Perceived access, fear, and preventative behavior: Key relationships for positive outcomes during the COVID-19 health crisis

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Abstract
The Coronavirus (COVID-19) pandemic reduced real and perceived access to healthcare services, exacerbating pandemic fear, and thus influencing consumers' adoption of preventative health behaviors. Extending the EHBM, results from two studies show that perceived access to health services and pandemic fear impact an individual's general and COVID-preventative health behaviors. High perceived access reduces pandemic fear through its buffering effects on perceived health vulnerability and pandemic-related health system concern, especially with telehealth usage during the pandemic. While pandemic fear motivates COVID-19 vaccination, pandemic fear reduces personal preventative health behavior (e.g., healthy eating, exercising) and has little effect on personal COVID-preventative behaviors (e.g., wearing a mask, social distancing) when individuals perceive high pandemic-related control. Moreover, the fear-behavior link does not hold for preventative health visits; instead, perceived access directly promotes preventative visits and screening. This research informs public health stakeholders' communication, education, and resource allocation during health crises like the COVID-19 pandemic.

KEYWORDS
Coronavirus, fear, perceived access to health services
1 | INTRODUCTION

The Coronavirus (COVID-19) pandemic has changed the world, especially healthcare services. Public health guidance in the initial wave of the pandemic (Center for Disease Control, 2020) constrained healthcare, including canceling non-emergency procedures, moving office visits to virtual settings, and sharply limiting family/caretaker involvement in healthcare encounters. Because these changes altered how healthcare services are received, consumer perceptions of their access to healthcare services also changed, altering consumer health and healthcare-related behaviors.

For example, individuals responded to these constraints by accessing healthcare less, with primary care visits down 70% (Cutler, 2020) and emergency room visits down 42% (Hartnett, 2020). Delayed healthcare access due to pandemic-related fear is resulting in dramatic consequences for patients (e.g., higher pediatric mortality, Lazzerini & Putoto, 2020; worsened mental health, Marroquín et al., 2020) and health system stability (e.g., increased hospital closure risk, Fried et al., 2020; employee layoffs and negative hospital profit margins, Teasdale & Schulman, 2020). However, these changes likely only represent the “tip of the iceberg” for how the current crisis affects preventative health behavior.

These constraints also affected healthcare access perceptions which influence consumer perceptions of their health vulnerability and overall health. Connecting social and behavioral science to the public health crisis response (Arora & Grey, 2020; Van Bavel et al., 2020), this research seeks to understand how healthcare access perceptions influence consumer behavior during a public health crisis. Healthcare access perceptions are a global evaluation of one’s expectations and experiences for past and anticipated healthcare encounters (Tanner et al., 2020). COVID-19 provides a challenging and fluid environment to understand better how a crisis like the pandemic impacts these evaluations. These evaluations, in turn, affect downstream judgments and behaviors related to the pandemic and general health.

Specifically, we ask, how do access perceptions and pandemic fear affect health behavior like personal preventative health behavior, personal COVID-preventative behavior, preventative health visits/screening, and COVID-19 vaccination behaviors? Do personal judgments like pandemic-related control influence how access and fear relate to behavior? What impact do system adjustments, such as telehealth, have on these perceptions?

Following an exploratory arc informed by research on perceived access to health services (PAHS, Tanner et al., 2020) and the expanded health belief model (Burns, 1992), two studies demonstrate three primary outcomes observed at two different stages of the pandemic. First, high levels of PAHS can buffer individuals from personal health vulnerability and health system concerns that arise during a global public health crisis. These reductions are especially pronounced in individuals that use telehealth during the pandemic (health system response, Study 2). Secondly, depending on an individual’s perceived pandemic-related control, pandemic-related fear has mixed effects for motivating individually-enacted health behaviors such as personal preventative health (e.g., maintained a healthy weight, good sleep) and personal COVID-preventative behaviors (e.g., washing hands, delaying travel; Studies 1 and 2). When individuals have high levels of perceived pandemic-related control, fear’s motivating effect for health-protective behavior is reduced, thus decreasing the likelihood of those behaviors. However, perceived pandemic control does not influence more health-system enacted health behaviors; the fear-behavior link is unaffected for COVID-19 vaccination behaviors and the fear-behavior link is not present for preventative health visits/screening, where perceived health care access directly drives increased preventative behavior.
This research is expected to make the following contributions. First, we add to the Expanded Health Belief Model (EHBM) by exploring how perceptions of access to health services and personal beliefs impact health-related decisions during a global health crisis. We investigate potential forms of expectancy judgments that expand the EHBM and examine the link between these judgments and fear. Second, we identify telehealth, an often-proposed solution (e.g., Center for Disease Control, 2020; Tanner et al., 2020), as possible opportunities to influence healthcare expectancy and, ultimately, behavior. Thirdly, to understand the role of fear on behavior during a global health crisis, we expose potentially important boundary conditions in the fear-preventative behavior relationships. Finally, the evidence supports perceived access’s importance in stemming the fear-inaction link’s adverse effects, especially when individuals believe they have perceived control over the pandemic. We offer opportunities for health officials, policymakers, health systems, and concerned individuals to create conditions through messaging, care options, and policy capable of encouraging healthy behavior and pandemic prevention during the current and future public health crises.

2 CONCEPTUAL FRAMEWORK

The Expanded Health Belief Model (EHBM, Burns, 1992) is a flexible value-expectancy framework that integrates an individual’s perception of facilitators, barriers, benefits, susceptibility, and severity for different health situations into predicting whether individuals adopt beneficial health behaviors (Champion & Skinner, 2008). The framework assumes that individuals balance the value of avoiding illness (severity) and the behavioral value of benefits associated with preventative behaviors with their expectancy of being able to avoid illness (susceptibility) and their behavioral expectancy of successfully putting preventative behaviors into practice (Carpenter, 2010).

Healthcare access is complex because it includes structural system characteristics and patients’ lived, subjective experience (Loroz & Lichtenstein, 2004; Mittelstaedt et al., 2009). We focus on perceived access to health services (PAHS) for this research, defined as an individual’s comparative, subjective evaluation of personal opportunity and ability to obtain health services (Tanner et al., 2020). PAHS reflects a comparative evaluation between experienced, expected, and desired access as well as a subjective, holistic assessment of access that cuts across health system provision, situational factors, and personal experiences.

This subjective view of healthcare access should be more sensitive to both actual and anticipated access changes during a public health crisis like the COVID-19 pandemic. From an EHBM viewpoint, an individual’s PAHS evaluations should encompass various facilitating and obstructing factors that inform their behavioral and illness-related expectancies of benefitting from health services to avoid illness or manage its severity. Many of the specific constructs within this research, including PAHS, can be thought of as judgments about external facilitators or barriers or personal beliefs (e.g., control) that contribute to an individual’s value and expectations of avoiding COVID-19 specifically and illness generally. These evaluations and beliefs create expectancies that provoke consumers to act (or not act) (Burns, 1992). Figure 1 illustrates the proposed model.

During a public health crisis, two different forms of expectancy judgments are likely impacted by access perceptions. The first is perceived health vulnerability, an illness-related expectancy (e.g., a more generalized form of health susceptibility) which represents the feeling that one cannot mitigate the severity of unwanted health outcomes in a particular situation, especially when compared to others (Blanton et al., 2001). When people have high PAHS, their perceived health vulnerability is reduced due to the expectancy of effectively handling the
effects of illness and health-related problems (Tanner et al., 2020). The perception that healthcare needs will be met reduces a perceptual barrier to receiving care, encouraging a more positive assessment of personal ability to avoid unwanted health outcomes. Thus, PAHS should buffer individuals from health-related vulnerability during a public health crisis like this pandemic. Alternatively, if one's healthcare access perceptions are low, then perceived health vulnerability will be higher because individuals will perceive non-controllable barriers to avoiding severe, unwanted health outcomes.

A second expectancy judgment likely to be more salient and affect behavior is the set of beliefs regarding how the health system changes during a crisis that may affect an individual's ability to cope with the crisis. We define health system concern as an individual's judgment of how public health crisis management introduces barriers to individual care and health behaviors. Public health guidance (Centers for Disease Control, 2020) and crisis management (Truog et al., 2020) has led to substantial changes in how healthcare visits are conducted, the opportunities for including caretakers and family members in healthcare interactions, and the crisis decision-making authority of medical providers. Judgments around these changes are part of a consumer's evaluation of the health threat that COVID-19 presents and the barriers it introduces to pursuing health-promoting (and potentially lifesaving) behaviors. Thus, health system concern is viewed as a form of behavioral expectancy related to the threat of COVID-19 and other illnesses during the pandemic.

These access-related changes and the accompanying threat have the potential to diminish an individual's expectancy of receiving the care needed, desired, or expected to enact positive health behaviors, attain positive health outcomes, avoid illness, or minimize the adverse effects of illness. Suppose a consumer believes they will receive the care necessary when needed; in that case, this access perception can still reduce concerns about health system changes during the public health crisis, despite (social) media warnings to the contrary. Similar to health-related vulnerability, high levels of PAHS should diminish health system concern because overall perceived healthcare access (as a facilitating expectancy of health outcomes) compensates for concerns specific to a public health crisis (obstructing expectancy of health outcomes).

2.1 Pandemic fear and preventative health behaviors

Fear has been identified as one of the most important psychological aspects of the COVID-19 pandemic (Pakpour & Griffiths, 2020) and is a natural response to threatening situations. Fear
can be defined as the negative emotional response to danger or threat that results when individuals anticipate harm that would be difficult to cope with (Smith & Lazarus, 1993). The pandemic and its resulting public health crisis can threaten individuals’ well-being (Van Bavel et al., 2020) and generate fearful and anxious emotional responses.

We define pandemic fear as an individual’s negative, worrisome affect attributed to the specific pandemic situation. The different expectancies influenced by PAHS, perceived health vulnerability, and health system concern potentially add to the threat and anticipated emotional harm posed by the COVID-19 pandemic. Therefore, we expect increased perceived health vulnerability and health system concern, as judgments that reflect threatening expectancies should, in turn, lead to more pandemic fear.

Fear elicits a coping response to handle a threat that can be adaptive or maladaptive (e.g., Tanner Jr. et al., 1991). Accounting for appraisal tendencies (perceived need for physical or mental effort, Lerner & Keltner, 2000), pandemic fear may affect the uptake and maintenance of general preventative health behavior (e.g., eating well, exercising, getting enough sleep), personal COVID-preventative behavior (e.g., washing hands, limiting travel, wearing a face mask), preventative health visits/screening (diminished likelihood of acute personal health crisis during a time of potentially constrained care), and COVID-19 vaccination behavior (diminished likelihood of serious illness, hospitalization, or death) as fear often mobilizes effort for actions that minimize potential harm from the fear’s cause. Harper et al. (2020) have found evidence of this functional fear during the current pandemic. However, fear can also have the opposite effect. Individuals’ ability to handle uncertainty impacts the coping behaviors sought to address the threat (Einstein, 2014). Research during the H1N1 pandemic found that individuals with greater uncertainty intolerance were more likely to engage in maladaptive coping behaviors (Taha et al., 2014). For individuals struggling with uncertainty, PAHS may provide confidence and reduce uncertainty around the threat of COVID-19.

2.2 Telehealth use and pandemic-related control as moderators

Telehealth is the use of technology to “deliver health services at a distance, rather than in face-to-face settings” (Standing et al., 2016 p. 90). Though the term has been used for over 30 years, telehealth usage has increased rapidly in response to the COVID-19 pandemic, with 46% of consumers now using telehealth as an alternative to in-person visits compared to 11% pre-COVID-19 (Betsennyy et al., 2020). While significant research has examined telehealth from a services innovation perspective (Standing et al., 2016), to our knowledge, little work has investigated its connection to perceived access. As a novel channel for health services access, telehealth offers a practical step for health service systems, organizations, and providers to respond to pandemic healthcare restrictions. Accessing telehealth during the pandemic builds evidence in a very uncertain situation that many healthcare needs can still be met. This evidence likely assists positive healthcare access perceptions in reducing health system concerns and perceived vulnerability during the crisis by amplifying the certainty associated with positive healthcare access perceptions.

Moving to downstream consequences, an individual’s perceived pandemic control may also affect the connection between pandemic fear and preventative health behaviors. Pandemic-related control encompasses beliefs about personal control over COVID-19 outcomes (infection, illness, other effects) and locus of control in pandemic-related outcomes (low individual control, sense of being pushed around, or helplessness in light of external forces, see Rotter, 1966).
Returning to the notion of pandemic fear as possibly motivating preventative behavior (Harper et al., 2020), fear most often coincides with a cognitive appraisal of low situational agency (Lerner & Keltner, 2001), encouraging personal action to improve the situation. When perceived pandemic-related control is low, fear and perceived control should mutually support low situational agency and the motivation to change the situation. However, if perceived pandemic control is high, a mismatch between control beliefs and pandemic fear on assessed situational agency should undermine fear-based motivation and perhaps even encourage reactance to fearful emotions.

During a public health crisis like the COVID-19 pandemic, health resources can be strained and reallocated to treat pandemic patients. In order to preserve health system capacity and protect themselves, consumers benefit from acting to maintain their physical health, whether through general preventative health behaviors, taking precautions to avoid infection, keeping up to date on preventative health visits/screening, or completing COVID-19 vaccinations. Across two studies, we examine EHBM-aligned judgments, beliefs, and emotion to understand and explain preventative behavior during a global pandemic (see Figure 1).

3 | STUDY 1: MEDIATING AND MODERATING RELATIONSHIPS BETWEEN PERCEIVED ACCESS AND PREVENTATIVE HEALTH BEHAVIORS

The first study sought to understand better how perceived access to health services (PAHS) influences pandemic fear and how this PAHS-pandemic fear relationship then contributes to general and COVID-preventative health behaviors. This study empirically linked an individual’s PAHS to pandemic fear and examined how health vulnerability and health system concern influence this relationship. In a public health crisis, PAHS may diminish the experience of pandemic fear, so this study evaluated how perceived health vulnerability and pandemic-related health system concern translate perceived access into reduced or increased pandemic fear. Additionally, this study evaluated an individual’s pandemic-related control as a moderator of the relationship between pandemic fear and preventative health behavior (personal preventative and COVID-preventative). Through a serial moderated mediation analysis, this study provides evidence of how pandemic fear and perceived control influence whether individuals maintain preventative behaviors in a time of public health crisis like the pandemic.

3.1 | Participants and procedure

404 participants (158 women; $M_{age} = 36.21$, range: 20–69) were recruited from Amazon’s Mechanical Turk (MTurk). Three participants failed both attention checks (“Please respond with somewhat disagree”) and were excluded from further analysis (final $n = 401$). Additional demographic information for both studies is featured in Table 1.

Participants completed an online survey. In order, participants answered demographic questions, PAHS items (availability, acceptability, affordability subscales; Tanner et al., 2020), three perceived health vulnerability items (Tanner & Su, 2019), three health system concern items (developed to look at pandemic-related concern), three pandemic fear items (adapted from Harmon-Jones et al., 2016), five pandemic control items (adapted from Rotter, 1966), five preventative health behaviors items (adapted from Jayanti & Burns, 1998 and Levy & Myers, 2004);
six COVID-preventative behavior items (developed from CDC consumer guidance), and questions addressing personal and health-related controls. A complete item list with references, interconstruct correlations, and scale reliabilities for both studies are available in the Supporting Information. All the scales exhibited acceptable reliability (all Cronbach’s $\alpha > 0.87$).

### Table 1: Detailed sample characteristics for studies 1 and 2

|                | Study 1 | Study 2 |
|----------------|---------|---------|
| $n$            | 401     | 492     |
| Mean age       | 36.2    | 33.3    |
| Age range      | 20–69   | 18–78   |
| Gender         | 39.1% Female | 54.7% Female |
| Income         | 57% Household income <60k | 50.3% Household income <60k |
| Health insurance source | 25.7% Medicare or Medicaid; 47% Employer-sponsored; 26.5% No insurance/other sources | 25.2% Medicare or Medicaid; 57.3% Employer-sponsored; 17.4% No insurance/other sources |
| Education      | 30% Less than a college degree | 46% Less than a college degree |
| Ethnicity      | 78.5% Caucasian; 10.6% Black; 6.7% Latino | 65.9% Caucasian; 10.4% Black; 8.7% Latino |
| Rurality       | 76.7% Urban | 77.6% Urban |

3.2 | Results for study 1

Prior to analysis, indices were created for perceived healthcare access, health system concern, perceived health vulnerability, pandemic-related fear, pandemic-related control, preventative health behaviors, and COVID-preventative behaviors. We then tested two custom serial moderated mediation models (simultaneously testing serial mediation and moderated mediation, syntax available in Supporting Information) using a bootstrapping procedure with 10,000 resamples (Hayes, 2018). Next, we probed the interaction with floodlight moderation analysis using the Johnson-Neyman technique. This serial moderated mediation model tested direct and indirect mediation effects from PAHS to personal preventative health behavior (first model) or personal COVID-preventative behavior (second model) through perceived health vulnerability and health system concern and then pandemic fear. Pandemic-related control was evaluated as a moderator of the pandemic fear to behavior relationships. Age, gender, ethnicity, income, employment status, and health insurance source were included as covariates. The primary path relationships are shown in Figure 2 (complete path relationships and Johnson-Neyman visualizations for significant interactions in Supporting Information).

The indices of moderated mediation were significant for both behavioral outcomes (95% CI: vulnerability—personal preventative health behavior, 0.0194, 0.0549; health system concern—personal preventative health behavior, 0.0174, 0.0460; vulnerability—personal COVID-preventative behavior, 0.0035, 0.0284; health system concern—personal COVID-preventative behavior, 0.0030, 0.0243). For the first mediation stage (perceived access-vulnerability and perceived access-health system concern), PAHS diminished perceived vulnerability ($b = -0.84$, $p < 0.001$) and health system concern ($b = -0.77$, $p < 0.001$). High levels of PAHS buffered individuals from experiencing perceived vulnerability and health system concern amid the
pandemic. For the second mediation stage (perceived vulnerability-fear and concern-fear), both perceived vulnerability \( (b = 0.43, p < 0.001) \) and health system concern \( (b = 0.40, p < 0.001) \) contributed to increasing pandemic fear. This mediation was partial; PAHS still independently decreased pandemic fear \( (b = -0.18, p = 0.02) \) when controlling for the two indirect mediators to pandemic-related fear.

Pandemic-related control was expected to interact with how pandemic fear contributes to maintaining preventative health behaviors and the uptake of pandemic-preventative behaviors. The analysis shows that a person’s perception of their pandemic-related control directly influences how fear affects their behavior. Namely, for individuals low in perceived pandemic control (personal preventative health behavior—below 3.57, Johnson–Neyman significance region, about 31% of the sample; personal COVID-preventative behavior—below 5.62, about 67% of the sample), pandemic fear increased personal preventative health behavior and personal COVID-preventative behavior. For individuals high in perceived pandemic control (personal preventative health behavior—above 4.99, about 50% of the sample; personal COVID-preventative behavior—above 5.63, about 33% of the sample), pandemic fear decreases personal preventative health behavior or has no effect on personal COVID-preventative behavior.

### 3.3 Discussion

Even though public health crises can be times of great fear, increasing perceived access to health services can diminish fear directly and through its effect on perceived health
vulnerability and health system concern. In turn, health vulnerability and health system concern add to pandemic fear, especially when unmitigated by PAHS. Pandemic fear itself holds an important place in translating the pandemic experience into health-focused behavior. However, pandemic fear’s effect on personal preventative health and COVID-preventative behaviors depends on how individuals believe they have control over pandemic-related outcomes. Illustrating this effect, the fear of individuals who perceive greater control over the pandemic (about 50% of our sample, determined by the Johnson-Neyman significance region) diminishes their general preventative health behaviors. Moreover, pandemic fear for these high-control individuals gradually loses its ability to motivate personal COVID-preventative behaviors as control perceptions increase.

4 | STUDY 2: PERCEIVED ACCESS, TELEHEALTH USAGE, AND PREVENTATIVE HEALTH BEHAVIORS

In Study 2, the scope was expanded to evaluate the effects of PAHS and pandemic fear on a broadened set of health behaviors, including preventative health visits/testing and COVID-19 vaccinations, as well as replicating observed relationships with personal preventative health behaviors and personal COVID-preventative behaviors. Also, Study 2 addressed whether or not telehealth use amplifies the positive effects of perceived access, especially during a healthcare crisis like a pandemic, while also seeking to replicate the moderating relationship of perceived pandemic-related control. Practically, Study 2 also represented a unique opportunity to evaluate whether or not the PAHS-related relationships observed in Study 1 continued to influence meaningful outcomes nearly 1 year after the initial pandemic data collection.

4.1 | Participants and procedure

We recruited 493 participants (269 women; \(M_{age} = 33.26\), range: 18–78) from the Prolific Academic Panel service. Only one of the participants failed both attention checks, so 492 participants were retained for analysis.

Following the same general pattern as Study 1, participants completed an online survey composed of questions about demographics, PAHS, health system concern, health vulnerability, pandemic fear, pandemic-related control, telehealth use (adapted from Campos-Castillo and Anthony (2021)), an expanded set of personal and health visit/screening preventative health items (with items from Vickers Jr et al. (1990)), COVID-19 vaccinations, and health-related controls (see Supporting Information for item details). All scales exhibited acceptable reliability (all Cronbach’s \(\alpha > 0.72\)).

4.2 | Results

Prior to analysis of the full model, indexes were created for perceived healthcare access, health system concern, perceived health vulnerability, pandemic fear, pandemic-related control, telehealth use (summed values of four yes-no questions for different telehealth forms), personal preventative health behavior items, personal COVID-preventative behaviors, and general preventative health visit/screening behaviors. Using the same custom PROCESS model, we then
tested four serial moderated-moderated mediation models (one model for each of the four behavioral outcomes) using a bootstrapping procedure with 10,000 resamples (Hayes, 2018) and again probed the interaction with floodlight moderation analysis using the Johnson-Neyman technique. The model followed the same analytical pattern except for telehealth use, a health system response to the pandemic, which was evaluated as a moderator of the PAHS to vulnerability/concern relationships. The primary path relationships are shown in Figure 3, and complete path relationships and Johnson-Neyman visualizations for significant interactions are available in the Supporting Information.

As shown in Figure 3, increased perceived access to health services lowered individuals perceived health vulnerability ($b = -0.64, p < 0.001$) and was unaffected by telehealth use (95% CI for interaction: $-0.0598, 0.0615$). The relationship between PAHS and pandemic-related health system concern ($b = -0.25, p = 0.025$) followed the same pattern, but was moderated by telehealth use (95% CI: $-0.1901, -0.0345$). As telehealth use increased, PAHS was much more effective at lowering health system concern (no significant transitions observed in floodlight analysis). In turn, increases in personal health vulnerability ($b = 0.40, p < 0.001$) and health system concern ($b = 0.15, p = 0.001$) generated greater pandemic fear. In summary, perceived healthcare access reduced perceived vulnerability and health system concern. This effect was further amplified by increased telehealth use, but only for health system concern. Perceived vulnerability and health system concern increase pandemic fear, especially when unchecked by PAHS.

For personal preventative health behaviors, pandemic-related control again moderated the relationship between pandemic fear and health behaviors ($p < 0.001$). For individuals low in perceived pandemic control (below 3.38, Johnson-Neyman significance region, under 10% of the sample), pandemic fear encourages increased personal preventative health behaviors. However, for individuals high in perceived pandemic control (above 5.03, Johnson-Neyman significance region, over 55% of the sample), pandemic fear actually discourages personal preventative health behavior. For personal COVID-preventative behavior, pandemic-related control also moderated the pandemic fear to health behavior relationship ($p = 0.001$). For low pandemic control individuals, the positive effects of pandemic fear on COVID preventative behaviors were greater than for individuals high in pandemic-related control.

For preventative health visits and screening, pandemic-related control did not moderate the relationship between pandemic fear and visit-related behavior ($p = 0.34$). Pandemic fear did not significantly increase preventative health visits and screening behaviors ($b = 0.20, p = 0.11$). Instead, PAHS directly influenced preventative health visits, with increased PAHS encouraging increasing preventative health visits and screening ($b = 0.41, p < 0.001$). In a similar pattern, pandemic-related control also did not moderate the relationships between pandemic fear and vaccination behavior ($p = 0.27$); however, pandemic fear did increase the uptake of full COVID vaccination behavior ($b = 0.20, p = 0.01$). In summary, pandemic fear contributes to increased personal health behavior in some cases, including COVID vaccination uptake. However, this finding is far more muted (COVID-preventative), not present (preventative health visits and screening), or even reversed (preventative health behaviors) when high levels of perceived pandemic control are factored into this effect for different types of personal health behavior.

### 4.3 Discussion

The results from Study 2 led to several important conclusions. First, the series of effects that start with perceived access to health services and culminate in preventative health behavior is
robust even at a later stage of the pandemic's development. Second, telehealth use exhibits the potential to amplify PAHS's ability to lower health system concern. Third, pandemic-related control again moderates the relationship between pandemic fear and preventative health behavior, but only for individually-enacted health behaviors. Including general preventative health behavior and COVID-preventative behavior, these individually-enacted health behaviors such as eating a healthy diet, getting enough sleep, wearing a mask, or practicing social distancing require little if any interaction with the health system for individuals to put them into practice. However, the relationship between pandemic fear and behavior is different for more system-enacted preventative behaviors. Preventative health behaviors like COVID vaccination and preventative screening/visits require individuals to directly interact with health system services to enact the preventative behavior. Pandemic control does not influence pandemic fear's motivating effect on COVID vaccination uptake, and pandemic fear does not influence maintaining preventative health visits and screening during the pandemic (although PAHS does positively and directly influence this behavior). In short, these results point to perceived access's continued buffering effect on pandemic fear and the significant challenges of unchecked pandemic fear for many health and well-being behaviors, especially when viewed in light of individuals' perceived pandemic-related control.

5 | GENERAL DISCUSSION

COVID-19 has changed the healthcare landscape in many ways. While necessary to maintain critical care during this public health crisis, healthcare delivery changes and service availability have increased consumers’ role in managing their health. Moreover, responsibility for preventing COVID-19 spread also falls on consumers. Our research examines the impact of the COVID-19 crisis on consumers’ perceived access to health services, its connections to pandemic fear, and, importantly, its influence on a wide range of preventative health behaviors.

First, we demonstrate that perceived access buffers an individual from pandemic-related fear, which in turn guides personal preventative and COVID-preventative health behaviors along with more system-enacted health behaviors like preventative health screening and COVID-19 vaccinations. While lack of access has been considered a barrier to healthcare utilization (e.g., Thomas & Penchansky, 1984), consumer access perceptions during the COVID-19 pandemic reduce pandemic-related fear by decreasing perceptions of vulnerability and concern about the health system. Consumers who perceive themselves susceptible to COVID-19 benefit more from this buffering effect of perceived access to health services on COVID-related fear.

Second, the impact of pandemic-related fear on both everyday preventative health, COVID-preventative behaviors, preventative health visits/screening, and COVID-19 vaccination behaviors is complex. Pandemic-related fear may constitute a relatively unique and extended form of fearful emotion. Traditionally, fear has been viewed as a short-term affect that, if not addressed, turns into generalized anxiety (e.g., Tanner Jr. et al., 1991). Contemporary fear and anxiety research separate the two, but their relationship is not as simple as once proposed (see LeDoux & Pine, 2016). A critical distinction between the two emotional experiences is that fear typically has a discernible cause, whereas anxiety is generalized, uncertain, or related to the future (Steimer, 2002).

While the cause of COVID-19 pandemic fear is discernible, this fear may have many sources within the pandemic context and likely endures through different stages of the pandemic. Nonetheless, our evidence shows that this pandemic-related fear flows from negative
antecedents (concern and vulnerability) and, for some consumers, leads directly to reduced preventative health behavior. In many ways, this pattern mirrors the maladaptive fear-based coping behaviors observed during the 2013–2016 Ebola outbreak in West Africa (McMahon et al., 2016). These findings are significant because of the potential resource constraints experienced during a major public health crisis like a pandemic (e.g., concern about the availability of hospital beds, shortages of ventilators). The strain of a global health crisis increases the importance of consumer participation in mitigating the pandemic and maintaining health access during this crisis.

However, fear is complicated, and with some behaviors, fear can be motivating. Our results show that pandemic-related fear can encourage personal preventative and COVID-preventative health behaviors if pandemic-related control is low and the behavior involves primarily personal enactment (e.g., eating well, wearing a mask). However, this fear-behavior relationship for individually-enacted health behavior either weakens or actually reverses (less preventative health behavior) for individuals high in pandemic-related control, and they represent significant portions of the population (about 33%–55% of our samples across studies). For preventative behaviors that share enactment with health system providers, perceived pandemic control has little effect. Instead, fear directly influences COVID-vaccination behavior without moderation, and the fear-behavior goes away for preventative health visits and screening behavior.

Pandemic-related control includes both illness-related control and locus of control. Individually-enacted health behaviors encourage an individual, personal framing of the behavior in terms of control. This recognition of personal control makes control beliefs more accessible and relevant for acting on fear-based motivation (or not). On the other hand, system-enacted health behaviors may reflect tacit recognition of shared control over behaviors where personal control is less relevant (scheduling, format, and availability defined by the system). Personal control beliefs would be less accessible and relevant for acting on fear-based motivation for system-enacted health behaviors.

This research has several implications for theory. First, we propose and test a series of facilitating/obstructing perceptions (PAHS), expectancy-linked judgments (perceived vulnerability and health system concern), and personal beliefs (pandemic-related control). Our findings move the EHBM framework in new directions to identify and explain how consumers make health-related decisions during a global health crisis. Traditionally, the EHBM is treated as summative; however, we find evidence of the EHBM as a process of successive judgments and appraisals that build on each other toward health behavior action (or inaction). We also integrate new explanatory constructs that differentiate different forms of expectancy likely to influence healthcare choices. Moreover, we also begin to identify the role different service delivery modes, such as telehealth, can have on healthcare expectancies and behavior. Finally, we link the judgments and beliefs of the EHBM to health and situation-related fear.

Second, these findings extend our understanding of how healthcare access perceptions and pandemic fear encourage and, in certain circumstances, discourage preventative health behaviors important to community and individual health. We uncover potentially important boundary conditions on the fear-preventative behavior relationship, identifying that both perceived control levels and the type of preventative health behavior (individually-enacted vs. system-enacted) explain, in part, the complicated relationship between fear and preventative health behavior. Moreover, these relationships proved important both at the height of the stay-at-home orders and after vaccine distribution had become more widespread in the United States. The importance of perceived access, pandemic fear, and personal beliefs remained consistent throughout the pandemic, and their influence on preventative behaviors continued even as
restrictions have eased. These results provide several implications for general public health policy and efforts during a major crisis like a pandemic.

6 | IMPLICATIONS FOR CONSUMER WELL-BEING AND POLICY

Prior research shows the importance of evidence-informed interventions for effective resource preparedness, education, and research in disaster situations (Morganstein & Ursano, 2020). The impact of a global health crisis like the COVID-19 pandemic can affect consumers’ perceptions of their access to healthcare services, the fear engendered by this crisis, and their shared effects on preventative health behavior. Our results pose a challenge for public health officials, service providers, and those involved in managing patient healthcare access because allowing or creating fear alone will not succeed. Therefore, including actions that can help consumers cope with their fear and avoid health threats is essential to promoting behavior (e.g., Tanner Jr. et al., 1991).

Perceived access lowers the threats of personal vulnerability and health system changes, especially for those who believe they are susceptible to the pandemic or embrace telehealth usage during the pandemic. In turn, lowering these pandemic-related threats to health and well-being understandably reduces pandemic fear. Reducing pandemic fear mitigates the risks associated with sustained negative emotion for both mental and physical health (Keeter, 2020; Marroquín et al., 2020; Ropeik, 2004) while also meeting ethical obligations to ease other’s suffering. In short, our results and prior research propose a strong case for making all possible efforts to increase perceived access to counteract pandemic-related fear.

However, with some evidence of functional pandemic fear (Harper et al., 2020, current studies), an imposing question is whether or not pandemic fear should be relied upon to motivate preventative health behavior. For COVID-19 vaccinations, our results show that pandemic fear increases this health-promoting behavior. Nevertheless, for equally important personal preventative and COVID-preventative health behaviors, a substantive percentage of our participants (up to 55%) actually experienced negative effects on preventative health behavior. Moreover, pandemic fear does not encourage any significant positive effects on preventative behavior for preventative health visits and screening. Indeed, in many cases, perceived access exerts an independent positive influence on preventative health behaviors (COVID-preventative behavior in Study 1; personal preventative, COVID-preventative, and preventative visits/screening in Study 2) even when controlling for pandemic fear. Especially with the negating or reversing influence of personal pandemic control, allowing pandemic-related fear to go unchecked by perceived access in hopes of a possible motivating effect seems both risky and inequitable to the many consumers likely to be discouraged from needed preventative health behaviors and harmed by the mental and physical toll of fear.

At the pandemic’s start, media reports expressed substantive concerns about the health system’s ability to treat pandemic patients; these commentaries, perhaps merited, signaled a lack of access to consumers. Our findings suggest that public health officials should reference the availability of needed health services to boost perceived access, even when presenting cautionary evidence and projections about the public health crisis. Promoting the opening of field hospitals, community vaccination sites, encouraging telehealth, or utilizing testimonials of access availability from trusted sources (Morganstein & Ursano, 2020) are various examples of ways public health officials can positively influence health access perceptions. Providing evidence to
support perceptions of access may indirectly help encourage individuals to behave in ways that lessen viral spread and avoid a follow-on public health crisis resulting from unhealthy choices during the pandemic. This evidence is crucial among those who believe they have personal control over the pandemic.

Another related route to improved outcomes may be to encourage consumer beliefs that make them more receptive to positive changes in perceptions of access. Public health agencies and officials should be cautious with control-related messaging that compounds the potentially harmful effects of pandemic fear on preventative behavior. Additionally, when resources are constrained, officials may be able to counteract fear-inducing access messaging (e.g., personal protection shortages, lack of ICU beds) by encouraging consumers to frame their access differently.

One example would be to use telemedicine as an opportunity for health officials to help influence access perceptions. Demonstrating how consumers can receive their healthcare services, albeit in a different way, may improve perceived access. Public officials and health service providers may accomplish this by educating consumers on telemedicine availability, making it easy to connect to services, and encouraging trial. Health officials and system administrators should streamline and simplify telemedicine for consumers wherever possible to maximize availability, acceptability, and affordability.

With access perceptions encompassing different health dimensions, public officials and service providers should consider the opportunity to influence the different dimensions of access (availability, acceptability, affordability; Tanner et al., 2020). For example, health system communication efforts could highlight extended hours available with virtual providers (availability), the ability to set up a provider preference profile for virtual appointment matching (acceptability), and lower out-of-pocket costs for virtual visits (affordability). At the same time, public health organizations and health systems may also need to facilitate technological access, since telehealth visits often require specific devices (e.g., mobile device) and connectivity (e.g., internet) that are disproportionately available across many communities (Dahl et al., 2018; Friedline & Chen, 2020). These technology access challenges parallel similar experiences encountered by school systems making the transition to fully remote learning during the COVID-19 pandemic (Garbe et al., 2020) and may require a mix of private and public partnerships to address the effects of the technological divide on telehealth and virtual healthcare access.

Addressing limitations, opportunities for future research should experimentally examine how the moderators (telehealth usage and perceived control) can be treated as interventions to increase preventative behavior and improve health during a public health crisis. Additionally, exploring the potential relationship between pandemic-related fear other potential motivating factors to engaging in telehealth is an opportunity for further exploration. Another potential future direction for this research would be to expand the representation of underrepresented groups; partnerships with community organizations may prove fruitful for expanding representation in future research. Additionally, better understanding perceived access antecedents and how it relates to reducing and counteracting fear may prove helpful for guiding well-being enhancing interventions that influence or improve access perceptions. Moreover, an expanded understanding of how health behavior framing (individually-enacted vs. system-enacted) may affect behavior’s relationship to fear and control promises new avenues for appreciating when fear and control facilitate or hinder preventative health behavior. While this research focuses on the COVID-19 pandemic, its implications should likely extend to other public health crises that lead to access concerns. The relationships between access perceptions, fear, and preventative health behaviors help unlock opportunities for health and well-being during a public health crisis.
CONCLUSION

Stopping the spread of COVID-19 requires consumers’ cooperation to get vaccinated and engage in preventative COVID-related measures. Additionally, to avoid a follow-on public health crisis, consumers must adopt or maintain general health preventative behaviors such as keeping up with screenings or regular check-up appointments during the pandemic. These behaviors become even more critical as the pandemic wears on, especially when fatigue sets in and consumers are tired.

COVID-19 has disrupted the delivery of health services and thus impacted consumers’ perceptions of their access to health services. Understanding the impact of these access perceptions on pandemic-related fear and preventative health behavior is vital as public health officials, health systems, and healthcare providers combat this crisis as well as future ones. In fact, according to recent research, in any given year, there is a 2% and growing probability of a pandemic that will be comparable in impact to COVID-19 (Marani et al., 2021). Therefore, in addition to research that examines the causes of the increased risk pandemics (e.g., population growth; Madhav et al., 2017), it is crucial to understand how consumers respond during times of crisis and find ways to effect changes in behaviors.

ACKNOWLEDGMENTS
The authors would like to thank Paula M. Fitzgerald for her encouragement of this project and John F. Tanner for a review of an earlier version of this manuscript. This research was supported by funding from West Virginia University and Penn State University.

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**How to cite this article:** Vann, R. J., Tanner, E. C., & Kizilova, E. (2022). Perceived access, fear, and preventative behavior: Key relationships for positive outcomes during the COVID-19 health crisis. *Journal of Consumer Affairs*, 56(1), 141–157. [https://doi.org/10.1111/joca.12439](https://doi.org/10.1111/joca.12439)