psychological impact of COVID-19 for these individuals. Additionally, 27% of participants obtained moderate to severe scores on the DASS-21 Depression scale, 23.3% obtained moderate to severe scores on the DASS-21 Anxiety scale, and 18.7% obtained moderate to severe scores on the DASS-21 Stress scale, suggesting that about 19-30% of individuals in the US may have been experiencing significant psychological distress during the early stages of the pandemic. Fortunately, results on the SCBI-RQ indicated that the majority of participants "occasionally" or "frequently" engage in some sort of self-care behaviors designed to decrease stress and distress. Other commonly reported self-care behaviors identified in the qualitative portion of this study, to be included in future development and assessment of the SCBI-RQ, included going to walks, home-spa days, reading, watching TV/streaming shows/movies, and spending time outdoors.

Overall, these results are consistent with more recent research on COVID-19 psychological and behavioral responses (Prati and Macini, 2021; Xiong et al., 2020). While most research to date on the psychological response to COVID-19 suggests psychological resiliency, there have been small but significant increases in anxiety and depression with COVID-19

outbreak and quarantine measures (Prati and Macini, 2021). Normative DASS-21 data for a nonclinical U.S. sample, in a pre-COVID-19 context, indicated average scores of 5.70, 3.99, 8.12, and 17.80 on the DASS-21 Depression, Anxiety, Stress, and Total scales, respectively (Sinclair, Siefert, Slavin-Mulford, Stein, Renna, & Blais, 2011). Normative DASS-21 data for an outpatient clinical U.S. sample, in a pre-COVID context, indicated average pre-treatment scores of 13.32, 9.09, and 15.01 on the DASS-21 Depression, Anxiety, and Stress scales, respectively. In the current study assessing psychological function within the context of early COVID-19 and quarantine, average scores were 8.3, 5.7, and 9.8 on the DASS-21 Depression, Anxiety, and Stress scales respectively, consistent with existing research suggesting slightly elevated psychological distress (Prati and Macini, 2021; Xiong et al., 2020).

While Wang and colleagues (2020) only reported an average total score on the DASS-21 (m = 20.16), this is similar but also slightly higher than normative pre-COVID U.S. data. Interestingly, considering categorical scores on these measures, this study suggests higher levels of depression and stress in the U.S. sample compared to the Chinese sample, but higher levels of anxiety in the Chinese sample compared to the U.S. sample. Frequencies of scores in the moderate to severe or extremely severe range were 16.5% (Wang et., 2020) versus 27.0% (current study) on the DASS-21 Depression Scale, 28.9% (Wang et al., 2020) versus 23.3% (current study) on the DASS-21 Anxiety Scale, and 13.9% (Wang et al., 2020) versus 18.7% (current study) on the DASS-21 Stress Scale.

While researchers are still working to describe differences in psychological response between groups, it is hypothesized that differences may be observed overtime between social groups, due to disparities in healthcare access and health outcomes (Prati and Macini, 2021; Xiong et al., 2020). One recent systematic review of the literature on responses to COVID-19

suggested relatively high levels of anxiety, depression, and psychological impact, with contributing factors including female gender, younger age, presence of chronic illness, and increased frequency of exposure to news and social media (Xiong et al., 2020). Other groups that have been identified as high risk for psychological distress and burnout are healthcare workers, with number of work hours, perceptions of support, and fear of infection predicting significantly predicting burnout (Giusti et al., 2020). Specific demographics of healthcare workers at higher risk for psychological distress and depersonalization were also identified and included female gender, being in contact with COVID-19 patients, working in the hospital, and being a nurse (Giusti et al., 2020). Another review paper discussing psychological impacts for the general public identified perceptions of inaccurate information from public health authorities as a risk factor for psychological distress, while also identifying a sense of community and social support as protective factors promoting psychological resilience (Serafini, Parmigiani, Amerio, Aguglia, & Amore, 2020). Our study adds to the current literature by further describing factors that may contribute to psychological distress or well-being in response to COVID-19 and quarantine measures. We also gained some information about perceptions of risk, perceptions of control with regards to contraction and management if contracted, confidence in medical providers, concern for loved ones, and beliefs about timeline of risk.

Common-Sense Model. Preliminary support for applying Leventhal's Common-Sense Model of Illness was obtained. When considered independently, all Cognitive Representation scales significantly predicted scores on all emotional representation scales, with the exception of the Timeline scale that only predicted traumatic stress. Specifically, persons who had higher scores on the Identity, Cause, and Consequences scales had higher scores on measures of trauma response, stress, anxiety, depression, and overall distress. This suggests individuals who

experienced physical symptoms characteristic of COVID-19, perceived themselves to be at higher risk, and were more attentive to information on prevalence and outcomes, had greater psychological distress. Interestingly, scores on the Control scale predicted lower scores on all emotional representation measures, suggesting that presence of medical insurance, satisfaction with available information, confidence in doctors, and greater perceived control over contraction were less distressed. Higher scores on the Timeline scale were predicted by greater scores on the IES-R scale, suggesting that people who believed the virus would persist for longer amounts of time and had greater worry about family and children, also had greater trauma responses. Again, at the time of the survey, the timeline of the pandemic was completely unknown and vaccines were not available.

Analysis of the role of Cognitive Representation in predicting precautionary behavior engagement yielded some interesting results as well. Notably, people with higher scores on the Cause, Consequences, and Timeline scales had greater frequency of engagement in all or most precautionary behaviors when cognitive representation scales were considered independently. Interestingly, when considered independently, only the Consequences scale and Timeline Scale predicted mask wearing, suggesting that people with more knowledge of outcomes and prevalence, higher perceived timeline of risk, and more concern for family members were more likely to wear their masks regularly.

Analysis of the role of Emotional Representation scales independently in predicting precautionary behavior engagement indicated that higher scores on all emotional distress measures predicted less frequent engagement in three behaviors – covering mouth when coughing and sneezing, avoidance of sharing utensils, and social distancing. While emotional representation did not seem to play a large role in predicting precautionary behavior engagement,

the trend was that people with higher emotional distress reported less frequent engagement in most precautionary behaviors.

Analysis of the role of Cognitive Representation and Emotional Representation scales independently in predicting self-care behavior engagement suggested that higher Identity scores, Consequence scores, and Control scores predicted greater engagement in self-care; higher scores on stress, depression, and overall psychological distress scales predicted less frequent engagement in self-care behaviors. This likely suggests that individuals with greater knowledge of the virus, their own risk, and perceived control, were those that had less distress and therefore, engaged in more self-care.

After considering scales independently, multiple regression analyses were conducted to evaluate the Common-Sense Model of COVID-19 as it applies to precautionary and self-care behavior engagement. Related to frequency of engagement in precautionary behaviors, the cognitive representation model was significant in explaining variance across all behaviors, with Control, Consequence, and Timeline most frequently providing significant contributions to the model. The emotional representation (IES-R and DASS-21 Total) model was also independently significant in explaining some, though less, variance in frequency of precautionary behavior engagement, for all but two precautionary behaviors. When entered into the full model, including both Cognitive and Emotional Representation components, variance explained increased for all but two precautionary behaviors. Interestingly, the DASS-21 was the Emotional Representation component that most frequently contributed significantly to the model. While IES-R contributed to some as well, it did not contribute to variance when DASS-21 Total did not also contribute.

This suggests that a full model, including both Cognitive and Emotional Representation components, best explains the variance in frequency of precautionary behavior engagement.

However, most variance can be explained considering only Cognitive Representation Scales. Perceptions of control, knowledge of COVID-19 outcomes, perceived timeline of risk, and concern for others, are aspects of cognitive representation that seem particularly important when considering precautionary behavior engagement. General psychologic distress in the past two weeks is also an important aspect to consider.

Interestingly, related to self-care behavior engagement, a full model, including both cognitive representation and emotional representation, was also best for explaining the most variance in behavior. However, Identity also contributed significantly, in addition to Consequences, Control, IES-R, and DASS-21 Total scores.

Analysis of perceived helpfulness of precautionary and self-care behavior engagement indicated that people who reported frequent engagement in precautionary behaviors perceived them to be helpful and people who reported frequent engagement in self-care behaviors perceived them to be helpful. Interestingly, perceived helpfulness of precautionary behaviors also predicted perceived helpfulness of self-care behaviors, suggesting that those who perceived precautionary behaviors to be helpful also perceived self-care behaviors to be helpful.

Clinical and Policy Implications

Clinical implications of these results suggest that psychologists working with distressed patients should consider pre-existing patient knowledge and perceptions of COVID-19, as well as engagement in self-care behaviors and perceptions of helpfulness in order to promote positive psychologic adjustment and engagement in precautionary behaviors to prevent the spread of COVID-19. These results may be additionally useful in helping patients navigating the decision to pursue vaccination. A recent study of 7,429 participants indicated that vaccine hesitancy is directly correlated with trust in the vaccine development and government approval processes

(Daly, Jones, and Robinson, 2021); while hesitancy has decreased over the past year, rates of hesitancy are still high, particularly among high-risk groups including Black and low SES groups, suggesting a need for more public outreach and education to increase trust. Policy makers might consider using the Common-Sense Model to drive education, planning, and reporting when delivering information to the public, considering that while "Timeline" may be uncertain, perceived control predicts a more adaptive response. For example, messaging focused on providing accurate, specific, and easily interpretable education on the virus, as well as messaging focused increasing perceptions of control related to the virus, may encourage a more adaptive emotional and behavioral response to COVID-19. Special attention may also be paid to ensuring that this type of messaging reaches communities that are typically considered to have low trust in the healthcare system. More tailored communication can ensure that they are receiving clear and accurate information with regard to the virus, methods to control the virus, and resources to aid in establishing a sense of control (e.g., where to obtain low cost or free masks if one is not yet vaccinated).

Strengths

The major strength of this study is that it is the first national study, to our knowledge, to consider the psychological and behavioral adjustment to COVID-19 in the United States, providing information on adjustment in the acute stages of the pandemic when "stay at home" orders and other restrictions were novel and vast. This study not only considered the impacts of knowledge and beliefs on behavior in terms of engagement in precautionary behaviors, but also considered self-care behavior, supporting a more comprehensive understanding of psychological adjustment to COVID-19 using the Common-Sense Model of Illness. It is believed that this

information will be important to consider as we continue to adjust to the ever-changing environment within the context of this pandemic.

Limitations

While this study has its strengths, it is not without limitations. The first is that the data sourcing software did not provide geographic information of respondents, as originally projected. This limited our ability to consider location as a factor in predicting psychological and behavioral adjustment. For example, living closer to New York and other "hot spots" may have predicted increased psychological distress, further influencing behavior. The second is the frequency of "invalid" responders, reducing our sample size by approximately 50% of what we originally expected. While this was unfortunate, we still had more than needed for statistical power. Third, our sample largely consisted of people with who were employed at the time of the survey, potentially limiting the generalizability of our data, considering high rates of job loss during COVID-19 and quarantine. Other limitations include that our study was only a one-time assessment of psychological and behavioral response to COVID-19, limiting us to a "snap-shot" at one early time point during the pandemic; another limitation is a lack of comprehensive medical history on each participant to more accurately assess a person's actual risk versus their perceptions of risk. Lastly, due to the nature of the questions and differences in response items (e.g., Likert and yes/no), test-retest data is needed to establish the reliability of the Cognition Representation Measure described in this study. However, analyses in this study used single-item responses to establish preliminary support for the model.

Future Directions

Future directions include retesting the model on specific samples to better develop the model, such as heart and lung disease patients who experience greater risk from COVID-19 infection. This may be helpful in predicting likelihood of getting the vaccine, continuing to adhere to mask mandates and other restrictions, and adjustment to future pandemics or other quarantine situations. Another future step will be to create the SBCI-RQ measure, incorporating items from the qualitative analysis, in order to readminister the measure, establishing its validity and reliability to be used in future pandemic or other quarantine contexts. Our results may help to develop "pandemic profiles" of people or information to be included in public health communications.

Conclusions

Results of this study indicated that during the early stages of the pandemic, US citizens felt knowledgeable about COVID-19 and confident in precautionary behaviors to control the spread of COVID-19. While most US citizens reported normative levels of emotional distress in response to COVID-19, about 19-30% had scores that indicated moderate to severe levels of psychological impact, depression, anxiety, or stress. Psychological distress is important to consider, as greater distress did predict decreased engagement in self-care behaviors and certain precautionary behaviors. People who engaged in both precautionary and self-care behaviors felt that they were helpful. This study built on the work of Wang and colleagues (2020), applying a model to the data to encourage a more comprehensive understanding of the psychological and behavioral response to COVID-19. While the results of this study are preliminary and further study is needed, these results suggest that Leventhal's Common-Sense Model of Illness may be applicable to understanding the US citizen experience of COVID-19. These factors should be considered as we enter into a new phase and future phases of the pandemic, considering

likelihood of receiving vaccines, impact of financial loss, and potential for stigmatization of various groups including healthcare workers and Asian Americans. In this ever-changing pandemic context, cognitive representations and emotional representation will likely play a large role in predicting behaviors that are imperative to managing and recovering from COVID-19 as a country.

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Appendix 1.

National University of Singapore Questionnaire on COVID-19 – Revised USA

Thank you very much for your willingness to participate in a study on the effects of COVID-19. The entire survey will take about 20 minutes to complete. No personally identifiable information will be collected.

Part A: Demographics

1. Gender: ◯ Male ◯ Female ◯ Other: _____
2. Age: _____
3. Education attainment
   - ◯ None/kindergarten
   - ◯ Primary school (Grades 1 – 6)
   - ◯ Lower secondary school (Grades 7 – 9)
   - ◯ Upper secondary school (Grades 10 – 12)
   - ◯ College
   - ◯ University: Bachelor
   - ◯ University: Master or PhD
4. Residential country during the COVID-19 outbreak
   - ◯ Cambodia
   - ◯ China
   - ◯ Philippines
   - ◯ Malaysia
   - ◯ Vietnam
   - ◯ United States
   - ◯ Other, please specify _____
5. Marital status
   - ◯ Single
   - ◯ Married
   - ◯ Divorced/separated
   - ◯ Widowed
6. Employment status
   - ◯ Student,
   - ◯ Employed
   - ◯ Unemployed
   - ◯ Housewife
   - ◯ Farmers
   - ◯ Retired
7. Parental status?
   - ◯ Not applicable
   - ◯ No children

◯ Pregnant
◯ Has child 16 years or under
◯ Has child older than 16 years

8. Household size:
   ◯ 1 person
   ◯ 2 persons
   ◯ 3-5 persons
   ◯ 6 persons or more
9. Have you traveled outside of your residential country in the past 14 days?
   ◯ No
   ◯ Yes, please specify visited countries _____

Part B: Symptoms and physical health status

1. Symptoms of body discomfort in the past 14 days (please check all that apply)

   ☐ Persistent fever (>38°C for at least 1 day)
   ☐ Chills
   ☐ Headaches
   ☐ Myalgia
   ☐ Cough
   ☐ Difficulty breathing
   ☐ Dizziness
   ☐ Coryza
   ☐ Sore throat
   ☐ Persistent fever and cough or difficulty breathing
   ☐ Nausea, vomiting, diarrhoea
2. Did you see a doctor in the clinic in the past 14 days?
   ◯ No
   ◯ Yes
3. Were you admitted to the hospital in the past 14 days?
   ◯ No
   ◯ Yes
4. Were you tested for COVID-19 / 2019-novel coronavirus in the past 14 days?
   ◯ No
   ◯ Yes
5. In the past 14 days, did you request a test or want a test but were unable to receive a test for COVID-19?
   ◯ No
   ◯ Yes
6. Were you diagnosed with COVID-19?
   ◯ No
   ◯ Yes
7. Were you under quarantine by health authority in the past 14 days?
   ◯ No
   ◯ Yes
8. Please self-rate your current health status

◯ Very good
◯ Good
◯ Fair
◯ Poor
◯ Very poor

9. Do you have medical insurance?
◯ Yes
◯ No
10. Do you suffer from a chronic illness?
◯ Yes
◯ No

11. Are you 65 years or older?
◯ Yes
◯ No
12. Do you have moderate to severe asthma?
◯Yes
◯No
13. Do you have chronic lung disease, aside from asthma?
◯ Yes
◯ No
14. Do you have cardiovascular disease?
◯ Yes
◯ No
15. Are you currently pregnant?
◯ Yes
◯ No
16. Do you have HIV?
◯ Yes
◯ No
17. What is your estimated height? _____
18. What is your estimated weight? _____
19. Have you avoided seeking acute or emergency healthcare when you felt you needed it for fear of COVID-19?

◯ Yes
◯ No

20. Have you avoided attendance of regularly scheduled healthcare appointments (e.g. for pre-existing healthcare conditions) for fear of COVID-19?

◯Yes

◯ No

21. Do you like to go surfing while eating scones?
◯ Never

◯ Rarely
◯ Sometimes
◯ Frequently
◯ Never

Part C: Contact history

1. Have you directly or indirectly contacted patients suffering from COVID-19?
   ◯ No (skip to Part D)
   ◯ Yes
2. Extent of direct and indirect contact history of COVID-19 patients (please check all that apply)
   ☐ Close contact with a confirmed case
   ☐ Indirect contact with a confirmed case (‘‘contact of direct contact’’)
   ☐ Contact with a suspected case
   ☐ Contact with infected materials

Part D: Knowledge and belief about COVID-19

1. Does the COVID-19 transmit through…	Agree	Disagree	Don’t know
a. Droplets	◯	◯	◯
b. Contact via contaminated objects	◯	◯	◯
c. Airborne	◯	◯	◯

2. How satisfy you are with the amount of health information available about COVID-19?
   ◯ Very satisfied
   ◯ Satisfied
   ◯ Dissatisfied
   ◯ Very dissatisfied
   ◯ Don’t know

3. Have you heard of the following…	Heard	Not heard
a. Number of cases infected by COVID-19	◯	◯
b. Number of deaths infected by COVID-19	◯	◯
c. Number of recovered cases infected by COVID-19	◯	◯

4. How do you mainly obtain health information?
   ◯ Social media (go to 4a)
   ◯ Internet
   ◯ Television
   ◯ Radio
   ◯ Newspaper
   ◯ Family members

◯ Other, please specify _____

4a.
How many hours per day do you spend on social media to obtain information about the 2019 coronavirus outbreak?
◯ 0-5
◯ 5-10
◯ 10-15
◯ 15-20
◯ 20+

5. How confident are you in your own doctor's ability to diagnose or recognize COVID-19?
◯ Very confident
◯ Somewhat confident
◯ Not very confident
◯ Not at all confident
◯ Don't know

6. Please rate your likelihood of …	Very likely	Somewh-at likely	Not very likely	Not likely at all	Don't know
a. Contracting COVID-19 during the current outbreak	◯	◯	◯	◯	◯
b. Surviving COVID-19 if infected	◯	◯	◯	◯	◯

7. Please rate your concerns about other family members getting COVID-19.
◯ Don't have family member
◯ Very worried
◯ Somewhat worried
◯ Not very worried
◯ Not worried at all

7. Please rate your concerns about child younger than 16 years getting COVID-19.
◯ Don't have child
◯ Very worried
◯ Somewhat worried
◯ Not very worried
◯ Not worried at all

8. Do you feel that you are being discriminated by other countries due to the outbreak of COVID-19?
◯ Yes
◯ No

Part E: Pre-cautionary measures in past 14 days

Do you do the following in the past 14 days…	Always	most of the time	sometime	occasional	Never
1.Covering mouth when coughing and sneezing	◯	◯	◯	◯	◯
2.Avoid sharing utensils	◯	◯	◯	◯	◯
3. Washing hands with soap and water	◯	◯	◯	◯	◯
4. Washing hands immediately after coughing, rubbing nose or sneezing	◯	◯	◯	◯	◯
5. Wearing mask regardless the presence or absence of symptoms	◯	◯	◯	◯	◯
6. Washing hands after touching contaminated objects	◯	◯	◯	◯	◯

7. Cleaning and disinfecting surfaces in your home

◯ Always

◯ Most of the time

◯ Sometimes

◯ Occasional

◯ Never

8. Using hand sanitizer, with 60% alcohol

◯ Always

◯ Most of the time

◯ Sometimes

◯ Occasional

◯ Never

9. Social Distancing, as able (i.e. maintaining 6-foot distance from others)

◯ Always

◯ Most of the time

◯ Sometimes

◯ Occasional

◯ Never

10. Staying home, aside from essential purposes (i.e. grocery store, pharmacy, medical appointments, caregiving)

◯ Always

◯ Most of the time

◯ Sometimes

◯ Occasional

◯ Never

11. Avoid touching eyes, nose, and mouth

◯ Always

◯ Most of the time

◯ Sometimes

◯ Occasional

◯ Never

12. How confident do you feel the precautionary measures you are taking will help prevent you from contracting or spreading COVID -19?

◯ Not confident at all
◯ Not very confident
◯ Neutral
◯ Somewhat confident
◯ Very confident

13. Do you feel that too much fuss has been made about COVID-19?

◯ Always
◯ Most of the time
◯ Sometime
◯ Occasional
◯ Never

14. How many extra hours per day do you stay at home to avoid COVID-19?

◯ 0-5

◯ 5-10

◯ 10-15

◯ 15-20

◯ 20+

◯ I don't leave home.

22. How much control do you feel you have over contraction of COVID-19?
◯ I have already been diagnosed
◯ No control at all
◯ Very little control
◯ Neutral
◯ Some control
◯ A lot of control
◯ Total control

23. If you have been diagnosed, how much control do you feel you have in managing COVID-19?
◯ No control at all
◯ Very little control
◯ Neutral
◯ Some control
◯ A lot of control
◯ Total control

24. How long do you feel COVID-19 will pose a risk to you?
◯ Days
◯ Weeks
◯ Months
◯ 1-3 years
◯ 3+ years
◯ Forever

18 If you have been diagnosed with COVID-19, how long do you think the virus will last?
◯ Days
◯ Weeks
◯ Months
◯ 1-3 years
◯ 3+ years
◯ Forever

19. How often do you travel to Neptune for lunch?
◯ Never
◯ Rarely
◯ Sometimes
◯ Frequently
◯ Always

Part F Additional information about COVID-19

1. Would you like to receive additional information about COVID-19?
◯ Yes
◯ No

2. I would like to receive additional information about COVID-19 on …	Yes	No
a. Details on symptoms	◯	◯
b. Advice on prevention	◯	◯
c. Advice on treatment	◯	◯
d. Regular updates for latest information	◯	◯
e. Regular updates for the Outbreaks	◯	◯
f. Advice for people who might need more tailored information, such as those with pre-existing illness	◯	◯
g. Availability and effectiveness of medicine/vaccine	◯	◯
h. How many people are affected/where it is affected	◯	◯
i. Travel advice	◯	◯
j. How COVID-19 is spread	◯	◯
k. What other countries are doing	◯	◯

3. Please specify other information you would like to receive about COVID-19

_____

Appendix 2.

Self-Care Behavior Inventory – Revised for Quarantine

Over the past month, how often have you engaged in the following self-care behaviors:

0- Never
1- Rarely
2- Occasionally
3- Frequently

1. Virtually connect with others you enjoy
2. Maintain deep interpersonal relationships
3. Stay in contact with important people
4. Seek out projects that are exciting or rewarding
5. Take time to chat with peers
6. Allow yourself to laugh
7. Quiet time to complete tasks
8. Seek out comforting activities
9. Be open to not knowing
10. Eat healthy
11. Exercise
12. Spend time in nature
13. Medical care
14. Take breaks from virtual work, class, or similar obligations
15. Pray
16. Meditate
17. Connect with spirituality
18. Contribute to causes
19. Advocate

Other activities you have been doing to take care of yourself:

How helpful do you feel engaging in self-care behaviors has been for reducing emotional stress in response to COVID-19 and quarantine?

◯Not helpful at all
◯ Not very helpful
◯ Neutral
◯ Somewhat helpful
◯ Very helpful

How often do you visit Mars?

◯ Never
◯ Somewhat often
◯ Often
◯Frequently
◯Very often

Appendix 3.

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building · Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office 252-744-2914 · Fax 252-744-2284 ·
rede.ecu.edu/umcirb/

Notification of Amendment Approval

From: Biomedical IRB
To: Samuel Sears
CC:
Date: 6/5/2020
Re: Amd2 UMCIRB 20-000838
UMCIRB 20-000838
COVID-19: The Psychological Impact of a Pandemic

Your Amendment has been reviewed and approved using expedited review on 6/4/2020. It was the determination of the UMCIRB Chairperson (or designee) that this revision does not impact the overall risk/benefit ratio of the study and is appropriate for the population and procedures proposed.

Please note that any further changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must adhere to all reporting requirements for this study.

If applicable, approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Document	Description
Adding Dr. Roger Ho to the study team.	

For research studies where a waiver or alteration of HIPAA Authorization has been approved, the IRB states that each of the waiver criteria in 45 CFR 164.512(i)(1)(i)(A) and (2)(i) through (v) have been met. Additionally, the elements of PHI to be collected as described in items 1 and 2 of the Application for Waiver of Authorization have been determined to be the minimal necessary for the specified research.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.