June 2021

An Examination of COVID-19 Health Behaviors and Public Health Messaging Using the Health Belief Model and Organization-Public Relationship Quality

Aaron L. Nichols
University of South Florida

An Examination of COVID-19 Health Behaviors and Public Health Messaging

Using the Health Belief Model and Organization-Public Relationship Quality

by

Aaron L. Nichols

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts in Mass Communications
with a concentration in Strategic Communication Management
Zimmerman School of Advertising and Mass Communications
College of Arts and Sciences
University of South Florida

Major Professor: Kelli Burns, Ph.D.
Kimberly Walker, Ph.D.
Kelly Werder, Ph.D.

Date of Approval:
June 4, 2021

Keywords: coronavirus, cues to action, health behavior change, public health communication, relationship theory

DEDICATION

I dedicate this work to my wife, Blair, who gave me the supportive push needed to continue my academic journey and is an unabating source of encouragement and most trusted sounding board. I also dedicate this work to my parents, Tim and Jo Ann, who are constants, patient through obduracy, and always encouraging me.

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ABSTRACT

In the context of the most severe pandemic in over 100 years, this study examined public health behavior and public health messaging using the health belief model (HBM) and organization-public relationships (OPR) as frameworks. The study employed a cross-sectional survey of students (N = 288) and employees (N = 203) at a large public university in the southeastern United States. First, the study empirically tested the components of the HBM as determinants of engaging in public health behaviors meant to slow or prevent the spread of COVID-19 and found all components of the model to be significantly related to engaging in the health behaviors. Next, the study looked at the university's COVID-19 public health messaging. While findings indicated there was no significant relationship between the university's public health messaging and the study population's on-campus engagement in COVID-19 health behaviors, the relationship between the university's messaging and OPR quality was found to be statistically significant. Additionally, findings indicated that OPR quality was significantly related to engaging in the COVID-19 health behaviors.

BACKGROUND

In December of 2019, dozens of cases of pneumonia were reported in the city of Wuhan, China; the cause of the pneumonia was unknown. On January 7, 2020, the outbreak was identified as a new coronavirus: Coronavirus Disease 2019 or COVID-19 (World Health Organization, 2020). On January 30, the World Health Organization, or WHO, declared the outbreak a global public health emergency; more than 9,000 cases had been reported worldwide (2020). Three days later the United States declared a public health emergency.

The first COVID-19 death in the United States occurred on February 29. On March 11, the WHO classified the outbreak a pandemic (2020); by this time there were over 3,000 confirmed cases in the United States. With no vaccine to help reduce the spread of the virus, non-pharmacological measures were required. Governments and public health organizations around the world began to put public health behavior measures in place to slow the spread of the COVID-19 pandemic. Many schools and universities in the United States announced plans to close and numerous states, counties, and municipalities issued "stay-at-home" orders limiting all but essential services and activities. By the end of March, numbers had continued to climb; there were over 102,000 cases and 2,000 deaths in the United States (Johns Hopkins, 2021). A year later, in March 2021, there was a cumulative total of over 28,260,000 cases and 500,000 deaths in the United States and over 114,000,000 cases and 2,550,000 deaths globally (Johns Hopkins, 2021).

Public health behaviors like wearing a mask, staying at least six feet apart (referred to as *physical distancing* or *social distancing*), frequently washing or sanitizing hands, and disinfecting frequently touched surfaces were critical to reduce the chance of infection and help prevent the spread of COVID-19 (Centers for Disease Control and Prevention, 2020). Public health messaging promoted and reinforced these behaviors through a wide variety of channels. In addition to public health messaging from government agencies and health organizations; many businesses, from giants like Amazon and Walmart to regional and local companies, also ran advertisements across various media promoting COVID-19 health behaviors. It became commonplace to see signs and decals in places of business and other public spaces promoting, or in many cases requiring, public health behaviors like wearing masks and physical distancing.

INTRODUCTION

The COVID-19 pandemic is the most severe since the 1918 H1N1 flu pandemic. While the development and production of COVID-19 vaccines were fast-tracked, it still took almost a year to begin getting vaccines distributed. As of late March 2021, only 13% of the United States population had been vaccinated (Carlsen et al., 2021). Much like the 1918 flu pandemic, with no vaccine available, public health behaviors were necessary to mitigate the risk of infection and slow the spread of the virus. These critically important behaviors were communicated through public health messaging from organizations including government agencies, health and public health experts, schools and universities, and businesses using a wide variety of communication channels.

The current study examines engagement in COVID-19 health behaviors by students and employees at a large public university in the southeastern United States, the factors that influenced those behaviors, the public health messaging developed and implemented by the university, and the intersection of these things with the organization-public relationship quality between the university and the study population[1]. In early March 2020, the university established a COVID-19 taskforce made up of subject matter experts from the university's

[1] The researcher played a key role in the development and implementation of the university's COVID-19 public health messaging and was involved in the university's overall response effort to the pandemic. The account of activities provided in this introduction is based on this firsthand knowledge.

college of public health, college of medicine, department of emergency management, and other relevant areas. This group drove the university's response to the pandemic. In April 2020, following the university's spring break, the decision was made to move all instruction online with no in-person classes. All employees who could work remotely were directed to do so. This continued through the Summer term. During this time, the university developed and implemented a phased "return to campus" plan.

The Fall 2020 term, which began on August 24, 2020, would see limited in-person instruction on campus, residence halls at approximately 30% of capacity, and no more than 50% of employees on campus with those who could work remotely directed to do so. The Spring 2021 term saw those levels only slightly increase with around 60% of courses having some portion of instruction on campus (often with some students participating in-person and some via synchronous online participation), residence halls increasing to 50% capacity, and still no more than 50% of employees on campus with those who could work remotely continuing to do so.

In preparation for the limited return to campus in the Fall 2020 term, the university's COVID-19 taskforce expressed the need for on-campus signage to promote COVID-19 public health behaviors. In May 2020 the university began developing public health messaging and designing accompanying signage and other creative assets. The messaging was based on guidance from the U.S. Centers for Disease Control and Prevention (CDC) and the university's COVID-19 taskforce. The messaging focused on four health behaviors to decrease the spread of the virus: wear a face covering, practice physical distancing, wash your hands or use hand sanitizer often, and clean and disinfect your space (an example of the messaging is included in

Appendix A). The focus on these health behaviors was consistent with other COVID-19 public health messaging being widely communicated by federal, state, and local public health officials. Signage promoting the use of face coverings and physical distancing was being used extensively in retail, commercial, and other public spaces around the United States by this time.

Before being finalized, the messaging and design used for the university's COVID-19 health behavior signage were tested using an online questionnaire distributed to a convenience sample of students ($N = 166$) and employees ($N = 73$). This survey showed that participants had a positive impression of the signage and found it to be clear and understandable. For example, when shown an image of the primary signage and asked to rate their impression of it on a 5-point Likert scale from *extremely positive* to *extremely negative*, 87% of participants found it to be either extremely positive or somewhat positive. When asked to rate how clear and understandable the signage was on a 5-point Likert scale from *extremely clear* to *extremely unclear*, 98% of participants found it to be either extremely clear or somewhat clear. The complete results of the survey, which included participant comments, informed slight modifications to the messaging and design in an effort to improve the overall effectiveness of the signage. Ultimately, over two dozen unique pieces of signage were designed to promote the public health behaviors. This signage included various decals, table tents, barricade tape (used to block off seating for physical distancing), a-frame signs, and accompanying digital assets for use on electronic displays throughout the campus.

To prepare for the phased return to campus the university's facilities team, with input from the university's COVID-19 taskforce, developed a detailed installation guide and plan drawings for each building showing installation locations for the various COVID-19 related

signage. Approximately 33,000 pieces of signage were installed across 284 buildings on the campus. All signage was in place one week prior to the start of the Fall 2020 term.

In addition to on-campus signage, the university also used electronic communication for COVID-19 related messaging. In the period between late January 2020 and the start of the Fall 2020 term, the university sent 17 mass e-mails related to COVID-19 to all students and employees. The content of the majority of these e-mails was operational information and updates. About 30% of the e-mails included mention of one or more of the four health behaviors. In January 2020 the university also created a special website for COVID-19 information, with the content of the website focusing on the public health behaviors as well as operational information and updates. All of the COVID-19 related mass e-mails the university sent after this website was created included a link to the site.

In July 2020, the university began posting health behavior messaging on social media with the frequency increasing after the start of the Fall 2020 term. For example, in the seven weeks between July 8, 2020 (when the first post was made) and the start of the Fall 2020 term, seven of the university's Twitter posts focused on one or more of the health behaviors. In the seven weeks following the start of the Fall 2020 term, 31 of the university's Twitter posts focused on one or more of the health behaviors. As the term progressed, the university continued to use social media to promote the health behaviors. During the Spring 2021 term the university averaged one Twitter post per week related to one or more of the health behaviors. The university’s social media posts focusing on the health behaviors used the same or similar messaging and creative as the on-campus signage.

Using the health belief model (HBM) and organization-public relationships (OPR) as theoretical frameworks; the current study examines health behavior engagement, public health messaging, and OPR quality in the context of the COVID-19 pandemic. First, to build on the body of HBM research, the HBM components are empirically tested as determinants of engaging in COVID-19 health behaviors. Previous research exploring which HBM components are the strongest predictors of a health behavior have not been consistent in their findings which suggests the components of the HBM vary in effectiveness depending on the health behaviors and populations being studied (Janz & Becker, 1984; C. J. Jones et al., 2014; Tong et al., 2020a). The findings of the current research will provide insight into which HBM components are the strongest determinants of pandemic-related public health behaviors in the population studied.

Next, the study looks at the university's COVID-19 public health messaging. The university's messaging was executed in an environment where the population already had awareness of the COVID-19 public health behaviors and the reasons they should engage in them. An online survey of a random sample of 10% of students and 10% of employees at the university was conducted by the researcher in mid-August of 2020 prior to the limited Fall 2020 return to campus and before any substantial public health behavior messaging had been disseminated by the university. The survey asked participants about their awareness of the public health behaviors: wearing a face covering/mask, physical distancing (or social distancing), washing your hands or using hand sanitizer frequently, and cleaning and disinfecting frequently touched surfaces. The survey found that in employee participants (N = 350) 100% were aware of the need to wear masks, physical (or social) distance, and frequently

wash hands or use hand sanitizer and 99% were aware of the need to clean and disinfect frequently touched surfaces (Nichols, 2020). The survey also found that in student participants (N = 721) over 99% were aware of all of the COVID-19 public health behaviors asked about (Nichols, 2020). With such widespread awareness of the health behaviors, the university's messaging wasn't going to communicate anything the target population had not already seen or heard. While the stated and primary need for the university's COVID-19 public health messaging efforts was to promote and maintain awareness of the COVID-19 health behaviors; there was also an expectation that the university would install signage and push out messaging as part of its response to the pandemic to demonstrate its commitment and effort to keep the university safe, to the extent possible.

With these things in mind, the already ubiquitous COVID-19 public health messaging and the expectation that the university would engage in a public health messaging effort, the current study explores if a relationship exists between the university's messaging and engagement in the health behaviors, acknowledging that isolating and accurately measuring such a relationship is unlikely. However, focusing on the expectation for the university to engage in a messaging effort as a way demonstrate its commitment to and concern for the university community, the study also examines what relationship may exist between the university's public health messaging and OPR quality between the university and its employees and students in the context of the pandemic response. Finally, examining OPR from a different perspective, the study explores the relationship between OPR quality and engagement in the COVID-19 health behaviors.

LITERATURE REVIEW

The Health Belief Model

The foundation of the HBM was developed in the 1950s and 1960s by social psychologists Godfrey Hochbaum, Howard Leventhal, Irwin Rosenstock, and Steven Kegels who were working with the United States Public Health Service. These researchers were looking at the widespread failure of people to get inoculations and screening tests to help prevent and detect diseases (Hochbaum, 1958; Rosenstock, 1974a). They developed the model to predict the likelihood of people taking a preventative health action. Building on Hochbuam's 1958 study, Rosenstock brought more definition to the model in his 1966 paper titled "Why People Use Health Services". In 1974, *Health Education Monographs* devoted an entire issue to the HBM. This was instrumental in solidifying the model. Many of the articles included in that issue, as well as the complete issue itself, are regularly cited as seminal works (e.g., Becker, 1974; Maiman & Becker, 1974; Rosenstock, 1974a, 1974b). Rosenstock's (1974a) discussion of the historical origins of the HBM is especially enlightening to anyone seeking an understanding of the genesis of this theory.

The researchers who developed the HBM were influenced by the theories of psychologist Kurt Lewin (Rosenstock, 1974a). They saw behavior intention as a function of the value placed on an outcome of a behavior along with the expectation the behavior will result in that outcome (V.L. Champion & Skinner, 2008; Maiman & Becker, 1974; Rosenstock, 1966). This

value-expectancy is reflected in the construct of the HBM. The HBM suggests that for a health behavioral change to occur a person must feel threatened by an illness or condition, believe the health behavioral change will reduce the threat, feel competent in their ability to implement the change, and be prompted by a stimulus to start the new behavior (Janz & Becker, 1984; Rosenstock, 1974a; Rosenstock et al., 1988).

The HBM consists of the following components (Rosenstock, 1966, 1974a; Rosenstock et al., 1988). The complete model is shown in Figure 1.

- ***Perceived susceptibility***. The perceived risk or chance of contracting a condition (Rosenstock, 1974a). People are unlikely to practice a health behavior to prevent an illness or condition they perceive as unlikely to affect them.
- ***Perceived severity***. The perceived seriousness of contracting a health condition, considering not just the medical impact but also the psychological and economic impacts on self, family, and others. While a person may not perceive a condition as medically serious, they might still perceive the condition as having a high degree of severity because of the psychological and/or economic tensions it could create (Rosenstock, 1974a). The greater the perceived severity, the more motivated a person will be to take action to prevent contracting an illness or condition (Rosenstock, 1966).
- ***Perceived benefits***. The belief in the benefit of a health behavior, perceiving it as effective in reducing the susceptibility to or severity of a condition (Rosenstock, 1974a).
- ***Perceived barriers***. The potential negative aspects of the health behavior (inconvenient, expensive, unpleasant, painful, upsetting, side effects, too time-consuming, etc.) (Becker

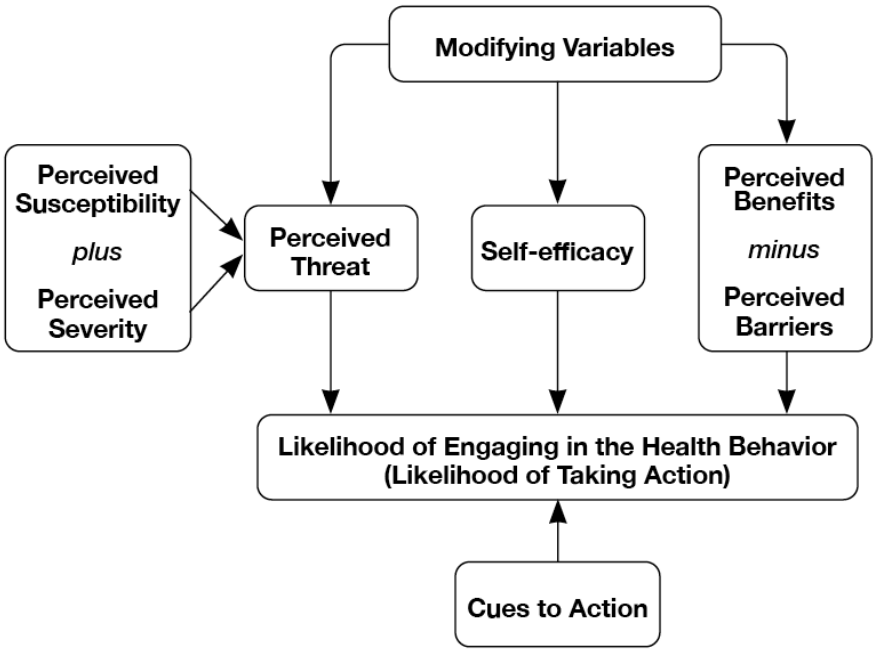
& Janz, 1985; Rosenstock, 1974a). Perceived barriers can prevent people from taking action, even if they believe the health behavior is effective (Rosenstock, 1966).

- ***Modifying variables***. These are variables, outside of the components of the model, that may impact a person's perceptions and perceived benefits of the health behavior. They include demographic variables (age, sex, race, ethnicity, education level, etc.), socio-psychological variables (personality, social class, peer pressure, etc.), and structural variables (knowledge about the condition, prior contact, etc.) (Rosenstock, 1974a).
- ***Self-efficacy***. This is a person's expectation that they can perform a behavior. In the context of the HBM, this would be the belief they are personally capable of performing the health behavior (Rosenstock et al., 1988).
- ***Cues to action***. A stimulus to trigger a person to start the health behavior (Rosenstock, 1966, 1974a). Cues to action could include internal cues like a person experiencing symptoms of an illness or external cues like public health campaigns, mass media, advice from others, or knowing others who have the health condition (Becker & Janz, 1985; Rosenstock, 1966).

In the HBM, perceived susceptibility and perceived severity have an additive relationship. The combination of these components results in the perceived threat a health condition poses to a person (Rosenstock et al., 1988). Two other components of the HBM have a subtractive relationship. In the model, the perceived benefits must outweigh the perceived barriers. The remaining weight of the benefits must then be perceived as effective in reducing the perceived threat in order for a person to be likely to engage in a health behavior (Rosenstock et al., 1988). Becker and Janz describe this as "a kind of cost-benefit analysis" that occurs (1985, p. 42).

According to Rosenstock, the combination of perceived susceptibility and severity provides "the energy or force to act" and the benefits minus the barriers provide "a preferred path of action" (1974a, p. 332).

Figure 1: *The Health Belief Model*



Model adapted from Rosenstock (1974a)

Ten years after the seminal articles in the 1974 issue of *Health Education Monographs* devoted to the HBM, Janz and Becker's (1984) critical review of 46 HBM studies found substantial empirical support for the model. Twenty-nine of the studies reviewed by Janz and Becker (1984) were published after 1974 and 18 were published before 1974. Of note, the studies published after 1974 "produced significance ratios as good or better than those derived from retrospective surveys" (Janz & Becker, 1984, p. 41). Janz and Becker's overall results found

perceived barriers to be the most powerful predictor of the HBM components followed by perceived susceptibility and perceived benefits. Perceived severity was the least powerful predictor.

Since Janz and Becker's review in 1984, other reviews of HBM studies have been inconsistent in their findings. This could be due to inconsistencies in the application and measurement of the HBM. Jones et al. (2015) point out the literature includes a large body of research supporting the HBM. However, Jones et al. (2015) also echo previous studies that argue ambiguity in the application of the HBM and its components has led to the inconsistencies noted. A meta-analysis by Harrison et al. (1992) of 16 HBM studies examined perceived susceptibility, perceived severity, perceived benefits, and perceived barriers and found positive relationships between these individual components and health behaviors. Harrison et al. (1992) did not look at possible interaction between the components or at the model as a whole; a weakness that has been true of other reviews of HBM studies.

Carpenter (2010) conducted a meta-analysis of 18 longitudinal studies with a total of 2,702 subjects to determine if the components of the HBM could predict behavior. This meta-analysis found that benefits and barriers were the strongest predictors followed by severity while susceptibility was found to be the weakest predictor, with the estimate of the effect of susceptibility nearly zero (Carpenter, 2010). Sulat et al. (2018) conducted scoping review of HBM studies. Of the four studies ultimately reviewed, all showed the HBM components were consistently related to the health behaviors. Similar to other reviews, Sulat et al. (2018) found that perceived barriers and perceived benefits were the strongest predictors.

While other reviews looked at the HBM's ability to predict behavior, Jones et al. (2014) reviewed interventional studies that used the HBM as the basis for the design of the intervention. Of the 18 studies reviewed, 15 (83%) reported a significant positive impact of the HBM based interventions. However, none of the studies reviewed by Jones et al. (2014) used measures that allowed for comparison between the studies. Additionally, only five of the 18 studies measured the health beliefs targeted by the intervention as a post-intervention outcome.

As shown by the aforementioned reviews of HBM studies, while results showing the degree of impact of the components of the model and the model as a whole are varied, these studies have provided empirical evidence that the core components of the HBM (perceived susceptibility, perceived severity, perceived benefits, and perceived barriers) are significantly related to health behavior (Sulat et al., 2018). The literature also suggests the components of the HBM may interact differently and vary in effectiveness depending on the health behavior(s) (C. J. Jones et al., 2014; Tong et al., 2020).

Recently, responsive to the COVID-19 pandemic, studies have been published using the HBM as a framework for looking at COVID-19 health behaviors (e.g., Clark et al., 2020; Ghosh et al., 2020; Jose et al., 2020; Tong et al., 2020). These range from suggestions about how the HBM could be used as a framework to guide message design (Carico et al., 2020) to studies using the HBM to analyze and predict the practice of COVID-19 health behaviors (Clark et al., 2020; Tong et al., 2020). Two studies, both in India, used the HBM to help understand public perception of COVID-19 health behaviors. One of these used online questionnaires to assess the perception of physical distancing in an apartment complex after some of the residents tested positive for COVID-19 (Ghosh et al., 2020). The researchers found that perceived susceptibility

and perceived severity had a stronger impact on this community than perceived benefits. In the other study, Jose et al. (2020) surveyed 680 participants using questions answered on a seven-point Likert scale to understand public perception of COVID-19 and examine the association between HBM components and behavioral change outcomes. The researchers found that HBM components had a significant association with behavioral change (Jose et al., 2020).

Tong et al. (2020) used the HBM to analyze strategies for promoting COVID-19 health behaviors in Macao, China. A telephone survey using a five-point Likert scale was conducted with 616 participants. The results of the study showed the practice of those health behaviors was found to be significantly associated with HBM components. Perceived benefits had a positive association with handwashing, face mask wearing, and physical distancing. Perceived barriers had a negative association with handwashing and face mask wearing. Notably, this study looked at the impact of cues to action and found they were positively associated with physical distancing and carrying hand sanitizer. Based on their findings, the researchers suggest that exposure to more cues to actions (like public health messaging campaigns) might increase the practice of physical distancing (Tong et al., 2020).

Clark et al. (2020) used the HBM as a framework to explain and predict voluntary compliance with COVID-19 health behaviors. An online survey of 8,317 participants from 70 different countries was conducted. The survey questions used a five-point Likert scale. The study found perceived benefits to be the strongest predictor of COVID-19 health behaviors and perceived susceptibility to be the weakest predictor. Based on the results of the study, the researchers suggest that communicating the benefits of the health behaviors might increase

voluntary compliance while warnings about individual's vulnerability to COVID-19 and the severity of COVID-19 might not increase voluntary compliance (Clark et al., 2020).

Organization-Public Relationships

In a paper presentation at the 1984 conference of the Association for Education in Journalism and Mass Communication, Ferguson called for theory development in public relations and argued that the field should focus on public relationships. The paper states that "the unit of study should not be the organization, not the public, not the communication process. Rather, the unit of study should be the relationships between organizations and their publics" (Ferguson, 2018, p. 164). Ferguson's paper was the catalyst for a paradigm shift in the study and practice of public relations and changed the way the field was defined (Bruning & Ledingham, 1999; Cheng, 2018; Ledingham, 2001; Ledingham & Bruning, 1998).

The shift from a focus on influencing opinions to a focus on relationships was noted by Ehling in *Excellence in Public Relations and Communication Management* (1992). It was further solidified in public relations textbooks with *Effective Public Relations* calling public relations "the management function that establishes and maintains mutually beneficial relationships between an organization and the publics on whom its success or failure depends" (Cutlip et al., 1994, p. 2) and *Public Relations Practices: Managerial Case Studies and Problems* stating "the proper term for the desired outcomes of public relations practice is public relationships" (Center & Jackson, 1995, p. 2).

In 1997, Broom et al. expressed the need to define the relationship between an organization and its publics, or the organization-public relationship (OPR), arguing that:

> …the absence of a fully explicated definition precludes the development of valid operational measures of organization-public relationships and limits theory building in public relations. Without such definition, both scholars and practitioners will continue to use indirect measures to draw inferences about relationships without measuring the relationships themselves. (Broom et al., 1997, p. 83)

In response to Broom et al. (1997), Ledingham and Bruning offered a "tentative definition" of the OPR as "the state which exists between an organization and its key publics in which the actions of either entity impact the economic, social, political and/or cultural well-being of the other entity" (1998, p. 62). Ledingham and Bruning also suggest the dimensions of trust, commitment, openness, investment, and involvement as measures of OPRs (1998). The following year, informed by Grunig's excellence theory (1992), this scale was updated to include the dimensions of reciprocity, mutual legitimacy, and mutual understanding (Bruning & Ledingham, 1999).

In an unpublished doctoral dissertation, Huang (1997), a student of J.E. Grunig, developed measures of OPR quality informed by the literature on interpersonal and organizational relationships as well as Grunig's excellence theory. Huang posits that trust, control mutuality, satisfaction, and commitment are "the most essential and pertinent indicators representing the quality of organization-public relationships" (1997, p. 60).

Citing Huang's (1997) work, Hon and Grunig's *Guidelines for Measuring Relationships in Public Relations* (1999) lists trust, control mutuality, satisfaction, and commitment as indicators OPR quality. In addition to those four indicators, Hon and Grunig add "exchange vs. communal relationships" (1999, p. 20) as a fifth indicator to define "the kinds of relationships

that public relations programs attempt to achieve, in comparison with the nature of relationship outcomes produced by other fields such as marketing" (1999, p. 20). To measure these OPR quality indicators, Hon and Grunig introduced their *PR Relationship Measurement Scale* in *Guidelines for Measuring Relationships in Public Relations* (1999). Continuing to build on the four OPR quality indicators proposed in Huang's dissertation (1997), Grunig and Huang (2000, pp. 23–53) authored a chapter *Public Relations as Relationship Management: A Relational Approach to Public Relations* that further discusses the four indicators and presents scale items for each adapted from prior studies.

On the foundation of the four OPR indicators developed by Huang (1997) and used by Hon and Grunig (1999) and Grunig and Huang (2000), Huang defines an OPR as "the degree that the organization and its publics trust one another, agree that one has the rightful power to influence, experience satisfaction with each other, and commit oneself to one another" (Huang, 1998, as cited in Huang 2001, p.65). This definition aligns with Huang's *Organization-Public Relationship Assessment* (OPRA), introduced as a scale for OPR measurement (Huang, 1997, 2001). OPRA uses the four OPR quality indicators: trust, control mutuality, satisfaction, and commitment (Hon & Grunig, 1999; Huang, 1997). Huang argues that "these four factors represent the essence of OPRs" (2001, p. 65). In addition to these four core indicators, Huang includes a fifth in OPRA, *renqing* and *mianzi* ("favor and face"), that is specific to social relationships in Eastern culture (Huang, 2001). The scales used to measure trust, control mutuality, satisfaction, and commitment in OPRA closely align with the scales presented by Hon and Grunig (1999) and Grunig and Huang (2000).

In 2003, after reviewing the relevant literature to date, Leadingham argued that the relationship management approach to public relations met the criteria to be considered a general theory of public relations thus bringing to fruition Ferguson's call for public relations theory development focused on relationships between organizations and their publics (Ledingham, 2003). The four OPR quality indicators: trust, control mutuality, satisfaction, and commitment proposed by Huang (1997) and further developed in subsequent literature (Grunig & Huang, 2000; Hon & Grunig, 1999; Huang, 2001) are noted as the most widely studied and used measures to evaluate OPR quality (Huang & Zhang, 2013; Ni, 2007). They are shown below as defined by Hon and Grunig (1999) whose definitions were adopted by Huang (2001) and widely used in OPR research (Huang & Zhang, 2013; Jo et al., 2004; Ki & Shin, 2006).

- ***Trust*** is "one party's level of confidence in and willingness to open oneself to the other party" (Hon & Grunig, 1999, p. 19). Integrity, dependability, and competence are dimensions of trust as defined by Hon and Grunig (1999).
- ***Control Mutuality*** is "the degree to which parties agree on who has the rightful power to influence one another" (Hon & Grunig, 1999, p. 19). Hon and Grunig note that "some degree of power imbalance is natural" in OPRs, but extreme, unilateral control adversely affects OPR quality (1999, p. 19).
- **S*atisfaction*** is "the extent to which one party feels favorably toward the other because positive expectations about the relationship are reinforced. Or, a satisfying relationship is one in which the benefits outweigh the costs. Satisfaction can also occur when one party believes that the other party's relationship maintenance behaviors are positive" (Hon & Grunig, 1999, p. 20).

- ***Commitment*** is "the extent to which one party believes and feels that the relationship is worth spending energy to maintain and promote" (Hon & Grunig, 1999, p. 20).

There is a paucity of studies examining OPRs in the context of public health communication. Wise argues for the application of relationship management in public health, suggesting a relationship exists between OPR quality and public health outcomes (Wise, 2008). Prophetically written in 2008, Wise uses the possibility of a pandemic influenza as an example of how relationship management theory could help public health organizations, noting that "if public relations practitioners at public health bodies successfully implement relationship management in their organizations, the benefits to the nation's public health system could be significant" (2008, p. 325). Wise proposes that the OPR indicators and scales developed and used by Huang (1997, 2001), Hon and Grunig (1999), and Grunig and Huang (2000) be used to measure a public health organizations relationship with its publics.

Chon and Park (2021) incorporated OPR quality into the situational theory of problem-solving (STOPS) to predict communicative actions and willingness to follow public health instructions from the Centers for Disease Control and Prevention (CDC) during an infectious disease outbreak. Among the study's hypotheses is that the OPR quality between a health organization and its publics will be positively associated with behavioral intention. The study was conducted using an online survey with 363 participants. OPR quality was measured using scales for control mutuality, satisfaction, trust, and commitment adapted from Hon and Grunig (1999). The researchers found that OPR quality was positively associated with behavioral intention to follow CDC instructions (Chon & Park, 2021).

HYPOTHESES AND RESEARCH QUESTIONS

In the HBM a person's perception, or belief, about their susceptibility to a health condition, the severity of the health condition, the benefits of and barriers to engaging in a health behavior to avoid the condition, their self-efficacy in performing the behavior, and exposure to cues to action influence the likelihood of engaging in a health behavior (Becker & Janz, 1985; Rosenstock, 1966, 1974a; Rosenstock et al., 1988). According to the HBM, perceived susceptibility combined with perceived seriousness results in the perceived threat a health condition poses (Rosenstock et al., 1988). Applying this to the current study, the possibility of contracting COVID-19 (perceived susceptibility) combined with concern about the spread of COVID-19 (perceived severity) will result in the perceived threat of COVID-19.

Moving through the remaining components of the model, in the context of the current study, perceived benefits reflect the perceived effectiveness of the four COVID-19 health behaviors (promoted in the university's public health messaging) in reducing the risk of contracting COVID-19. Perceived barriers are any negative aspects that would prevent someone from engaging in the COVID-19 health behaviors. Self-efficacy is one's confidence in being able to practice the COVID-19 health behaviors. Lastly, the COVID-19 public health messaging provides the cues to action.

In the HBM, modifying variables are variables that impact a person's perceptions and perceived benefits of the health behavior. These include demographic variables, socio-

psychological variables, and structural variables. While outside of the scope of the current study, the researcher acknowledges the abundance of possible modifying variables that could be examined as part of the current study.

Previous studies have shown the HBM to be successful in predicting the likelihood of engagement in a health behavior (Janz & Becker, 1984). The current study examines the relationship between HBM components and engaging in COVID-19 health behaviors, empirically testing the HBM components as determinants of the health behaviors (see Figure 2). It is hypothesized that:

H1a: A positive relationship exists between perceived threat of COVID-19 and engaging in COVID-19 health behaviors.

H1b: A positive relationship exists between perceived benefits of COVID-19 health behaviors and engaging in COVID-19 health behaviors.

H1c: A negative relationship exists between perceived barriers to performing COVID-19 health behaviors and engaging in COVID-19 health behaviors.

H1d: A positive relationship exists between perceived self-efficacy to perform COVID-19 health behaviors and engaging in COVID-19 health behaviors.

H1e: A positive relationship exists between exposure to cues to action to perform COVID-19 health behaviors and engaging in COVID-19 health behaviors.

The university's COVID-19 public health messaging meets the description of external cues to action (Becker & Janz, 1985; Rosenstock, 1966) and was intended to promote the health behaviors in general, but also specifically when on the university campus. As previously noted, the use of signage in public spaces and messaging across various media to promote COVID-19

health behaviors became very common as the pandemic progressed. As a result, this near ubiquity of COVID-19 public health messaging leading up to and at the time of the current study makes it unlikely to isolate and accurately measure what effect the university's messaging alone had on engagement in the COVID-19 public health behaviors. While aware of this likely limitation, the current study poses the following research question to examine the data for a relationship between the university's public health messaging (cues to action) and engagement in the COVID-19 health behaviors specifically when on the university campus.

> **RQ1:** Does exposure to the university's COVID-19 public health messaging (cues to action) have an association with on-campus engagement in COVID-19 health behaviors?

Informed by the relevant literature (Grunig & Huang, 2000; Hon & Grunig, 1999; Huang, 1997, 2001; Jo et al., 2004); the current study uses trust, control mutuality, satisfaction, and commitment as indicators of OPR quality. Considering these four OPR indicators in the context of the current study, trust indicates student and employee perceptions of the university's truthfulness, concern, ability, and expertise when considering the university's actions and guidance specific to COVID-19. Control mutuality reflects the degree to which the study population feels the university considers and responds to their opinions and concerns about COVID-19 and agrees on what one party should expect from the other in the COVID-19 environment. Satisfaction is the degree to which the university's response to COVID-19 has meet the expectations of the study population and made the study population feel favorably toward the university. Commitment is the study population's feeling that, as a result of how the

university is handling the response to COVID-19, they want to maintain their relationship with the university.

The following research questions look at how the university's COVID-19 public health messaging may have impacted OPR quality between the university and its employees and students. The questions examine the relationship that exposure to the university's messaging has with each of the four indicators of OPR quality: trust, commitment, control mutuality, and satisfaction.

RQ2a: What is the association between exposure to the university's COVID-19 public health messaging and trust?

RQ2b: What is the association between exposure to the university's COVID-19 public health messaging and control mutuality?

RQ2c: What is the association between exposure to the university's COVID-19 public health messaging and satisfaction?

RQ2d: What is the association between exposure to the university's COVID-19 public health messaging and commitment?

Previous research found that OPR quality positively affected the intention to engage in a health behavior (Chon & Park, 2021). Informed by this finding; the current study asks the following research questions to explore the relationship between the four indicators of OPR quality (trust, control mutuality, satisfaction, commitment) and engagement in the COVID-19 health behaviors when on the university's campus.

RQ3a: What association does trust have with on-campus engagement in the COVID-19 health behaviors?

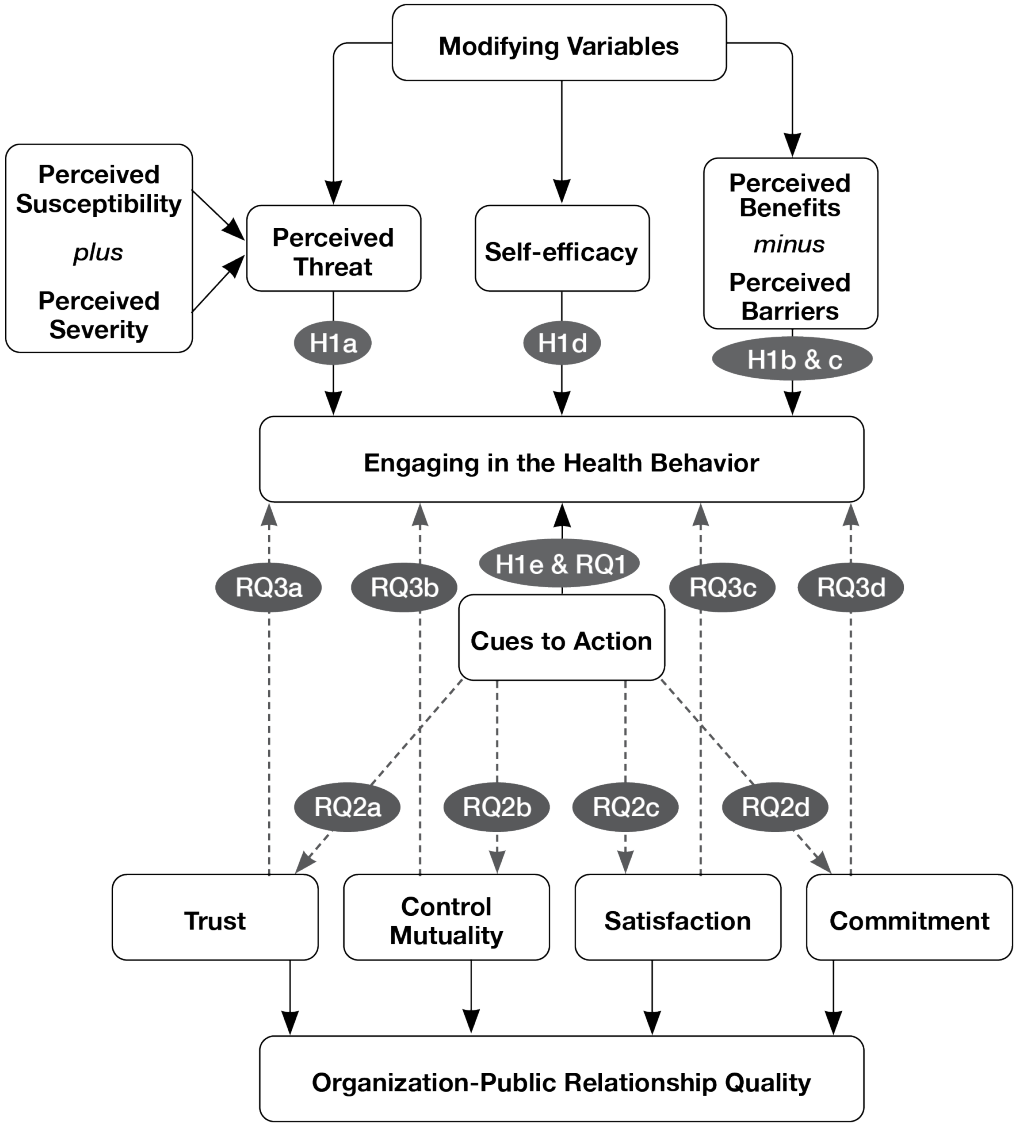
RQ3b: What association does control mutuality have with on-campus engagement in the COVID-19 health behaviors?

RQ3c: What association does satisfaction have with on-campus engagement in the COVID-19 health behaviors?

RQ3d: What association does commitment have with on-campus engagement in the COVID-19 health behaviors?

Figure 2 maps the hypotheses and research questions laid out in the current study to the framework provided by the HBM and OPR.

Figure 2: *Hypotheses and Research Questions Mapped to the Health Belief Model and Organization-Public Relationships*



Health belief model portion adapted from Rosenstock (1974a)

METHODOLOGY

Study Population

The study population consists of the full-time students and full-time employees at a large university in the southeastern United States. The study sample was randomly selected. Two e-mail lists, one containing a random sample of 10% of full-time students at the university and the other containing a random sample of 10% of full-time employees at the university was provided by the university's information technology group. The e-mail addresses in the random samples consisted of 4,736 students and 1,451 employees. An invitation to participate in the study by completing an online questionnaire was e-mailed to the student list and the employee list.

Procedure

An online questionnaire was used for this cross-sectional, self-administered survey. The questionnaire was built and managed using Qualtrics XM. Prior to beginning the study, the protocol was reviewed and approved by the university's Institutional Review Board (IRB). The IRB determined the study meet the criteria for exemption from IRB review, the IRB determination letter is included as Appendix B. Additionally, following university policy, approval to send e-mail to the population samples was obtained from the appropriate university leadership.

The questionnaire was distributed to the random sample of students and employees via an e-mailed link (also called a Uniform Resource Locator or "URL"). The questionnaire was distributed to the student sample in late March 2021 and to the employee sample in early April 2021, prior to the university's spring break. The student e-mail list and the employee e-mail list were sent different links to allow the two groups to more easily be analyzed separately. The e-mail sent advised that, as either students or employees of the university, the individuals were randomly selected to take a short questionnaire that is part of a research study about the university's public health messaging related to COVID-19. The e-mail asked that the recipients participate in the study by taking the questionnaire. A link to the online questionnaire was provided in the e-mail. The link took participants to the questionnaire introduction page, which provided further explanation of the project and instructions to click to the next page if the person agreed to take part in the survey. For each distribution, the questionnaire was left open for four days and then closed.

After data collection was complete, a field was added to identify responses as belonging to either the student or employee sample respectively. The student and employee datasets were then merged and exported from Qualtrics XM to IBM SPSS Statistics 27 for analysis.

Measures

The online questionnaire used in the current study takes approximately 13 minutes to complete and consists of single response items; no open-ended items are used. The questionnaire items focus on HBM components, OPR indicators, and engagement in COVID-19 health behaviors. The questionnaire asks about and references the four COVID-19 health

behaviors that were the focus of the university's public health messaging. These behaviors consist of wearing a mask, physical distancing (or social distancing), using hand sanitizer or washing your hands frequently, and cleaning and disinfecting frequently touched surfaces. To keep like questions and like contexts together in the questionnaire, as suggested by Wrench et al. (2019), items specific to the HBM are grouped together as are items specific to the OPR indicators and the COVID-19 health behaviors. An example of the questionnaire is included as Appendix C.

Following an introduction providing information about the research and the survey, participants, who choose to do so, click to the next page to begin the online questionnaire. The first item is formatted as a four-item matrix table asking about exposure to information about each of the four health behaviors (cues to action) from sources other than the university. A five-point Likert scale from *a great deal* to *not at all* is used.

The next two items address how frequently the participant has been on campus. The university implemented a phased "return to campus" plan, limiting the amount of on-campus instruction and the number of employees on campus. The items addressing frequency on campus ask how many days per week, on average, the participant was on campus. The first item is specific to the Fall 2020 term and the second is specific to the Spring 2021 term during which the questionnaire was distributed. A six-point scale with *not at all*, *less often than once a week*, *about once a week*, *2-3 days per week*, *4-5 days per week*, and *6-7 days per week* is used for these items. If *not at all* is selected for both of these items, the questionnaire is set up to omit questions specific to exposure to on-campus signage and frequency of on-campus engagement in the health behaviors.

Thirteen items measuring the HBM components susceptibility, severity, benefits, barriers, and self-efficacy are included in the questionnaire. Three items measure susceptibility, three items measure severity, two items measure benefits, three items measure barriers, and two items measure self-efficacy. Following these thirteen items, four items are included asking about exposure to cues to action from the university through specific communication channels: social media, e-mail, website, and on-campus signage. Using display logic in Qualtrics, the item measuring exposure to on-campus signage was omitted if the participant answered *not at all* for both "frequency on campus" items earlier in the questionnaire. Following these communication channel specific items, the four-item matrix table measuring exposure to information about each of the four health behaviors (cues to action) that was used at the top of the questionnaire is repeated. This time, instead of asking about exposure from sources other than the university, it asks about exposure from university sources.

The wording of the HBM items used in the questionnaire is based on scales developed by Champion (1999). The Champion HBM scales have "demonstrated moderate to high reliability" (Chapman-Lambert et al., 2017) and have been adapted by other studies including Blue and Valley (2002), Chapman-Lambert et al. (2017), Tong et al. (2019, 2020), and Wang et al. (2016). Consistent with previous HBM studies, a 5-point Likert scale from *strongly agree* to *strongly disagree* was used for HBM items (e.g., Blue & Valley, 2002; Clark et al., 2020; Tong et al., 2019, 2020). Items measuring exposure to cues to action were the exception and are measured, in the current study, on a 5-point Likert scale from *a great deal* to *not at all*. A table comparing the wording of the HBM items used in the current study to the HBM items developed by or adapted from Champion (1999) is included as Appendix D.

A set of questions asking about engagement in the public health behaviors in general and specifically when on the university campus, is used for each of the four COVID-19 public health behaviors promoted in the university's public health messaging. For example, "How often do you wear a mask when around others not in your household?" uses general engagement wording and "When you are on the [university] campus, how often do you wear a mask when around others?" asks the same question using on-campus specific wording. The questions specific to on-campus engagement were omitted if a participant answered *not at all* for both frequency on campus items presented earlier in the questionnaire.

The next section of the questionnaire focuses on OPR quality. Seventeen items are used to measure the four OPR indicators: trust, commitment, control mutuality, and satisfaction. Grunig and Huang argue that trust, control mutuality, commitment, and satisfaction "seem to represent the essence of organization public relationships" (2000, p. 42) and point out that these four indicators "appear consistently in the literature of interpersonal and organizational relationships" (2000, p. 42). These four indicators are the most widely studied and used measures of OPR quality (Huang & Zhang, 2013; Ni, 2007). Huang and Zhang reported the Cronbach's alpha measure of reliability of the scales "reached an acceptable level, most being higher than 0.70" (2013, p. 86).

In the questionnaire used for the current study, five items measure trust, four items measure control mutuality, three item measure commitment, and five items measure satisfaction. Consistent with previous OPR studies, a five-point Likert scale from *strongly agree* to *strongly disagree* is used for all OPR items (Jo et al., 2004; Ki & Hon, 2007).

OPR quality is measured specific to the COVID-19 environment by adapting the OPR measurement scales to address perceptions of the university's response to COVID-19 as opposed to a measurement of the general OPR between the university and the study population. The wording of the OPR items used in the questionnaire was adapted from Hon and Grunig's *Guidelines for Measuring Relationships in Public Relations* (1999), Huang's *Organizational-Public Relationship Assessment* (2001), and a 2004 study by Jo et al. which tested the OPR indicators proposed by Hon and Grunig (1999) and found them "valid and reliable" (Jo et al., 2004, p. 24). With regard to adapting the OPR scales, Huang argues that "when necessary, the skeleton can be adapted or supplemented to fit the characteristics or specific research needs of a particular OPR" (2001, p. 82). A table comparing the wording of the OPR items used in the current study to the OPR items they were adapted from is included as Appendix D.

Two demographic items are included at the end of the questionnaire. The first item measures age range with responses of *18 - 24 years old, 25 - 34 years old, 35 - 44 years old* continuing through *65 years or older.* The second demographic item asks how the participant identifies, with responses of *female, male, some other way,* or *prefer not to answer*. Following this final question, participants are shown a thank you message, and the questionnaire is complete.

RESULTS

Demographics

An invitation to participate in the current study by completing an online questionnaire was e-mailed to random samples consisting of 4,736 students and 1,451 employees. In response, 288 student participants (6%) and 203 employee participants (14%) completed the questionnaire, for a total of 491 participants and an overall questionnaire completion rate of 8%. Demographic data is shown in Table 1.

Table 1: *Participant demographic data*

	Employees		Students		Combined	
	N	%	N	%	*N*	%
Gender						
Female	133	66	181	63	314	64
Male	59	29	98	34	157	32
Some other way	2	1	5	2	7	1
No answer	9	4	4	1	13	3
Age						
18 to 24	21	25	173	60	194	40
25 to 34	48	24	66	23	114	23
35 to 44	51	25	24	8	75	15
45 to 54	35	17	14	5	49	10
55 to 64	36	18	7	3	43	9
65 or older	12	6	4	1	16	3

Scale Reliability Measurement

The current study uses HBM scale items adapted from those developed by Champion (1999), the current study also uses OPR scale items adapted from these developed by Huang (1997, 2001) and Hon and Grunig (1999). The original HBM and OPR scale items have been widely used in previous research and demonstrated validity and reliability (Chapman-Lambert et al., 2017; Jo et al., 2004). As part of the results listed in this section, a Cronbach's alpha coefficient is reported for each HBM and OPR subscale based on data from the combined employee and student participants. The alpha coefficient estimates the interrelatedness of the items making up these subscales, reporting "how much the test score depends upon general and group, rather than item specific, factors" (Cronbach, 1951, p. 320). Cronbach's alpha is one of the most commonly used and reported scalar reliability tests in the social sciences (Wrench et al., 2019).

In the currently study, Cronbach's alpha coefficients are interpreted using the "Interpreting Reliability" guidelines chart offered by Wrench et al. (2019, p. 259). As noted by Hon and Grunig (1999) and Di Iorio (2006), scales with few items generally have lower Cronbach's alpha coefficients than scales with a large number of items. Since the subscales in the current study all have under five items, this should be considered when evaluating the Cronbach's alpha coefficient values provided.

Health Belief Model Descriptives

The current study used subscales to measure the HBM components. Descriptives for the HBM component items are shown in Table 2.

Table 2: *Health belief model component item descriptives*

HBM Component	Item	Mean	Std. Deviation	N
Perceived Susceptibility[1]				
	My chances of getting COVID-19 are good.	2.69	1.15	487
	Healthy people can get COVID-19.	4.83	.50	487
	I worry a lot about getting COVID-19.	3.31	1.33	487
Perceived Severity[1]				
	The thought of getting COVID-19 scares me.	3.55	1.36	487
	The consequences of COVID-19 would be very serious and harmful to me.	3.57	1.26	487
	Problems I would experience from getting COVID-19 would last a long time.	3.45	1.23	487
Perceived Benefits[1]				
	I have a lot to gain by practicing the health behaviors.	4.51	.90	490
	Practicing the health behaviors reduces the chances of getting COVID-19.	4.67	.75	489
Perceived Barriers[1]				
	In order to practice the health behaviors, I have to give up quite a bit.	3.08	1.36	484
	Practicing the health behaviors interferes with my daily activities.	2.92	1.36	484
	I am concerned that others will make fun of me for practicing the health behaviors.	1.73	1.13	484
Perceived Self-efficacy[1]				
	I am confident that I can practice the health behaviors if I would like to do so.	4.71	.66	487
	It is easy for me to practice the health behaviors.	4.48	.85	487
Cues To Action – Other than university sources[2]				
	Wearing a mask.	4.75	.58	490
	Physical distancing (or social distancing).	4.65	.68	488
	Using hand sanitizer or washing your hands frequently.	4.46	.81	489
	Cleaning and disinfecting frequently touched surfaces.	4.04	1.06	489

Table 2 (Continued)

HBM Component	Item	Mean	Std. Deviation	N
Cues To Action – University sources[2]				
	Wearing a mask.	4.24	.96	490
	Physical distancing (or social distancing).	4.22	.97	489
	Using hand sanitizer or washing your hands frequently.	4.00	1.08	489
	Cleaning and disinfecting frequently touched surfaces.	3.68	1.18	489

Notes:
[1] A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.
[2] Items were presented in a four-item matrix table asking how often participants had been exposed to information about the following public health behaviors from university sources. A 5-point Likert scale was used for these items, coded so that 5 equals *a great deal* and 1 equals *not at all*.

According to the HBM, perceived susceptibility combined with perceived severity results in the perceived threat a health condition poses (Rosenstock et al., 1988). In the current study, perceived susceptibility and perceived severity items were combined to provide a single measure of perceived threat. Cronbach's alpha for the three perceived susceptibility items combined with the three perceived severity items was .82, indicating good reliability. These six items were collapsed into a single variable for *perceived threat*.

The two perceived benefits items had a Cronbach's alpha of .76, indicating respectable reliability, and were collapsed into a single variable for *perceived benefits*. Cronbach's alpha for the three perceived barriers items was .61, indicating undesirable reliability. Deleting the item "I am concerned that others will make fun of me for practicing the health behaviors" raised the alpha coefficient to .75, indicating respectable reliability. As a result, this item was omitted and the remaining items were collapsed into a single variable for *perceived barriers*.

The two perceived self-efficacy items had a Cronbach's alpha of .55, indicating unacceptable reliability. Considering that scales with few items can result in low alpha coefficient values and also considering the high face validity of the two perceived self-efficacy items; these items were retained and collapsed into a single variable for *perceived self-efficacy*.

Cues to actions were measured by two four-item matrix tables asking about exposure to public health messaging about each of the four health behaviors from 1) sources other than the university and 2) university specific sources. The four items measuring exposure to sources other than the university were collapsed into a variable for *cues to action*. Similarly, the four items measuring exposure to the university's messaging were collapsed into a variable for *university's cues to action*.

Descriptives for all of the collapsed HBM variables are shown in Table 3.

Table 3: *HBM variable descriptives*

HBM Variable	Mean	Std. Deviation	N	Cronbach's Alpha
Perceived Threat[1]	3.57	.85	481	.82
Perceived Benefits[1]	4.59	.75	482	.76
Perceived Barriers[1]	3.00	1.23	479	.75
Perceived Self-efficacy[1]	4.56	.63	482	.55
Cues To Action[2]	4.48	.65	481	-
University's Cues To Action[2]	4.05	.95	483	-

Notes:
[1]A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.
[2]A 5-point Likert scale was used for these items, coded so that 5 equals *a great deal* and 1 equals *not at all*.

The current study included four items asking about exposure to cues to action from the university through specific communication channels that were used (social media, e-mail, website, and on-campus signage). Descriptives for these items are shown in Table 4, broken down by employees, students, and the combination of the two.

Table 4: *University communication channels item descriptives*

Item	Mean	Std. Deviation	N
Social Media			
Employees	3.66	1.31	202
Students	3.58	1.24	287
Combined (employees & students)	3.61	1.27	489
E-mails from [the university]			
Employees	3.75	.99	203
Students	3.90	.99	284
Combined (employees & students)	3.84	.99	487
[the university] website			
Employees	3.81	1.01	202
Students	3.76	1.10	285
Combined (employees & students)	3.78	1.06	487
Signage and decals on the [university] campus[1]			
Employees	4.20	1.05	99
Students	4.13	1.09	123
Combined (employees & students)	4.16	1.07	222

Notes:
A 5-point Likert scale was used for these items, coded so that 5 equals *a great deal* and 1 equals *not at all*.
[1]Using display logic in Qualtrics, the item measuring exposure to on-campus signage was omitted if the participant answered *not at all* for both "frequency on campus" items earlier in the questionnaire.

Health Belief Model Components (H1a through H1e)

Hypotheses 1a through 1e examine the relationship between the individual HBM components and engagement in the COVID-19 health behaviors, empirically testing the HBM components as determinants of health behavior. The four items measuring engagement in the health behaviors were collapsed into a single variable for *frequency of engaging in the health behaviors*. Descriptives for these items are shown in Table 5. The combined results of employee and student participants were used for the H1a through H1e analyses.

Table 5: *Health behavior engagement item descriptives*

Item	Mean	Std. Deviation	N
How often do you wear a mask when around others not in your household?	4.21	1.05	491
How often do you practice physical distancing when around others not in your household?	4.09	1.01	489
Do you use hand sanitizer or wash your hands with soap and water?	4.61	.68	490
Do you clean and disinfect frequently touched surfaces in your space?	3.60	1.14	487

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *always* or *a great deal* and 1 equals *never* or *not at all*.

Perceived Threat (H1a)

Hypothesis 1a predicted that the perceived threat of COVID-19 would have a positive relationship with engaging in the COVID-19 health behaviors. Item descriptives for perceived susceptibility and perceived severity, which were combined to measure perceived threat, are shown in Table 2. Variable descriptives for perceived threat are shown in Table 3. A bivariate

linear regression was conducted to evaluate the relationship between the perceived threat of COVID-19 (M = 3.57, SD = .85, N = 481) and the frequency of engaging in the COVID-19 health behaviors (M = 4.13, SD = .70, N = 481). The regression equation for the analysis is: *Frequency of engaging in the health behaviors* = (.42 x *perceived threat*) + 2.62. The linear combination was significant, $F(1, 479) = 169.17$, $p < .001$, $r = .51$, $R^2 = .26$. The perceived threat of COVID-19 was found to have a moderate positive relationship with the frequency of engaging in the health behaviors. Approximately 26% of the variance in the frequency of engaging in the health behaviors can be accounted for by perceived threat.

Perceived Benefits (H1b)

Hypothesis 1b predicted that the perceived benefits of the COVID-19 health behaviors would have a positive relationship with engaging in the COVID-19 health behaviors. Item and variable descriptives for perceived benefits are shown in Tables 2 and 3. A bivariate linear regression was conducted to evaluate the relationship between the perceived benefits of practicing the COVID-19 health behaviors (M = 4.59, SD = .75, N = 482) and the frequency of engaging the COVID-19 health behaviors (M = 4.13, SD = .70, N = 482). The regression equation for the analysis is: *Frequency of engaging in the health behaviors* = (.48 x *perceived benefits*) + 1.93. The linear combination was significant, $F(1, 480) = 172.21$, $p < .001$, $r = .51$, $R^2 = .26$. The perceived benefits of practicing the COVID-19 health behaviors were found to have a moderate positive relationship to the frequency of engaging in the health behaviors. Approximately 26% of the variance in the frequency of engaging in the health behaviors can be accounted for by perceived benefits.

Perceived Barriers (H1c)

Hypothesis 1c predicted that the perceived barriers to practicing the COVID-19 health behaviors would have a negative relationship with engaging in the COVID-19 health behaviors. Item and variable descriptives for perceived barriers are shown in Tables 2 and 3. A bivariate linear regression was conducted to evaluate the relationship between the perceived barriers to practicing the COVID-19 health behaviors (M = 3.00, SD = 1.23, N = 479) and the frequency of engaging in the COVID-19 health behaviors (M = 4.12, SD = .70, N = 479). The regression equation for the analysis is: *Frequency of engaging in the health behaviors* = (-.09 x *perceived barriers*) + 4.39. The linear combination was significant, $F(1, 477) = 11.47$, $p < .001$, $r = -.15$, $R^2 = .02$. The perceived barriers to practicing the COVID-19 health behaviors were found to have a very weak negative relationship to the frequency of engaging in the health behaviors. Approximately 2% of the variance in the frequency of engaging in the health behaviors can be accounted for by perceived barriers.

Perceived Self-efficacy (H1d)

Hypothesis 1d predicted that perceived self-efficacy to perform the COVID-19 health behaviors would have a positive relationship with engaging in the COVID-19 health behaviors. Item and variable descriptives for perceived self-efficacy are shown in Tables 2 and 3. A bivariate linear regression was conducted to evaluate the relationship between perceived self-efficacy (M = 4.56, SD = .63, N = 482) and the frequency of engaging in the health behaviors (M = 4.13, SD = .70, N = 482). The regression equation for the analysis is: *Frequency of engaging in the health behaviors* = (.37 x *perceived self-efficacy*) + 2.44. The linear combination was significant, $F(1,$

480) = 58.76, $p < .001$, $r = .33$, $R^2 = .11$. Perceived self-efficacy to perform the COVID-19 health behaviors was found have a weak positive relationship to the frequency of engaging in the health behaviors. Approximately 11% of the variance in the frequency of engaging in the health behaviors can be accounted for by perceived self-efficacy.

Cues to Action (H1e)

Hypothesis 1e predicted that exposure to cues to action to perform the COVID-19 health behaviors would have a positive relationship with engaging in the COVID-19 health behaviors. Item and variable descriptives for cues to action shown in Tables 2 and 3. A bivariate linear regression was conducted to evaluate the relationship between exposure to cues to action (M = 4.48, SD = .65, N = 481) and the frequency of engaging in the health behaviors (M = 4.12, SD = .70, N = 481). The regression equation for the analysis is: *Frequency of engaging in the health behaviors* = (.13 x *cues to action*) + 3.54. The linear combination was significant, $F(1, 479) = 7.14$, p = .008, $r = .12$, $R^2 = .01$. Exposure to cues to action (from sources other than the university) to perform the COVID-19 health behaviors was found to have a very weak positive relationship to the frequency of engaging in the health behaviors. Approximately 1% of the variance in the frequency of engaging in the health behaviors can be accounted for by exposure to cues to action.

In addition to the four items measuring exposure to cues to action from sources other than the university, exposure to public health messaging (cues to action) from the university was also measured. Item and variable descriptives for the university's cues to action are shown in Tables 2 and 3. A bivariate linear regression was conducted to evaluate the relationship

between exposure to the university's cues to action (M = 4.05, SD = .95, N = 483) and the frequency of practicing the health behaviors (M = 4.13, SD = .70, N = 483). The regression equation for the analysis is: *Frequency of engaging in the health behaviors* = (.01 x *university's cues to action*) + 4.08. The linear combination was significant, $F(1, 481) = .127$, $p < .001$, $r = .02$, $R^2 = .00$, however the F value was below the critical value at the $p < 0.05$ level. Exposure to the university's cues to action about the COVID-19 health behaviors was found to have a very weak positive relationship to the frequency of engaging in the health behaviors. Less than 1% of the variance in the frequency of engaging in the health behaviors can be accounted for by exposure to the university's cues to action.

University's Cues to Action (RQ1)

Research Question 1 asks if there is an association between exposure to the university's public health messaging and on-campus engagement in the COVID-19 health behaviors. Item and variable descriptives for exposure to the university's messaging (university's cues to action) are shown in Tables 2 and 3. The four items measuring on-campus engagement in the health behaviors were collapsed into a single variable for *frequency of on-campus engagement in the health behaviors*. Descriptives for the on-campus engagement items are shown in Table 6 and reflect the combined (employee and student) participants.

A bivariate linear regression was conducted to evaluate the relationship between exposure to the university's cues to action (M = 4.28, SD = .85, N = 220) and the frequency of on-campus engagement in the health behaviors (M = 4.32, SD = .67, N = 220). The regression equation for the analysis is: *Frequency of on-campus engagement in the health behaviors* = (.07 x

university's cues to action) + 4.04. The linear combination was nonsignificant, $F(1, 218) = 1.50$, $p = .222$, $R^2 = .01$, indicating no evidence found through this analysis to suggest a relationship between exposure to the university's COVID-19 public health messaging and the frequency of on-campus engagement in the public health behaviors.

Table 6: *On-campus health behavior engagement item descriptives*

Item	Mean	Std. Deviation	N
When on the [university] campus, how often do you wear a mask when around others?	4.76	.69	221
When on the [university] campus, how often do you practice physical distancing?	4.44	.87	221
When on the [university] campus, do you use hand sanitizer or wash your hands with soap and water?	4.52	.74	221
When on the [university] campus, do you clean and disinfect frequently touched surfaces in your space?	3.55	1.29	220

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *always* or *a great deal* and 1 equals *never* or *not at all*.

University's Public Health Messaging and Organization-Public Relationship Quality (RQ2a through RQ2d)

Research Questions 2a through 2d explore what association exposure to the university's COVID-19 public health messaging (cues to action) has with OPR quality between the university and its employees and students. The items measuring exposure to the university's messaging were collapsed into single variables (*university's cues to action*) for employees, students, and the combination of the two. Descriptives for these items are shown in Table 7.

Table 7: *University's messaging (cues to action) item descriptives*

Items were presented in a four-item matrix table asking how often participants had been exposed to information about the following public health behaviors from university sources.

Item	Mean	Std. Deviation	N
Wearing a mask.			
Employees	4.32	.87	203
Students	4.20	1.01	287
Combined (employees & students)	4.24	.96	490
Physical distancing (or social distancing).			
Employees	4.27	.91	203
Students	4.20	1.01	286
Combined (employees & students)	4.22	.97	489
Using hand sanitizer or washing your hands frequently.			
Employees	4.04	1.00	203
Students	3.97	1.12	286
Combined (employees & students)	4.00	1.08	489
Cleaning and disinfecting frequently touched surfaces.			
Employees	3.71	1.11	203
Students	3.67	1.24	286
Combined (employees & students)	3.68	1.18	489

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *a great deal* and 1 equals *not at all*.

Cronbach's alpha coefficients for the subscale items measuring the four OPR indicators ranged from .90 to .95, indicating excellent reliability. Descriptives for each subscale are included as part of the results for Research Questions 2a through 2d. Items were collapsed into single variables for *trust* (RQ2a), *control mutuality* (RQ2b), *satisfaction* (RQ2c), and *commitment* (RQ2d) for employees, students, and the combination of the two. Descriptives for the OPR indicator variables are shown in Table 8.

Table 8: *OPR quality indicator variable descriptives*

Item	Mean	Std. Deviation	N	Cronbach's Alpha
Trust				
Employees	4.29	.79	202	-
Students	4.02	.99	282	-
Combined (employees & students)	4.18	.87	484	.90
Control Mutuality				
Employees	3.95	.95	203	-
Students	3.83	1.03	280	-
Combined (employees & students)	3.88	1.00	483	.91
Satisfaction				
Employees	4.12	.97	201	-
Students	3.80	1.13	275	-
Combined (employees & students)	3.93	1.08	476	.95
Commitment				
Employees	4.04	.98	202	-
Students	3.85	1.06	281	-
Combined (employees & students)	3.93	1.03	483	.90

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

University's Messaging and Trust (RQ2a)

Research Question 2a explores the association between exposure to the university's COVID-19 public health messaging (cues to action) and trust. Item descriptives for trust ($\alpha = .90$), shown in Table 9, were collapsed into a single variable. Three bivariate linear regressions were conducted looking at university employees, university students, and the combination of the two to evaluate the respective relationships between exposure to the university's cues to action and trust.

- ***Employees****:* University's cues to action (M = 4.08, SD = .89, N = 202), trust (M = 4.29, SD = .79, N = 202). The regression equation is: *Trust* = (.36 x *university's cues to action*) + 2.83. The linear combination was significant, $F(1, 200) = 38.71$, $p < .001$, $r = .40$, $R^2 = .16$.
- ***Students****:* University's cues to action (M = 4.02, SD = .99, N = 282) and trust (M = 4.12, SD = .91, N = 282). The regression equation is: *Trust* = (.23 x *university's cues to action*) 3.17. The linear combination was significant, $F(1, 280) = 19.23$, $p < .001$, $r = .25$, $R^2 = .06$.
- ***Combined participants (employees and students)****:* University's cues to action (M = 4.04, SD = .95, N = 484) and trust (M = 4.18, SD = .87, N = 484). The regression equation is: *Trust* = (.28 x *university's cues to action*) + 3.04. The linear combination was significant, $F(1, 482) = 50.94$, $p < .001$, $r = .31$, $R^2 = .10$.

In university employees, exposure to the university's COVID-19 public health messaging was found to have a moderate positive relationship with trust. In employees, approximately 16% of the variance in the measure of trust can be accounted for by exposure to the university's messaging. In university students and in the combined participants, exposure to the university's messaging was found to have a weak positive relationship with trust. In students and the combined participants, approximately 6% and 10% respectively, of the variance in the measure of trust can be accounted for by exposure to the university's messaging.

Table 9: *Trust item descriptives*

Item	Mean	Std. Deviation	N
[the university] is truthful with me about COVID-19.			
Employees	4.44	.81	203
Students	4.29	.96	286
Combined (employees & students)	4.36	.90	485
Whenever [the university] makes an important decision related to COVID-19, I know the university will be concerned about people like me.			
Employees	1.02	1.12	203
Students	3.88	1.12	286
Combined (employees & students)	3.94	1.13	485
When it comes to COVID-19, I feel very confident about [the university]'s ability and expertise.			
Employees	4.19	1.01	202
Students	3.94	1.12	286
Combined (employees & students)	4.05	1.09	485
I am very willing to follow [the university]'s guidance regarding COVID-19.			
Employees	4.60	.75	203
Students	4.04	1.12	284
Combined (employees & students)	4.46	.91	485
When considering COVID-19, sound principles seem to guide [the university]'s decisions.			
Employees	4.19	1.10	203
Students	4.04	1.11	284
Combined (employees & students)	4.10	1.09	485

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

University's Messaging and Control Mutuality (RQ2b)

Research Question 2b explores the association between exposure to the university's COVID-19 public health messaging (cues to action) and control mutuality. Item descriptives for control mutuality (α = .91), shown in Table 10, were collapsed into a single variable. Three

bivariate linear regressions were conducted looking at university employees, university students, and the combination of the two to evaluate the respective relationships between exposure to the university's cues to action and control mutuality.

- ***Employees****:* University's cues to action (M = 4.08, SD = .89, N = 203), control mutuality (M = 3.95, SD = .95, N = 203). The regression equation is: *Control mutuality* = (.44 x *university's cues to action*) + 2.15. The linear combination was significant, $F(1, 201) = 41.38$, $p < .001$, $r = .41$, $R^2 = .17$.
- ***Students****:* University's cues to action (M = 4.01, SD = .99, N = 280), control mutuality (M = 3.83, SD = 1.03, N = 280). The regression equation is: *Control mutuality* = (.31 x *university's cues to action*) 2.57. The linear combination was significant, $F(1, 278) = 27.95$, $p < .001$, $r = .30$, $R^2 = .09$.
- ***Combined participants (employees and students)****:* University's cues to action (M = 4.04, SD = .95, N = 483), control mutuality (M = 3.88, SD = 1.00, N = 483). The regression equation is: *Control mutuality* = (.36 x *university's cues to action*) + 2.41. The linear combination was significant, $F(1, 481) = 65.08$, $p < .001$, $r = .35$, $R^2 = .12$.

In university employees, exposure to the university's COVID-19 public health messaging was found to have a moderate positive relationship with control mutuality. In employees, approximately 17% of the variance in the measure of control mutuality can be accounted for by exposure to the university's messaging. In university students and the combined participants, exposure to the university's messaging was found to have a weak positive relationship with control mutuality. In students and the combined participants, approximately 9% and 12%

respectively, of the variance in the measure of control mutuality can be accounted for by exposure to the university's messaging.

Table 10: *Control mutuality item descriptives*

Item	Mean	Std. Deviation	N
Considering COVID-19, [the university] and I agree on what we can expect from one another.			
Employees	4.16	1.01	203
Students	3.98	1.15	283
Combined (employees & students)	4.06	1.10	484
[the university] and people like me are attentive to what each other say when it comes to COVID-19.			
Employees	4.03	1.03	203
Students	3.92	1.14	285
Combined (employees & students)	3.96	1.10	484
With regard to COVID-19 and the university's decisions and guidance, [the university] believes the opinions of people like me are legitimate.			
Employees	3.79	1.14	203
Students	3.75	1.22	285
Combined (employees & students)	3.76	1.19	484
When people like me interact with [the university] about the university's response to COVID-19, I feel the university listens to questions and concerns and provides timely answers.			
Employees	3.81	1.14	203
Students	3.67	1.13	283
Combined (employees & students)	3.72	1.14	484

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

University's Messaging and Satisfaction (RQ2c)

Research Question 2c explores the association is the association between exposure to the university's COVID-19 public health messaging (cues to action) and satisfaction. Item

descriptives for satisfaction (α = .95), shown in Table 11, were collapsed into a single variable. Three bivariate linear regressions were conducted looking at university employees, university students, and the combination of the two to evaluate the respective relationships between exposure to the university's cues to action and satisfaction.

- ***Employees****:* University's cues to action (M = 4.08, SD = .89, N = 201), satisfaction (M = 4.12, SD = .97, N = 201). The regression equation is: *Satisfaction* = (.37 x *university's cues to action*) + 2.59. The linear combination was significant, $F(1, 199) = 27.18$, $p < .001$, $r = .35$, $R^2 = .12$.
- ***Students****:* University's cues to action (M = 4.00, SD = .99, N = 275) and satisfaction (M = 3.80, SD = 1.13, N = 275). The regression equation is: *Satisfaction* = (.25 x *university's cues to action*) 2.80. The linear combination was significant, $F(1, 273) = 13.23$, $p < .001$, $r = .22$, $R^2 = .05$.
- ***Combined participants (employees and students)****:* University's cues to action (M = 4.04, SD = .95, N = 476) and satisfaction (M = 3.93, SD = 1.08, N = 476). The regression equation is: *Satisfaction* = (.30 x *university's cues to action*) + 2.71. The linear combination was significant, $F(1, 474) = 36.11$, $p < .001$, $r = .27$, $R^2 = .07$.

In university employees, university students, and the combination of the two; exposure to the university's COVID-19 public health messaging was found to have a weak positive relationship with satisfaction. In employees, approximately 12% of the variance in the measure of satisfaction can be accounted for by exposure to the university's messaging. In students and in the combined participants, approximately 5% and 7% respectively, of the variance in the measure of satisfaction can be accounted for by exposure to the university's messaging.

Table 11: *Satisfaction item descriptives*

Item	Mean	Std. Deviation	N
Thinking about COVID-19, generally speaking, [the university] is meeting my expectations.			
Employees	4.21	1.07	203
Students	3.88	1.23	284
Combined (employees & students)	4.01	1.18	477
In general, I am satisfied with the relationship [the university] has established with people like me during the university's response to COVID-19.			
Employees	4.07	1.12	202
Students	3.80	1.23	281
Combined (employees & students)	3.91	1.19	477
Throughout the COVID-19 pandemic, my relationship with [the university] has been good.			
Employees	4.37	.87	203
Students	3.94	1.18	286
Combined (employees & students)	4.11	1.09	477
How [the university] is handling the response to COVID-19 makes me feel like I am important to this university.			
Employees	3.80	1.21	203
Students	3.55	1.23	286
Combined (employees & students)	3.63	1.27	477
Considering how [the university] is handling the response to COVID-19, I am happy with the university.			
Employees	4.17	1.07	202
Students	3.87	1.26	283
Combined (employees & students)	3.99	1.18	477

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

University's Messaging and Commitment (RQ2d)

Research Question 2d explores the association between exposure to the university's COVID-19 public health messaging (cues to action) and commitment. Item descriptives for

commitment (α = .90), shown in Table 12, were collapsed into a single variable. Three bivariate linear regressions were conducted looking at university employees, university students, and the combination of the two to evaluate the respective relationships between exposure to the university's cues to action and commitment.

- ***Employees****:* University's cues to action (M = 4.08, SD = .89, N = 202), commitment (M = 4.04, SD = .98, N = 202). The regression equation is: *Commitment* = (.39 x *university's cues to action*) + 2.44. The linear combination was significant, $F(1, 200) = 29.63$, $p < .001$, $r = .36$, $R^2 = .13$.
- ***Students****:* University's cues to action (M = 4.01, SD = .99, N = 281) and commitment (M = 3.85, SD = 1.06, N = 281). The regression equation is: *Commitment* = (.29 x *university's cues to action*) 2.70. The linear combination was significant, $F(1, 279) = 21.39$, $p < .001$, $r = .27$, $R^2 = .07$.
- ***Combined participants (employees and students)****:* University's cues to action (M = 4.04, SD = .95, N = 483) and commitment (M = 3.93, SD = 1.03, N = 483). The regression equation is: *Commitment* = (.33 x *university's cues to action*) + 2.60. The linear combination was significant, $F(1, 481) = 48.81$, $p < .001$, $r = .30$, $R^2 = .09$.

In university employees, university students, and the combination of the two; exposure to the university's COVID-19 public health messaging was found to have a weak positive relationship with commitment. In employees, approximately 13% of the variance in the measure of commitment can be accounted for by exposure to the university's messaging. In students and in the combined participants, approximately 7% and 9% respectively, of the variance in the measure of commitment can be accounted for by exposure to the university's messaging.

Table 12: *Commitment item descriptives*

Item	Mean	Std. Deviation	N
Considering [the university]'s response to COVID-19, I wish to keep a long-lasting relationship with the university.			
Employees	4.26	.96	202
Students	4.06	1.00	284
Combined (employees & students)	4.14	.99	484
Considering how [the university] is handling the response to COVID-19, I feel like the university is trying to maintain a long-term commitment to people like me.			
Employees	4.03	1.09	203
Students	3.89	1.19	285
Combined (employees & students)	3.95	1.15	484
Considering how [the university] is handling the response to COVID-19, I feel a sense of loyalty to the university.			
Employees	3.83	1.16	202
Students	3.59	1.25	286
Combined (employees & students)	3.69	1.22	484

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

Organization-Public Relationship Quality and On-campus Engagement in Health Behaviors (RQ3a through RQ3d)

Research Questions 3a through 3d explore what association the indicators of OPR quality have with on-campus engagement in the COVID-19 health behaviors. Using display logic in Qualtrics, only those participants who indicated they had been on the university campus were asked to respond to questions about on-campus engagement in the health behaviors; as a result, participant data used in the analyses for Research Questions 3a through 3d are only from participants who indicated they had been on-campus. The items measuring

on-campus engagement in the health behaviors were collapsed into single variables (*frequency of on-campus engagement in the health behaviors*) for employees, students, and the combination of the two. Descriptives for these items are shown in Table 13.

Table 13: *On-campus health behavior engagement item descriptives by participant group*

Item	Mean	Std. Deviation	N
When on the [university] campus, how often do you wear a mask when around others?			
Employees	4.86	.45	99
Students	4.68	.83	122
Combined (employees & students)	4.76	.69	221
When on the [university] campus, how often do you practice physical distancing?			
Employees	4.61	.60	99
Students	4.30	1.02	122
Combined (employees & students)	4.44	.87	221
When on the [university] campus, do you use hand sanitizer or wash your hands with soap and water?			
Employees	4.61	.59	99
Students	4.44	.83	122
Combined (employees & students)	4.52	.74	221
When on the [university] campus, do you clean and disinfect frequently touched surfaces in your space?			
Employees	3.86	1.12	99
Students	3.31	1.37	121
Combined (employees & students)	3.55	1.29	220

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *always* or *a great deal* and 1 equals *never* or *not at all*.

In the subset of data from only participants who indicated they had been on-campus, Cronbach's alpha coefficients for the subscale items measuring the four OPR indicators ranged

from .91 to .96, indicating excellent reliability. Descriptives for each subscale are included as part of the results for Research Questions 3a through 3d. Items were collapsed into single variables for *trust* (RQ3a), *control mutuality* (RQ3b), *satisfaction* (RQ3c), and *commitment* (RQ3d) for employees, students, and the combination of the two. Descriptives for the OPR indicator variables are shown in Table 14.

Table 14: *OPR quality indicator variable descriptives using "on-campus" responses*

Item	Mean	Std. Deviation	N	Cronbach's Alpha
Trust				
Employees	4.41	.72	98	-
Students	4.11	.99	121	-
Combined (employees & students)	4.24	.89	219	.91
Control Mutuality				
Employees	4.07	.86	99	-
Students	3.79	1.15	118	-
Combined (employees & students)	3.91	1.04	217	.92
Satisfaction				
Employees	4.26	.89	98	-
Students	3.71	1.24	118	-
Combined (employees & students)	3.96	1.13	216	.96
Commitment				
Employees	4.21	.91	99	-
Students	3.76	1.15	119	-
Combined (employees & students)	3.96	1.07	218	.92

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

Research Questions 3a through 3d look what association multiple independent variables (the OPR indicators) have with a single dependent variable (engagement in the health behaviors

when on the university's campus). Because of this, the researcher explored using a multiple linear regression analysis. To evaluate the data, a collinearity test was conducted which showed the OPR indicators were moderately correlated. Many of the variance inflation factor (VIF) values were near or exceeding 5.00 and values of tolerance were less than .20, indicating likely multicollinearity. Multicollinearity can result in independent variables appearing to be statistically nonsignificant when they, in fact, have a significant relationship with the dependent variable (Daoud, 2017). To avoid this, multiple linear regression was not used for Research Questions 3a through 3d; instead, simple bivariate linear regressions were used.

Trust and On-campus Engagement (RQ3a)

Research Question 3a explores the association between trust and on-campus engagement in the COVID-19 health behaviors. Item descriptives for trust ($\alpha = .91$), shown in Table 15, were collapsed into a single variable. Three bivariate linear regressions were conducted looking at university employees, university students, and the combination of the two to evaluate the respective relationships between trust and frequency of on-campus engagement in the health behaviors.

- ***Employees****:* Trust ($M = 4.41$, $SD = .72$, $N = 98$), frequency of on-campus engagement in the health behaviors ($M = 4.48$, $SD = .48$, $N = 98$). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.23 x *trust*) + 3.44. The linear combination was significant, $F(1, 96) = 13.45$, $p < .001$, $r = .35$, $R^2 = .12$.
- ***Students****:* Trust ($M = 4.11$, $SD = .99$, $N = 121$), frequency of on-campus engagement in the health behaviors ($M = 4.18$, $SD = .76$, $N = 121$). The regression equation is: *Frequency of on-*

campus engagement in the health behaviors = (.42 x *trust*) + 2.44. The linear combination was significant, $F(1, 119) = 51.50$, $p < .001$, $r = .55$, $R^2 = .30$.

- ***Combined participants (employees and students)****:* Trust ($M = 4.24$, $SD = .89$, $N = 219$), frequency of on-campus engagement in the health behaviors ($M = 4.32$, $SD = .67$, $N = 219$). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.39 x *trust*) + 2.68. The linear combination was significant, $F(1, 217) = 77.69$, $p < .001$, $r = .51$, $R^2 = .26$.

In university employees, trust was found to have a weak positive relationship with the frequency of on-campus engagement in the COVID-19 health behaviors; accounting for approximately 12% of the variance in the frequency of on-campus engagement in the health behaviors. In university students and in the combined participants, trust was found to have a moderate positive relationship with the frequency of on-campus engagement in the COVID-19 health behaviors. In students, approximately 30% of the variance in the frequency of on-campus engagement in the health behaviors can be accounted for by trust. In the combined participants, this was slightly lower at approximately 25%.

Table 15: *Trust item descriptives using "on-campus" responses*

Item	Mean	Std. Deviation	N
[the university] is truthful with me about COVID-19.			
Employees	4.45	.76	99
Students	4.31	1.04	123
Combined (employees & students)	4.38	.93	221

Table 15 (continued)

Item	Mean	Std. Deviation	N
[the university] is truthful with me about COVID-19.			
Employees	4.45	.76	99
Students	4.31	1.04	123
Combined (employees & students)	4.38	.93	221
Whenever [the university] makes an important decision related to COVID-19, I know the university will be concerned about people like me.			
Employees	4.28	.98	99
Students	3.88	1.21	123
Combined (employees & students)	4.05	1.13	221
When it comes to COVID-19, I feel very confident about [the university]'s ability and expertise.			
Employees	4.31	.96	98
Students	3.93	1.19	123
Combined (employees & students)	4.10	1.11	221
I am very willing to follow [the university]'s guidance regarding COVID-19.			
Employees	4.72	.59	99
Students	4.33	1.10	123
Combined (employees & students)	4.50	.93	221
When considering COVID-19, sound principles seem to guide [the university]'s decisions.			
Employees	4.29	.99	99
Students	4.05	1.19	123
Combined (employees & students)	4.16	1.12	221

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

Control Mutuality and On-campus Engagement (RQ3b)

Research Question 3b explores the association between control mutuality and on-campus engagement in the COVID-19 health behaviors. Item descriptives for control mutuality ($\alpha = .92$), shown in Table 16, were collapsed into a single variable. Three bivariate linear

regressions were conducted looking at university employees, university students, and the combination of the two to evaluate the respective relationships between control mutuality and frequency of on-campus engagement in the health behaviors.

- ***Employees****:* Control mutuality (M = 4.07, SD = .86, N = 99), frequency of on-campus engagement in the health behaviors (M = 4.48, SD = .48, N = 99). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.15 x *control mutuality*) + 3.88. The linear combination was significant, $F(1, 97) = 7.41$, $p = .008$, $r = .27$, $R^2 = .07$.
- ***Students****:* Control mutuality (M = 3.79, SD = 1.15, N = 118), frequency of on-campus engagement in the health behaviors (M = 4.18, SD = .77, N = 118). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.32 x *control mutuality*) + 2.97. The linear combination was significant, $F(1, 116) = 34.09$, $p < .001$, $r = .48$, $R^2 = .23$.
- ***Combined participants (employees and students)****:* Control mutuality (M = 3.91, SD = 1.04, N = 217), frequency of on-campus engagement in the health behaviors (M = 4.32, SD = .67, N = 217). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.28 x *control mutuality*) + 3.22. The linear combination was significant, $F(1, 215) = 49.50$, $p < .001$, $r = .43$, $R^2 = .19$.

In university employees, control mutuality was found to have a weak positive relationship with the frequency of on-campus engagement in the COVID-19 health behaviors; accounting for approximately 7% of the variance in the frequency of on-campus engagement in the health behaviors. In university students and in the combined participants, control mutuality was found to have a moderate positive relationship with the frequency of on-campus engagement in the COVID-19 health behaviors. In students, approximately 23% of the variance in the

frequency of on-campus engagement in the health behaviors can be accounted for by control mutuality. In the combined participants, this was slightly lower at approximately 19%.

Table 16: *Control mutuality item descriptives using "on-campus" responses*

Item	Mean	Std. Deviation	N
Considering COVID-19, [the university] and I agree on what we can expect from one another.			
Employees	4.36	.86	99
Students	3.94	1.27	121
Combined (employees & students)	4.13	1.13	219
[the university] and people like me are attentive to what each other say when it comes to COVID-19.			
Employees	4.17	.90	99
Students	3.91	1.22	123
Combined (employees & students)	4.02	1.10	219
With regard to COVID-19 and the university's decisions and guidance, [the university] believes the opinions of people like me are legitimate.			
Employees	3.85	1.08	99
Students	3.75	1.30	123
Combined (employees & students)	3.78	1.21	219
When people like me interact with [the university] about the university's response to COVID-19, I feel the university listens to questions and concerns and provides timely answers.			
Employees	3.89	1.08	99
Students	3.58	1.25	122
Combined (employees & students)	3.71	1.18	219

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

Satisfaction and On-campus Engagement (RQ3c)

Research Question 3c explores the association between satisfaction and on-campus engagement in the COVID-19 health behaviors. Item descriptives for satisfaction ($\alpha = .96$),

shown in Table 17, were collapsed into a single variable. Three bivariate linear regressions were conducted looking at university employees, university students, and the combination of the two to evaluate the respective relationships between satisfaction and frequency of on-campus engagement in the health behaviors.

- ***Employees****:* Satisfaction (M = 4.26, SD = .89, N = 98), frequency of on-campus engagement in the health behaviors (M = 4.48, SD = .48, N = 98). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.14 x *satisfaction*) + 3.87. The linear combination was significant, $F(1, 96) = 49.50$, $p = .008$, $r = .27$, $R^2 = .07$.
- ***Students****:* Satisfaction (M = 3.71, SD = 1.24, N = 118), frequency of on-campus engagement in the health behaviors (M = 4.18, SD = .77, N = 118). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.26 x *satisfaction*) + 3.23. The linear combination was significant, $F(1, 116) = 23.91$, $p < .001$, $r = .41$, $R^2 = .17$.
- ***Combined participants (employees and students)****:* Satisfaction (M = 3.96, SD = 1.13, N = 216), frequency of on-campus engagement in the health behaviors (M = 4.31, SD = .67, N = 216). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.24 x *satisfaction*) + 3.35. The linear combination was significant, $F(1, 214) = 42.75$, $p < .001$, $r = .41$, $R^2 = .17$.

In university employees, satisfaction was found to have a weak positive relationship with the frequency of on-campus engagement in the COVID-19 health behaviors; accounting for approximately 7% of the variance in the frequency of on-campus engagement in the health behaviors. In university students and in the combined participants, satisfaction was found to have a moderate positive relationship with the frequency of on-campus engagement in the

COVID-19 health behaviors. In both students and the combined participants, approximately 17% of the variance in the frequency of on-campus engagement in the health behaviors can be accounted for by satisfaction.

Table 17: *Satisfaction item descriptives using "on-campus" responses*

Item	Mean	Std. Deviation	N
Thinking about COVID-19, generally speaking, [the university] is meeting my expectations.			
Employees	4.28	1.01	99
Students	3.75	1.32	123
Combined (employees & students)	4.01	1.18	477
In general, I am satisfied with the relationship [the university] has established with people like me during the university's response to COVID-19.			
Employees	4.23	1.00	98
Students	3.70	1.32	122
Combined (employees & students)	3.94	1.22	218
Throughout the COVID-19 pandemic, my relationship with [the university] has been good.			
Employees	4.43	.77	99
Students	3.81	1.31	123
Combined (employees & students)	4.08	1.15	218
How [the university] is handling the response to COVID-19 makes me feel like I am important to this university.			
Employees	4.03	1.10	99
Students	3.53	1.38	123
Combined (employees & students)	3.74	1.29	218
Considering how [the university] is handling the response to COVID-19, I am happy with the university.			
Employees	4.32	.98	99
Students	3.75	1.33	121
Combined (employees & students)	4.00	1.22	218

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

Commitment and On-campus Engagement (RQ3d)

Research Question 3d explores the association between commitment and on-campus engagement in the COVID-19 health behaviors. Item descriptives for commitment (α = .92), shown in Table 18, were collapsed into a single variable. Three bivariate linear regressions were conducted looking at university employees, university students, and the combination of the two to evaluate the respective relationships between commitment and frequency of on-campus engagement in the health behaviors.

- ***Employees****:* Commitment (*M* = 4.21, *SD* = .91, *N* = 99), frequency of on-campus engagement in the health behaviors (*M* = 4.49, *SD* = .48, *N* = 99). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.18 x *commitment*) + 3.74. The linear combination was significant, $F(1, 97) = 12.38$, $p < .001$, $r = .34$, $R^2 = .11$.
- ***Students****:* Commitment (*M* = 3.76, *SD* = 1.15, *N* = 119), frequency of on-campus engagement in the health behaviors (*M* = 4.17, *SD* = .76, *N* = 119). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.26 x *commitment*) + 3.18. The linear combination was significant, $F(1, 117) = 22.00$, $p < .001$, $r = .40$, $R^2 = .16$.
- ***Combined participants (employees and students)****:* Commitment (*M* = 3.96, *SD* = 1.07, *N* = 218), frequency of on-campus engagement in the health behaviors (*M* = 4.31, *SD* = .67, *N* = 218). The regression equation is: *Frequency of on-campus engagement in the health behaviors* = (.25 x *commitment*) + 3.31. The linear combination was significant, $F(1, 216) = 43.12$, $p < .001$, $r = .41$, $R^2 = .17$.

In university employees, commitment was found to have a weak positive relationship with the frequency of on-campus engagement in the COVID-19 health behaviors; accounting for

approximately 11% of the variance in the frequency of on-campus engagement in the health behaviors. In university students and in the combined participants, commitment was found to have a moderate positive relationship with the frequency of on-campus engagement in the COVID-19 health behaviors. In students, approximately 16% of the variance in the frequency of on-campus engagement in the health behaviors can be accounted for by control mutuality. In the combined participants, this was similar at approximately 17%.

Table 18: *Commitment item descriptives using "on-campus" responses*

Item	Mean	Std. Deviation	N
Considering [the university]'s response to COVID-19, I wish to keep a long-lasting relationship with the university.			
Employees	4.38	.82	99
Students	3.99	1.09	123
Combined (employees & students)	4.16	1.00	220
Considering how [the university] is handling the response to COVID-19, I feel like the university is trying to maintain a long-term commitment to people like me.			
Employees	4.16	1.02	99
Students	3.76	1.26	122
Combined (employees & students)	3.94	1.17	220
Considering how [the university] is handling the response to COVID-19, I feel a sense of loyalty to the university.			
Employees	4.07	1.06	99
Students	3.52	1.34	122
Combined (employees & students)	3.77	1.25	220

Note: A 5-point Likert scale was used for these items, coded so that 5 equals *strongly agree* and 1 equals *strongly disagree*.

DISCUSSION

The primary goals of this study were to empirically test the HBM components as determinants of COVID-19 health behaviors; explore the association of the university's messaging efforts with engagement in the health behaviors; and, in the context of the university's response to COVID-19, determine how that messaging was related to OPR quality and how OPR quality was related to engagement in the health behaviors promoted by the university. This section provides a discussion of the study's findings and how the findings compare to previous, related studies.

Health Belief Model

Previous research found the HBM components to be significantly related to health behavior (Harrison J.A. et al., 1992; Janz & Becker, 1984; C. J. Jones et al., 2014; Jose et al., 2020; Sulat et al., 2018). Consistent with the results of prior HBM research, the current study found the relationship between the HBM components and health behavior to be statistically significant. As predicted; perceived threat of COVID-19, perceived benefits of COVID-19 health behaviors, perceived self-efficacy to perform COVID-19 health behaviors, and exposure to cues to action to perform COVID-19 health behaviors all had a positive relationship with engaging in COVID-19 health behaviors. Also as predicted, perceived barriers to performing COVID-19

health behaviors had a negative relationship with engaging in COVID-19 health behaviors. Thus, hypotheses 1a through 1e were supported by the findings.

While adding to the greater body of HBM literature in general, the current study is of particular value as all components of the HBM in its entirety were tested. As noted by Harrison et al. (1992) and Jones et al. (2014), many HBM studies do not use the HBM in its entirety, instead applying only a selection of the components. The current study applied the model as a whole, contributing to the body of HBM research by addressing what has been identified as a weakness in past HBM studies (C. J. Jones et al., 2014).

When looking at the variance in behavior explained by the HBM components, the current study found perceived threat and perceived benefits to be the strongest determinants of engaging in the COVID-19 public health behaviors, followed by perceived self-efficacy. Perceived barriers and cues to action were the weakest determinants of engaging in the COVID-19 public health behaviors. The findings partially support HBM studies that indicate perceived benefits is often one of the strongest predictors of health behaviors (Carpenter, 2010; Janz & Becker, 1984; Sulat et al., 2018). However, the literature is not completely decisive on which HBM components are consistently the strongest predictors of health behaviors; instead, reviews of previous studies indicate the effectiveness of the individual components depends greatly on the specific situation and health behavior(s) being studied (C. J. Jones et al., 2014; Tong et al., 2020). With this in mind, the following paragraphs look more closely at the findings of this study that differ from prior HBM research; namely the findings related to perceived threat, perceived barriers, and cues to action.

Perceived Threat

Perceived threat, or its components perceived severity and perceived susceptibility, have often been found to be among the weakest predictors of health behaviors (Carpenter, 2010; Janz & Becker, 1984). Contrary to that prior research, this study found perceived threat to instead be one of the strongest predictors of health behaviors. When looking specifically at applications of the HBM to COVID-19 health behaviors in other studies the findings relative to perceived threat are varied. For example; results of the current study support Ghosh et al. (2020) in their finding that perceived threat was the strongest predictor of COVID-19 health behaviors, but are opposite the finding of Clark et al. (2020) that perceived susceptibility was the weakest predictor of COVID-19 health behaviors.

The difference in study populations used by Clark et al. (2020) and Ghosh et al. (2020) might explain the difference in findings between the two studies. Both studies were conducted in early 2020, when the total worldwide number of positive cases still numbered in the low thousands and an understanding of the associated threat of the virus was still being developed and communicated by public health experts. When these studies were conducted only a few weeks had passed since the WHO (2020) classified COVID-19 as a pandemic. However, while the Clark et al. (2020) study participants came from a large international sample that consisted of many areas where COVID-19 had not yet had a major impact, participants in the Ghosh et al. (2020) study were residents of an apartment building where other residents had contracted COVID-19 and the entire complex had been placed in quarantine by the local government. For participants in the Ghosh et al. (2020) study, the perceived threat of COVID-19 was, perhaps, greater as a result of the immediacy of the situation. Similarly, by early 2021 when the current

study was conducted, the worldwide number of positive cases and deaths resulting from COVID-19 numbered in the millions and had been widely covered in the media. This made the threat of the virus well known and understood by most, as well as more immediate, perhaps contributing to the study's finding that perceived threat was one of the strongest predictors of engaging in COVID-19 health behaviors.

Perceived Barriers

Perceived barriers has often been found to be one of the strongest predictors of health behaviors (Carpenter, 2010; Janz & Becker, 1984). Though, in the current study perceived barriers was one of the weakest predictors of engaging in COVID-19 health behaviors. Unlike health behaviors such as vaccinations, which may have potential perceived barriers like side effects, pain, or inconvenience; barriers to practicing COVID-19 health behaviors were negligible. This was especially true for the study population. For example, masks, hand sanitizer, and cleaning and disinfecting supplies were provided for free by the university to all students and employees. Mask distribution stations were placed in convenient areas on campus, vending machines that provided free spray bottles of hand sanitizer to anyone with a university ID card were installed around the campus, and kits containing cleaning and disinfecting supplies were accessible in common areas. When considering the health behaviors and the situational context of the current study, it is not surprising that perceived barriers was found to have a very weak relationship with engaging in the COVID-19 health behaviors.

While not directly addressed or considered in the current study, COVID-19 and the related public health measures have been intensely politicized in the United States (Halpern,

2020). In general, those who purported that COVID-19 was a hoax or the public health measures were unnecessary and impeded personal freedoms, had far right political views. This group often ridiculed those who wore masks or practiced physical distancing, to the point of holding protests and threatening public health officials (Halpern, 2020). Conceivably, this could have impacted the perceived barriers variable. One of the perceived barriers items in the study questionnaire asked about concern that others would make fun of the respondent for practicing the health behaviors. Interestingly, this item had the lowest mean value of all HBM measurement items.

Cues to Action

Cues to action have not been widely studied in HBM research (V.L. Champion & Skinner, 2008; Janz & Becker, 1984; C. J. Jones et al., 2014; Sulat et al., 2018). Larson et al. (1982), who did look at the effect of cues to action, found cues to action to be very strongly associated with engagement in health behavior. A more recent study by Tong et al. (2020), suggests that increased exposure to cues to action might increase engagement in COVD-19 health behavior, specifically physical distancing. The findings of the current study, however, were counter to the findings of Larson et al. (1982) and suggestion of Tong et al. (2020).

In the current study, exposure to cues to action was very high in the study participants; approximately 97% of participants indicated they had been exposed to public health messaging about the COVID-19 health behaviors. However, the study's findings indicate that cues to action was the weakest determinant of engaging in COVID-19 health behaviors, accounting for

1% or less of the variance in engagement in the health behaviors. The cues to action results are further examined in the following discussion of the university's public health messaging.

University's Public Health Messaging

In addition to cues to action from sources other than the university, the current study also examined exposure to cues to action from the university. As with cues to action from sources other than the university, results indicate that public health messaging from the university had a very weak relationship with engaging in COVID-19 health behaviors. When looking at cues to action from the university (the university's public health messaging), the study examined the relationship with engagement in COVID-19 health behaviors in general and also specifically when on the university campus. As noted earlier in this study, it was unknown if there would be a measurable relationship between the university's messaging and on-campus engagement in the health behaviors because of the inability to isolate the university's messaging from the nearly ubiquitous COVID-19 public health messaging that existed. This was likely the case, as results indicated there was no relationship between the university's public health messaging and on-campus engagement in COVID-19 health behaviors. It is recognized, however, that this supposition does not explain why cues to action from sources other than the university did not have a stronger relationship with engaging in the health behaviors.

Organization-Public Relationship

Having reviewed the extant literature, the researcher found no studies expressly examining the relationship of public health messaging to OPR quality. The current study begins

to fill this gap in the literature by looking at the relationship between the university's COVID-19 health messaging and the indicators of OPR quality (trust, control mutuality, satisfaction, and commitment). In this study, OPR quality was measured in the context of the university's response to COVID-19. Looking at the combined employee and student participants; trust had the highest mean value, followed by satisfaction and commitment, and finally control mutuality. When looking at the results from only those participants who had been on campus; trust also had the highest mean value, again followed by satisfaction and commitment, and lastly control mutuality. Also, when comparing employees and students, employees had higher mean values across all OPR quality indicators.

The current study found the relationship between the university's COVID-19 health messaging and all four indicators of OPR to be statistically significant. The messaging was most strongly related to the level of control mutuality in both the employee and student participants. In employees, this was followed by trust, while in students it was followed by commitment. The messaging was most weakly related to satisfaction in both groups.

It is interesting that the university's COVID-19 messaging was most strongly related to control mutuality since the messaging utilized only mass communication channels. One possible reason for this finding could be the inclusion of a link/URL to the university's COVID-19 information website on virtually all COVID-related messaging from the university as well as a "covidquestions" e-mail address that was included in all electronic communication. This e-mail address was prominently featured on the university's COVID-19 website as well. The account was activity monitored, with responses typically sent within one business day. While this dedicated e-mail address provided a channel for questions and feedback, it is still

somewhat surprising that this would create a perception of some degree of power balance between the publics and the university.

Comparing the employee and student participants, the university's messaging accounted for more variance in the levels of OPR indicators in the employee group. However, exposure to the university's messaging was only slightly higher in the employee participants. For example, the greatest difference was seen in exposure to the university's messaging about wearing a mask, where the mean exposure score in employees was 4.32 and in students was 4.20 (on a 5-point scale). This small difference in exposure to the messaging could indicate the university's COVID-19 messaging had a greater impact on OPR quality in the employee group than in the student group.

Wise (2008) suggested a relationship exists between OPR quality and public health outcomes. In line with this suggestion, the current study examined the relationship between the indicators of OPR quality and on-campus engagement in the COVID-19 health behaviors promoted by the university. Results found the relationship between the indicators of OPR quality (trust, control mutuality, satisfaction, and commitment) and on-campus engagement in the health behaviors to be statistically significant.

Supporting Chon & Park (2021), who found OPR quality to be positively associated with behavioral intention to follow CDC recommended guidelines regarding COVID-19, results of the current study found all OPR quality indicators to be positively associated with on-campus engagement in the COVID-19 health behaviors. In both the employee and student participants, trust had the strongest relationship with on-campus engagement in the health behaviors. In employees this was followed by commitment and in students it was followed by control

mutuality. In employees, control mutuality and satisfaction were tied for the weakest relationship with on-campus engagement in the health behaviors; in students, commitment had the weakest relationship. Comparing the employee and student participants, each OPR indicator accounted for more variance in on-campus engagement in the COVID-19 health behaviors in the student group. This could indicate that OPR quality had a greater impact on on-campus engagement in the health behaviors in the student group than in the employee group.

As noted earlier, this study used OPR as a framework to examine how public health messaging from the university would be related to the relationship publics (employees and students) had with the organization in the context of the university's COVID-19 response. This is especially germane considering the response was largely made known to the university's employees and students through its COVID-related messaging. The results of the current study suggest that health messaging impacts the relationship between the organization that sends the messaging and the publics to whom the messaging is targeted. The results also suggest the quality of that relationship impacts engagement in the behaviors promoted by the messaging.

Based on these findings, while the university's public health messaging had no measurable association with employees and students engaging in the COVID-19 health behaviors, it did positively impact the relationship quality between the university and its employees and students in the context of the university's response to the pandemic. OPR quality, in turn, had a positive relationship with engaging in the health behaviors.

LIMITATIONS AND FUTURE RESEARCH

Using an online questionnaire allowed the researcher to easily distribute the survey instrument to a large random sample. The use of an online questionnaire was especially important considering the limitations to face-to-face interaction due to the COVID-19 pandemic at the time of the study. However, this of course meant that answers were self-reported which can lead to measurement problems like participants responding to items in a way they think the researcher wants or in a way they think is opposite of what the researcher wants; Wrench et al. (2019) refer to these problems as *acquiescence* and the *"screw-you" effect*. The fact that participants' responses were anonymous and participants were advised of this prior to taking the questionnaire, may have helped mitigate such problems (Wrench et al., 2019).

Being cognizant of the length of the questionnaire as a result of the number of items needed for both HBM and OPR measurement, an attempt was made to limit the number of items in each subscale. As noted by Hon and Grunig (1999) and Di Iorio (2006), scales with few items generally have lower reliability coefficients. This was the case with the HBM self-efficacy subscale, which was found to have a Cronbach's alpha that indicated unacceptable reliability. Future research using this questionnaire should consider adding additional items to the HBM and OPR subscales.

At the time of questionnaire distribution for the current study, approximately 16% of the population in the state where the study occurred had been fully vaccinated for COVID-19

according to the Centers for Disease Control and Prevention's COVID Data Tracker (2021). Vaccination was outside the scope of this study and vaccination questions were not included in the questionnaire. It is, however, recognized that being fully vaccinated might have an impact on the way a participant would respond to some of the questionnaire items, particularly two of the HBM items: "My chances of getting COVID-19 are good" and "I worry a lot about getting COVID-19". Future studies examining COVID-19 health behaviors should consider the relationship between vaccination status and engagement in the behaviors.

Cues to actions were found to be very weakly related to engagement in the COVID-19 health behaviors. In the case of the university's cues to action, there was no significant relationship with engaging in the health behaviors. As noted, these results could be because of the ubiquity of COVID-19 public health messaging that existed by the time the study was conducted. Using a cross-sectional study design, the study only examined findings from a single point in time, limiting the study's ability to develop a more complete picture of how public health messaging may have been associated with engaging in the health behaviors. As pointed out in the literature, cues to action have not been widely studied as a component of the HBM (Carpenter, 2010; V.L. Champion & Skinner, 2008; Janz & Becker, 1984; C. J. Jones et al., 2014; Rosenstock, 1974a), although the earliest concepts of the model have included this component (Rosenstock, 1966). Future HBM research should continue to address this gap and study cues to action; arguably one of the most critical components of the model for practitioners. To better understand the relationship of cues to action with engagement in health behavior, future studies should use a longitudinal design optimally beginning prior to the participants exposure to any cues to action specific to the health behavior(s) being studied.

In HBM studies, perceived threat is often one of the weakest predictors of health behaviors. Looking the current study and the Ghosh et al. (2020) study compared to other HBM research, it could be that increased knowledge about a health condition and a heightened immediacy of the condition contribute to the strength of perceived threat as a predictor of the health behavior. Future research should explore the association of knowledge and immediacy of a condition to the strength of perceived threat as a predictor of health behavior engagement.

As previously noted, the politicization of the COVID-19 pandemic and the related public health behaviors (Halpern, 2020) were outside of the scope of the current study. However, given the overarching polarized political environment in the United States prior to and throughout the pandemic, research exploring the impact of political affiliation and views on engagement in COVID-19 health behaviors, to include COVID-19 vaccine uptake, will be important.

Two key findings of the current study relate to OPR quality. These are: (1) the significant relationship between public health messaging and OPR quality and (2) the significant relationship between OPR quality and engagement in health behaviors. There is a lack of research on OPR quality in relation to public health initiatives and this topic is worthy of further examination. One direction of future study would be using structural equation modeling to examine the relationships between the HBM components and the indicators of OPR quality. More generally, future research should continue to explore how OPR quality is associated with engagement in health behaviors, as there are important practical implications for such research.

CONCLUSION

This study contributes to the larger body of knowledge on the health belief model, providing further empirical support for the model, while also shedding light on the need for future research that approaches the model as a whole. The study further contributes to organization-public relationship research and is believed to be the first to examine the association of public health messaging to the relationship quality between the organization sending the messaging and the publics receiving the messaging, finding public health messaging significantly related to OPR quality. Also examined was the association between OPR quality and engaging in the health behaviors promoted in the messaging, finding OPR quality to be significantly related to engagement in the health behaviors. Given the paucity of research on OPR quality when considering public health messaging and behaviors, this study begins to fill that gap by providing important insight for both theory and practice.

As translational research, this study is valuable to practitioners tasked with developing public health messaging for this and similar situations. Results of the study indicate that, of the HBM components, perceived threat and perceived benefits were the strongest determinants of engaging in the COVID-19 health behaviors. Results also indicate that, of the indicators of OPR quality, trust had the strongest relationship with engagement in the health behaviors. Based on this study's findings, to be most effective at influencing health behavior related to the COVID-19 pandemic, public health messaging should focus on the threat posed by the virus and the

efficacy of the suggested health behaviors in reducing that threat, and the messaging should be communicated in a way that builds trust between the organization sending the messaging and its publics. The results provide a better understanding of the determinants of the desired behaviors as well as the importance of the relationship quality between the organization sending public health messaging and those the messaging targets.

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APPENDICES

Appendix A: Example of COVID-19 Public Health Messaging Used by the University

Do your part to help prevent the spread of COVID-19

- **Wear a face covering.** Wear a mask or other face covering when inside or around others.
- **Practice physical distancing.** Stay at least 6 feet apart. Avoid hugs, handshakes, and close quarters.
- **Wash your hands often**. Wash your hands with soap and water for 20 seconds or use hand sanitizer that contains at least 60% alcohol.
- **Clean & disinfect your space.** Clean and disinfect frequently touched surfaces.

These easy actions don't just help protect you, they help protect the entire <university name> community. You play an important role in helping <university name> stay healthy.

Appendix B: IRB Determination Letter

EXEMPT DETERMINATION

August 13, 2020

Aaron Nichols
4202 E. Fowler Ave.
CGS301
Tampa, FL 33620

Dear Mr. Nichols:

On 8/12/2020, the IRB reviewed and approved the following protocol:

Application Type:	Initial Study
IRB ID:	STUDY001363
Review Type:	Exempt 2
Title:	COVID-19 Public Health Messaging Impact
Funding:	None
Protocol:	• COVID-19 Messaging Impact Protocol 08122020;

The IRB determined that this protocol meets the criteria for exemption from IRB review.

In conducting this protocol, you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Please note, as per USF policy, once the exempt determination is made, the application is closed in BullsIRB. This does not limit your ability to conduct the research. Any proposed or anticipated change to the study design that was previously declared exempt from IRB oversight must be submitted to the IRB as a new study prior to initiation of the change. However, administrative changes, including changes in research personnel, do not warrant a modification or new application.

Ongoing IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities impact the exempt determination, please submit a new request to the IRB for a determination.

Institutional Review Boards / Research Integrity & Compliance
FWA No. 00001669
University of South Florida / 3702 Spectrum Blvd., Suite 165 / Tampa, FL 33612 / 813-974-5638

Appendix C: Example of Questionnaire Used

Q1 *<Introduction>*

Q2 How often have you been exposed to information about the following public health behaviors from sources other than <the university>? (This could include sources like tv, radio, social media, websites, physical signs and decals, or word of mouth.)

	A great deal (11)	A lot (12)	A moderate amount (13)	A little (14)	Not at all (15)
Wearing a mask (1)	○	○	○	○	○
Physical distancing (or social distancing) (2)	○	○	○	○	○
Using hand sanitizer or washing your hands frequently (3)	○	○	○	○	○
Cleaning and disinfecting frequently touched surfaces (4)	○	○	○	○	○

Q3 Last term (Fall 2020), how many days per week, on average, were you on the <the university> Campus from the start of the term until the Thanksgiving break?

- ○ Not at all (1)
- ○ Less often than once a week (2)
- ○ About once a week (3)
- ○ 2-3 days per week (19)
- ○ 4-5 days per week (20)
- ○ 6-7 days per week (21)

Q4 This term (Spring 2021), how many days per week, on average, have you been on the <the university> campus?

- ○ Not at all (1)
- ○ Less often than once a week (2)
- ○ About once a week (3)
- ○ 2-3 days per week (19)
- ○ 4-5 days per week (20)
- ○ 6-7 days per week (21)

Q5 For the following items, please rate how much you agree or disagree with each statement.

Q6 My chances of getting COVID-19 are good.

- ○ Strongly agree (7)
- ○ Somewhat agree (8)
- ○ Neither agree nor disagree (9)
- ○ Somewhat disagree (10)
- ○ Strongly disagree (11)

Q7 Healthy people can get COVID-19.

- ○ Strongly agree (7)
- ○ Somewhat agree (8)
- ○ Neither agree nor disagree (9)
- ○ Somewhat disagree (10)
- ○ Strongly disagree (11)

Q8 I worry a lot about getting COVID-19

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q9 The thought of getting COVID-19 scares me.

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q10 The consequences of COVID-19 would be very serious and harmful to me.

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q11 Problems I would experience from getting COVID-19 would last a long time.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q12 For the following items, "health behaviors" refers to the COVID-19 related public health behaviors of wearing a mask, practicing physical distancing, using hand sanitizer or washing your hands frequently, and cleaning and disinfecting frequently touched surfaces.

Q13 I have a lot to gain by practicing the health behaviors.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q14 Practicing the health behaviors reduces the chances of getting COVID-19.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q15 In order to practice the health behaviors, I have to give up quite a bit.

- Strongly agree (16)
- Somewhat agree (17)
- Neither agree nor disagree (18)
- Somewhat disagree (19)
- Strongly disagree (20)

Q16 Practicing the health behaviors interferes with my daily activities.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q17 I am concerned that others will make fun of me for practicing the health behaviors.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q18 I am confident that I can practice the health behaviors if I would like to do so.

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q19 It is easy for me to practice the health behaviors.

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q20 For the following questions, think about what you have seen over the past two terms (August 2020 through today). Again, "health behaviors" refers to the COVID-19 related public health behaviors of wearing a mask, practicing physical distancing, using hand sanitizer or washing your hands frequently, and cleaning and disinfecting frequently touched surfaces.

Q21 How often have you seen information about COVID-19 health behaviors posted on official < university> social media accounts?

- ○ A great deal (11)
- ○ A lot (12)
- ○ A moderate amount (13)
- ○ A little (14)
- ○ None at all (15)

Q22 How often have you received e-mails from <the university> that included information about COVID-19 health behaviors?

- ○ A great deal (11)
- ○ A lot (12)
- ○ A moderate amount (13)
- ○ A little (14)
- ○ None at all (15)

Q23 How often have you seen information about COVID-19 health behaviors on the <university> website?

- ○ A great deal (11)
- ○ A lot (12)
- ○ A moderate amount (13)
- ○ A little (14)
- ○ None at all (15)

Q24 How often have you seen COVID-19 health behaviors signage and decals on the <university> campus?

- ○ A great deal (11)
- ○ A lot (12)
- ○ A moderate amount (13)
- ○ A little (14)
- ○ None at all (15)

Q25 How often have you been exposed to information about the following public health behaviors from <university> sources? (This could include <university> social media, e-mail from <the university>, the <university> website, or physical signs and decals on the <university> campus.)

	A great deal (11)	A lot (12)	A moderate amount (13)	A little (14)	Not at all (15)
Wearing a mask (1)	○	○	○	○	○
Physical distancing (or social distancing) (2)	○	○	○	○	○
Using hand sanitizer or washing your hands frequently (3)	○	○	○	○	○
Cleaning and disinfecting frequently touched surfaces (4)	○	○	○	○	○

Q26 How often do you wear a mask when around others not in your household?

- ○ Always (11)
- ○ Most of the time (12)
- ○ About half the time (13)
- ○ Sometimes (14)
- ○ Never (15)

Q27 How often do you practice physical distancing when around others not in your household?

- ○ Always (11)
- ○ Most of the time (12)
- ○ About half the time (13)
- ○ Sometimes (14)
- ○ Never (15)

Q28 Do you use hand sanitizer or wash your hands with soap and water?

- ○ A great deal (16)
- ○ A lot (17)
- ○ A moderate amount (18)
- ○ A little (19)
- ○ None at all (20)

Q29 Do you clean and disinfect frequently touched surfaces in your space?

- ○ A great deal (26)
- ○ A lot (27)
- ○ A moderate amount (28)
- ○ A little (29)
- ○ None at all (30)

Q30 Answer the following questions thinking specifically about time spent on the <university> campus.

Q31 When you are on the <university> campus, how often do you wear a mask when around others?

- Always (11)
- Most of the time (12)
- About half the time (13)
- Sometimes (14)
- Never (15)

Q32 When you are on the <university> campus, how often do you practice physical distancing?

- Always (11)
- Most of the time (12)
- About half the time (13)
- Sometimes (14)
- Never (15)

Q33 When you are on the <university> campus, do you use hand sanitizer or wash your hands with soap and water?

- A great deal (11)
- A lot (12)
- A moderate amount (13)
- A little (14)
- None at all (15)

Q34 When you are on the <university> campus, do you clean and disinfect frequently touched surfaces in your space?

- ○ A great deal (26)
- ○ A lot (27)
- ○ A moderate amount (28)
- ○ A little (29)
- ○ None at all (30)

Q35 For the following items, please rate how much you agree or disagree with each statement.

Q36 <the university> is truthful with me about COVID-19.

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q37 Whenever <the university> makes an important decision related to COVID-19, I know the university will be concerned about people like me.

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q38 When it comes to COVID-19, I feel very confident about <the university>'s ability and expertise.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q39 I am very willing to follow <the university>'s guidance regarding COVID-19.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q40 When considering COVID-19, sound principles seem to guide <the university>'s decisions.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q41 Considering COVID-19, <the university> and I agree on what we can expect from one another.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q42 <the university> and people like me are attentive to what each other say when it comes to COVID-19.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q43 With regard to COVID-19 and the university's decisions and guidance, <the university> believes the opinions of people like me are legitimate.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q44 When people like me interact with <the university> about the university's response to COVID-19, I feel the university listens to questions and concerns and provides timely answers.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q45 Considering <the university>'s response to COVID-19, I wish to keep a long-lasting relationship with the university.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q46 Considering how <the university> is handling the response to COVID-19, I feel like the university is trying to maintain a long-term commitment to people like me.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q47 Considering how <the university> is handling the response to COVID-19, I feel a sense of loyalty to the university.

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q48 Thinking about COVID-19, generally speaking, <the university> is meeting my expectations.

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q49 In general, I am satisfied with the relationship USF has established with people like me during the university's response to COVID-19.

- ○ Strongly agree (6)
- ○ Somewhat agree (7)
- ○ Neither agree nor disagree (8)
- ○ Somewhat disagree (9)
- ○ Strongly disagree (10)

Q50 Throughout the COVID-19 pandemic, my relationship with <the university> has been good.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q51 How <the university> is handling the response to COVID-19 makes me feel like I am important to the university.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q52 Considering how <the university> is handling the response to COVID-19, I am happy with the university.

- Strongly agree (6)
- Somewhat agree (7)
- Neither agree nor disagree (8)
- Somewhat disagree (9)
- Strongly disagree (10)

Q53 What is your age?

- ○ 18 -24 years old (1)
- ○ 25 - 34 years old (2)
- ○ 35 - 44 years old (3)
- ○ 45 - 54 years old (4)
- ○ 55 - 64 years old (5)
- ○ 65 years or older (6)

Q54 How do you identify?

- ○ Female (1)
- ○ Male (2)
- ○ Some other way (3) _____
- ○ Prefer not to answer (4)

Q55 Thank you for participating in this survey. Your input is very important and greatly appreciated by the researchers.

Appendix D: Comparison of Scale Item Wording

Health Belief Model

	Used in current study
Susceptibility	
⇒ My chances of getting CONDITION are good. (Blue & Valley, 2002) ⇒ Healthy people can get CONDITION. (Blue & Valley, 2002) ⇒ I worry a lot about getting CONDITION. (Champion, 1984)	⇒ My chances of getting COVID-19 are good. ⇒ Healthy people can get COVID-19. ⇒ I worry a lot about getting COVID-19. 5-point Likert scale from *strongly agree* to *strongly disagree*
Severity	
⇒ The thought of getting CONDITION scares me. (Blue & Valley, 2002; Champion, 1984) ⇒ The consequences of CONDITION would be very serious and harmful to me. (Tong et al., 2019; Wang et al., 2016) ⇒ Problems I would experience from CONDITION would last a long time (Champion, 1984)	⇒ The thought of getting COVID-19 scares me. ⇒ The consequences of COVID-19 would be very serious and harmful to me. ⇒ Problems I would experience from getting COVID-19 would last a long time. 5-point Likert scale from *strongly agree* to *strongly disagree*
Benefits	
⇒ I have a lot to gain by BEHAVIOR. (Blue & Valley, 2002; Champion, 1984) ⇒ Adherence to BEHAVIOR reduces the chances of CONDITION. (Tong et al. 2020)	⇒ I have a lot to gain by practicing the health behaviors. ⇒ Practicing the health behaviors reduces the chances of getting COVID-19. 5-point Likert scale from *strongly agree* to *strongly disagree*

Barriers	
⇒ BEHAVIOR interferes with my daily activities. (Blue & Valley, 2002; Champion, 1984) ⇒ In order to do BEHAVIOR, I have to give up quite a bit. (Champion, 1984) ⇒ I am concerned that others will make fun of me for BEHAVIOR. (Champion, 1984)	⇒ Practicing the health behaviors interferes with my daily activities. ⇒ I am concerned that others will make fun of me for practicing the health behaviors. ⇒ In order to practice the health behaviors, I have to give up quite a bit. 5-point Likert scale from *strongly agree* to *strongly disagree*
Self-efficacy	
⇒ I am confident that I can BEHAVIOR if I would like to do so. (Tong et al., 2019; Wang et al., 2016) ⇒ (R) I find it difficult to BEHAVIOR. (Wang et al., 2016)	⇒ I am confident that I can practice the health behaviors if I would like to do so. ⇒ It is easy for me to practice the health behaviors. 5-point Likert scale from *strongly agree* to *strongly disagree*
Cues to Action	
⇒ I have seen CUES TO ACTION asking me to BEHAVIOR. (modified from I have access to CUES TO ACTION. -Tong et al., 2019 and I have been asked to… Wang et al., 2016)	⇒ I have seen information about COVID-19 health behaviors posted on official USF social media accounts. ⇒ I have received emails from USF that included information about COVID-19 health behaviors. ⇒ I have visited USF's website and saw information about COVID-19 health behaviors ⇒ I have seen COVID-19 health behaviors signage on the USF campus. 5-point Likert scale from *A great deal* to *Not at all*

Organization-Public Relationship

	Used in current study
Trust	
⇒ Members of the organization are truthful with us (Huang, 2001) ⇒ Whenever this organization makes an important decision, I know it will be concerned about people like me (Hon and Grunig, 1999; Jo et al., 2004) ⇒ I feel very confident about this organization's skills (Hon and Grunig, 1999) ⇒ I am very willing to let this organization make decisions for people like me (Hon and Grunig, 1999) ⇒ Sound principles seem to guide behavior (Hon and Grunig, 1999; Jo et al., 2004)	⇒ USF is truthful with me about COVID-19. ⇒ Whenever USF makes an important decision related to COVID-19, I know the university will be concerned about people like me. ⇒ When it comes to COVID-19, I feel very confident about USF's ability and expertise. ⇒ I am very willing to follow USF's guidance regarding COVID-19. ⇒ When considering COVID-19, sound principles seem to guide USF's decisions. 5-point Likert scale from *strongly agree* to *strongly disagree*
Control Mutuality	
⇒ Both the organization and we agree on what we can expect from one another (Huang, 2001) ⇒ This organization and people like me are attentive to what each other say (Hon and Grunig, 1999) ⇒ This organization believes the opinions of people like me are legitimate (Hon and Grunig, 1999) ⇒ When I have an opportunity to interact with this organization, I feel I have some sense of control over the situation (Hon and Grunig, 1999; Jo et al., 2004)	⇒ Considering COVID-19, USF and I agree on what we can expect from one another. ⇒ USF and people like me are attentive to what each other say when it comes to COVID-19. ⇒ With regard to COVID-19 and the university's decisions and guidance, USF believes the opinions of people like me are legitimate. ⇒ When people like me interact with USF about the university's response to COVID-19, I feel the university listens to questions and concerns and provides timely answers. 5-point Likert scale from *strongly agree* to *strongly disagree*

Commitment	
⇒ I wish to keep a long-lasting relationship with the organization (Huang, 2001) ⇒ I feel like this organization is trying to maintain a long-term commitment to people like me (Hon and Grunig, 1999) ⇒ I feel a sense of loyalty to this organization (Hon and Grunig, 1999; Jo et al., 2004)	⇒ Considering USF's response to COVID-19, I wish to keep a long-lasting relationship with the university. ⇒ Considering how USF is handling the response to COVID-19, I feel like the university is trying to maintain a long-term commitment to people like me. ⇒ Considering how USF is handling the response to COVID-19, I feel a sense of loyalty to the university. 5-point Likert scale from *strongly agree* to *strongly disagree*
Satisfaction	
⇒ Generally speaking, organization members meet our needs (Huang, 2001) ⇒ In general, we are satisfied with the relationship with the organization has established with people like me (Hon and Grunig, 1999; Huang, 2001; Jo et al., 2004) ⇒ Our relationship with the organization is good (Huang, 2001) ⇒ I feel like I am important to this organization (Hon and Grunig, 1999) ⇒ I am happy with this organization (Hon and Grunig, 1999)	⇒ Thinking about COVID-19, generally speaking, USF is meeting my expectations. ⇒ In general, I am satisfied with the relationship USF has established with people like me during the university's response to COVID-19. ⇒ Throughout the COVID-19 pandemic, my relationship with USF has been good. ⇒ How USF is handling the response to COVID-19 makes me feel like I am important to this university. ⇒ Considering how USF is handling the response to COVID-19, I am happy with the university. 5-point Likert scale from *strongly agree* to *strongly disagree*

References for Comparison of Scale Item Wording

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