Unmasking America's Reaction To Face Masks: A Review Of The Literature

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UNMASKING AMERICA’S REACTION TO FACE MASKS:
A REVIEW OF THE LITERATURE

by

Tyler Caruthers

Submitted in fulfilment of the requirements for the degree of
Master of Public Health
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ABSTRACT

The United States has faced challenges in reestablishing normalcy as we learn to live with COVID-19. This has included adhering to competent infection containment guidelines. Despite evidence that masks can assist in COVID-19 transmission reduction, the mere suggestion has sparked outrage, violence, and even death in communities across the country. To safely reintroduce any semblance of normalcy that has been lost over the last year, it is critical to consider the variables that influence one's internal personal perspectives and to comprehend how this influences various behavioral responses. Several critical risk communication principles can aid scientists in better understanding how people in various parts of the country are reacting to the threat of SARS-CoV-2. The purpose of this paper was to gain a better understanding of the specific attitudes, social structures, and shared belief systems that surround public safety and intervention adherence, specifically regarding the use of face masks in public places to prevent COVID-19 transmission. The primary objective was to gain a better understanding of the social and attitudinal factors that influence mask use or nonuse. The results of this review will provide a comprehensive explanation for the behaviors observed in the United States during the COVID-19 pandemic by applying risk communication concepts such as risk perception and risk assessment to the challenges associated with public health recommendations to wear a face mask in public.
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Chapter I: Introduction

Background

The advent of the novel SARS-CoV-2 virus in late December 2019 prompted the launch of major global efforts aimed at mitigating and preventing the spread of this deadly disease. In the first 12 months since the virus's appearance, the global death toll has risen to approximately 3 million [1], with over 560,000 deaths occurring in the United States [2]. Since the outbreak of the pandemic, scientists have been able to elucidate key characteristics that drive viral transmission. SARS-CoV-2 is primarily transmitted via respiratory droplets carrying infectious viral particles over short distances (less than six feet) [3]. SARS-CoV-2 infections occur in a significant proportion of cases (40–45%) without symptoms and can be spread by presymptomatic and asymptomatic individuals [3]. To minimize the spread of virus-carrying droplets, public health experts recommend wearing face masks in public areas, as well as hand washing and social isolation [3]. Wearing a face covering has been demonstrated to be an effective nonpharmacologic intervention for reducing the spread of this infection, particularly as a source control measure to prevent transmission from infected individuals, but also as protection against infection exposure for wearers [4].

Science has overcome enormous logistical obstacles to develop effective COVID-19 vaccines that, ideally, will serve as a significant step toward containing the pandemic during one of the most challenging and destructive public health crises in history. 213 million vaccine doses have been administered in the United States' first four months of vaccine rollout, representing 26% of the total population fully vaccinated [2]. Despite this remarkable achievement, researchers are still understanding how vaccines affect COVID-19 spread, and preventive measures like face masks and social isolation are still recommended even after vaccination [5]. This is especially true in light of the recent emergence of SARS-CoV-2 variants in the United States, which are now widespread and rapidly spreading [6].
Current Situation

The United States has faced challenges in reestablishing normalcy as we learn to live with COVID-19. This includes adapting to new situations and adhering to competent containment guidelines. Despite evidence that masks can assist in COVID-19 transmission reduction, the mere suggestion has sparked outrage, violent clashes, and even death in communities across the country [7]. Masks have become politicized in order to reflect ideological and social divisions, rather than serving as a straightforward preventative measure to expedite America's reopening. As previous public health initiatives, most notably vaccination campaigns have demonstrated, a variety of beliefs contribute to community acceptance and adherence [8, 9]. A number of critical risk communication principles can aid scientists in better understanding how people in various parts of the country are reacting to the virus's threats [10].

Purpose and Objectives

In this extraordinary period of American history, there is an overwhelming need for mutual reliance to safeguard the common good. To safely reintroduce any semblance of normalcy that has been lost over the last year, it is critical to consider the variables that influence one's internal personal perspectives and to comprehend how this influences various behavioral responses. The purpose of this paper is to gain a better understanding of the specific attitudes, social structures, and shared belief systems that surround public safety and intervention adherence in the United States, specifically regarding the use of face masks in public places to prevent COVID-19 transmission. The primary objective is to gain a better understanding of the social and attitudinal factors that influence mask use or nonuse. The results of this review will provide a more comprehensive explanation for the behaviors observed in the United States during the COVID-19 pandemic by applying risk perception and assessment concepts as described below.

Framework

The findings of the review were presented using a modified version of Dr. Peter M. Sandman's risk communication model. The concept of "Hazard Versus Outrage" has been shown to be an effective way of summarizing and simplifying some of the most significant findings in risk perception and risk
communication research [11]. Messages intended to motivate individuals and communities to take action to mitigate personal and social risks have historically been used in health risk communication [12]. As is the case with most preventive measures, complications in health communications regarding the use of face masks during the novel COVID-19 pandemic stem from the fact that healthy people are required to follow advice in the hope of uncertain benefits [12]. People's attitudes and responses to risk are influenced by a variety of factors. Individual beliefs, perspectives, and attitudes, as well as broader social and cultural values, all influence risk perception and acceptance [12]. The framework that follows is used to explain how people perceive and characterize risk, which is important for decision-making and behavior intentions.

Defining Risk. Risk is quantified using data on the burden, etiology, and spread of disease. When risk communication was in its infancy, researchers discovered that two major factors influenced risk acceptability: hazard and outrage [10].

Outrage Factors. Health risks are only one predictor of risk perception. Risk perception is influenced by variables that affect risk acceptability across different audiences, messages, and contexts [10].

Outrage can be sparked by perceiving risk:

- to be involuntary versus voluntary;
- to be inequitably disseminated;
- to be inescapable even if safety measures are taken;
- to evolve from unfamiliar sources;
- to pose a threat to vulnerable populations or future generations;
- to be poorly understood; or to be subject to inconsistent statements from experts; or to be undetectable;
- to be perceived as immoral;
- to be memorable.
These factors may be mutually reinforcing [13].

**Risk Perception.** Individual (affective and experiential variables) and social variables (cultural worldviews and social norms) interact to demonstrate how risk perception is interpreted.

**Risk Attitude.** Individual risk attitudes vary, with some people being more cautious than others. Numerous motivators and barriers influence people’s compliance with public health recommendations.

**Risk Behavior.** Perception of risk influences individual attitudes and, consequently, behavioral intentions. Decisions about risk behavior involve a dynamic cognitive process that is intensified in the presence of a threat or uncertainty [13]. Humans use intuition and heuristics, or “rules of thumb,” to quickly filter and assess critical data [13].
Chapter II: Research Design

Methodology

To conduct a transparent and reproducible review of the literature on face mask compliance behaviors, the systematic research protocol developed by Casino et al. [14] was used, as well as aspects of the review process suggested by Briner and Denyer [15]. The overall methodology approach entails the following steps (refer to Table 1 of Appendix):

1. Specify the need for the review, write the review proposal, and create the review protocol.
2. Identify the literature, choose sources, evaluate their quality, and retrieve and synthesize data.
3. Present the review's findings.

Locating Studies

To address the research question, a search strategy was devised that included both published and unpublished studies, as well as sources from the grey literature. PubMed and Google Scholar were the primary journal databases searched for titles containing the terms 'face masks', 'America', 'compliance', and 'COVID-19' or 'SARS-CoV-2'. For PubMed searches, articles were limited to those published after April 6, 2020 (when the World Health Organization revised previous guidelines and recommended that the public wear cloth masks in public). Google Scholar's refinement features display advanced search results by a range of years; as a result, articles were limited to those published between 2020 and 2021. Additional searches were conducted using the referenced works of relevant articles. Electronic searches were also used to identify relevant grey literature, such as academic articles, research and committee reports, local and national news outlets, blogs, and opinion pieces. To identify published grey literature, Google results within the first ten pages were analyzed. During the search, alternate terms for the key words 'face masks', 'America', 'compliance', 'COVID-19', and 'SARS-CoV-2' were used. The relevance of abstracts from articles and grey literature sources was determined. When abstracts were unavailable, the
full text of the article was retrieved and evaluated for relevance. The full text of all potentially relevant articles was retrieved.

**Study Selection and Evaluation**

The retrieved literature was evaluated for eligibility using a set of predefined inclusion and exclusion criteria (refer to Table 3 of Appendix). To begin, the abstracts of all journal articles and introductions to grey literature were evaluated. Articles that met one of the exclusion criteria was removed and sorted according to the reason for removal. Following that, a full-text review was conducted, and additional literature was excluded and documented. In general, sources were excluded because they were primarily focused on the functionality of face masks as personal protective equipment, on the efficacy of face masks as personal protective equipment, on other concepts unrelated to preventive or avoidant face mask compliance behaviors, or because they did not describe the social, psychological, or demographic characteristics associated with face mask compliance behaviors.
Chapter III: Presentation of Findings

The strategies of the grey literature search plan of published and unpublished literature yielded 107 sources, including 36 journal articles and 71 web-based electronic sources (refer to Figure 1 of Appendix). The data from retrieved sources were then assessed for emerging themes or subthemes. From the literature review, the use of face masks was associated with the following risk communication principles:

Risk

Defining Risk

A risk is the possibility that a decision could result in a loss or an unfavorable outcome [16]. Nearly every human decision encompasses some level of risk. Under duress, decision-making is intrinsically tied to an individual's perception of risk, as well as their risk attitudes and behaviors. According to the risk perception formula developed by Dr. Peter Sandman (refer to Table 4 of Appendix), risk is equal to the sum of a quantifiable hazard and a sense of outrage. The term "risk perception" refers to an individual's subjective assessment of the characteristics and severity of a risk [17]. Hazard is a term that encompasses both the probability of an event occurring and the severity of the outcome [17]. The level of public anger and fear is referred to as outrage. This has a much bigger impact on how people react to a threat than objectively calculated risk [17]. Higher levels of outrage are associated with a stronger perception of risk [17]. The number of individuals exposed, contaminated, and infected during the COVID-19 pandemic poses a hazard. Outrage is related to how the public perceives and responds to risk communication [10]. Despite the fact that the COVID-19 pandemic has created numerous new public risks, Americans have adopted two diametrically opposed identities: those who believe the greatest threat is losing control of their individual liberties and those who believe the greatest threat is contracting infection and becoming ill.
Outrage Factors

Outrage factors are critical components of risk perception. According to the First Law of Risk Communication, “outrage, not hazard, drives reputation” [17]. For instance, when outrage is low, significant hazards are typically tolerated; when outrage is high, insignificant hazards are tolerated less [17]. The degree to which a risk is perceived as a threat is determined by a variety of outrage-inducing factors [13].

Involuntariness

Individuals value choice. Voluntary behavior is considered to be up to 1,000 times more acceptable than coerced or forced behavior [11]. People frequently express outrage when they believe their freedom of choice is being stripped away [18]. Businesses enforcing mask mandates demonstrate this. Accepting COVID-19 exposure and the risk of serious disease in lieu of wearing a mask has had a sizable impact on the implementation of recommended infection prevention measures.

Mandatory mask wear is frequently opposed by those who believe their freedom of choice is being violated. Restaurants and retailers are particularly vulnerable because such mandate enforcement frequently falls on their employees [19]. Since the outbreak began, individuals working in the service industry have had to strike a balance between job responsibilities and pacifying the anti-mask crowd, an act otherwise known as emotional labor [20]. Emotional labor is the process of controlling one's emotions or feelings in order to meet the demands of a job [20]. The National Retail Federation has encouraged retailers to establish their own national mask policies to combat harassment in the service industry as a result of mask enforcement, stating that “workers serving customers should not have to make critical decisions as to whether they should risk exposure to infection or lose their jobs because a minority of people refuse to wear masks in order to stop the spread of the deadly coronavirus” [21]. Despite encouraging recommendations, maintaining professional stability in the presence of a circulating pathogen continues to be a challenge for everyone from critical care physicians to supermarket cashiers [20].
Inequity

The critical component of fairness is the distribution of risk in relation to benefit [11]. It is critical to recognize that infection prevention behaviors such as wearing a face mask come with some element of perceived personal cost, which varies significantly across communities in the United States. Stereotypes are frequently amplified during times of crisis, resulting in increased hostility toward those considered to be "out-groups" [22, 23]. Throughout the COVID-19 pandemic, the media have thoroughly documented anecdotal accounts of discrimination, racial profiling, and xenophobia directed at members of various races and ethnic groups. Discrimination has been associated with an increase in psychological distress, particularly among minorities [24].

COVID-19, in conjunction with the escalating conflict between the United States and China, provided ample opportunity for stigmatization. Face masks are viewed as a critical component of infection prevention by Chinese health experts, and the Chinese government began requiring citizens to wear masks in January 2020 [25]. Prior to April 2020, however, American health officials claimed that masks were restricted for health care workers and those that were ill [25]. As the virus spread across the country, a narrative surfaced accusing China of being the source of the virus [25]. Asians were more likely to face racist acts and COVID-19-associated discrimination in the early stages of the pandemic [24], as they were perceived as suspicious for wearing masks and assumed to be a source of infection [23].

Another group that consistently faces increased discrimination as a result of COVID-19 is non-Hispanic Blacks [24]. During the pandemic's early stages, non-Hispanic Blacks faced increased stigma, with media outlets highlighting disparities in the enforcement of city mitigation efforts [23, 26]. Additionally, widespread concern was expressed regarding the stereotyping of people of color as criminals or gang members [27, 28]. Numerous accounts have surfaced in which African American and Latino men confessed to preferring traditional masks and less menacing, brightly colored face coverings to avoid unwanted attention [23, 28, 29].
Inescapability

Control provides individuals with a sense of security, particularly in high-risk situations [18]. When an individual has control over risk, they frequently use uncertainty to avoid worrying. This was evident at the start of the pandemic when experts lacked knowledge about the virus or the efficacy of infection prevention strategies. Initial uncertainties about wearing face masks may have contributed to the delay in incorporating face masks in the public domain until experts were confident in their effectiveness. Having control, on the other hand, may also result in inaction [11]. It may appear that there is no reason for urgency to act if there is no perceived threat or loss of control. This may be true for individuals who opt out of wearing masks in areas of the country where COVID-19 had no significant morbidity or mortality.

When the risk is societal and imposed, uncertainty becomes a reason for increased concern [11]. Several things can happen when a risk grows beyond an individual's control. According to Joseph J. Trunzo, chair and professor of psychology at Bryant University, "uncertainty breeds fear, which naturally fuels a desire for control" [30]. When confronted with circumstances over which they have no control, people's natural instinct is to exert power somewhere else to maintain some sense of stability [30]. The COVID-19 pandemic has introduced a slew of new risks for the public, and for some, the greatest danger is not contracting the virus and becoming ill but losing control of their individual liberties. Some people will feel more at ease exercising their control by refusing to wear masks, while others will feel safer wearing one [30].

Unfamiliarity

Novel risks elicit more outrage than familiar risks, which are frequently underestimated by individuals [11]. It is extremely difficult to convince an individual to take a risk seriously when it occurs on familiar territory; however, they often become outraged when the risk arrives on their doorstep [11]. The emergence of SARS-CoV-2 has posed an unimaginable threat to the American psyche, affecting individuals' mental health and eliciting a variety of coping mechanisms. Unfamiliarity causes people to revert to their basic instincts, clinging to whatever makes them feel safe [30]. Humans have an innately
strong survival instinct that becomes hyperactive in the face of an unknown threat [30]. Psychologists refer to this as "hot cognition," or the state of mind in which strong emotions trump rational thought [30]. Americans have been in a fight-or-flight state since the pandemic began, with some venting their frustration by attacking mask regulations. Others broadcast video streams, publicly shaming anti-mask activists. This is all the result of what sociologists believe is a release of hypervigilance, uncertainty, and tension that has grown since March 2020's initial lockdown [31].

Similarly, an issue of excessive familiarity has surfaced. Individuals lose their outrage as a risk becomes more familiar and may engage in behaviors that increase their risk of infection [11]. This is due to the Peltzman effect, or risk compensation theory, which states that people's behavior changes in response to perceived risks, which can include increased risk-taking as safety conditions improve [32, 33]. Face masks provide this sense of protection, and risk-averse behaviors have resulted in less time at home and more trips to public places as the pandemic progresses. According to a recent study, mask orders resulted in Americans spending 11-24 minutes less time at home and more time in commercial establishments, especially restaurants, which are classified as high-risk locations [34].

Vulnerability

It has been suggested that many individuals are more concerned with society's most vulnerable members, particularly children, than with the general public [11]. According to current CDC recommendations, individuals aged 2 and older should wear masks in public settings and when around non-family members [35]. Parents are concerned that masks will impair their child's speech, language, and social abilities as they attend classes with masked faces [36]. Several studies on infants' lip reading have revealed that when babies begin babble, their focus shifts away from the eyes toward the mouth, where they receive both auditory and visual cues [36].

Masks have the potential to cause three issues: 1) Children under the age of 12 may have trouble recognizing people since this age bracket typically focuses on individual characteristics; 2) children may have difficulty recognizing emotions and interacting with others because masks conceal the movement of
the facial musculature, which conveys emotional information; and 3) children may have difficulty recognizing speech when the mouth is covered [36].

Communication, on the other hand, is not limited to visual cues from observing the mouth. Regardless of the temporary visual impairment caused by masks, voices, gestures, and body language all contribute to the adaptation process for recognizing social expressions [36]. Due to the adaptability of children's brains, masks may enhance their ability to read nonverbal cues such as tone of voice and body language [36].

**Knowability**

Several factors contribute to the distinction between known and unknown risks [11]. Uncertainty is one component of knowability. While the public was willing to accept uncertainty during the initial stages of the pandemic, over a year later, it presents difficulties in developing specific, actionable infection prevention strategies [10]. This uncertainty can exacerbate anxiety and fear, prompting the public to either disregard the risk entirely or become enraged at the mitigation strategies [10].

Any time uncertainty exists, the possibility of politicization exists [11]. The federal government initially advised against widespread public use of face masks. Within two months, guidelines were reversed due to the revelation of the nature of presymptomatic and asymptomatic spread, eliciting a mixed public reaction ranging from relief to outrage. Some conservative officials protested, claiming that the requirement for masks violated civil liberties and was part of a larger political campaign against former President Donald Trump [37]. Political leaders' messaging undercut the legitimacy and importance of health officials' advice, thereby increasing public mistrust [31]. Expert disagreement is more dangerous than uncertainty because it breeds extreme hesitancy among the general public [11]. When combined with political polarization, inconsistent recommendations exacerbate widespread skepticism of government mandates [30]. During the pandemic's early stages, some health experts claimed that masks were ineffective and gave people a false sense of security, thereby increasing their risk of infection [38]. Guidelines had to evolve in lockstep with scientific understanding of COVID-19, but this uncertainty led disparate segments of the population to distrust and disregard any additional evidence or advice from these organizations.
Detectability is another component of knowability [11]. A virus is not a tangible threat and wearing a mask doesn't usually confer tangible benefits. The invisibility of SARS-CoV-2, combined with the strict enforcement of mask guidelines, may have contributed to the rise in public outrage.

Immorality

When the public reacts to a risk with unusual intensity, something has generally elicited a moral response [11]. Moral outrage can be defined as outbursts directed at a third party for harming another [39]. One theory underlying moral outrage is that individuals punish in order to benefit society [40]. Historically, communities have used vigilante justice and public humiliation to uphold widely accepted codes of social behavior that, when violated, do not constitute crimes [41]. Scolding has long been a popular method of communication, particularly online. Individuals can communicate their outrage to the world through social media platforms, which make it simple to connect with communities united by a shared belief [42]. Celebrities, politicians, and health care officials, as well as the remaining 48 million Americans on Twitter, have used the platform to express their support or opposition to mask wearing [43].

According to organizational psychologist Tasha Eurich, passing judgment was an evolutionary function that necessitated an understanding of what was or was not acceptable to the group [44]. The pandemic has reintroduced the reality that each individual's choices impact the health of others [44]. Simultaneously, local governments have repeatedly delegated risk management responsibility to individuals, creating an environment that is ideally suited to censure [44]. Though it is emotionally draining, labeling someone a bad person is psychologically easier than accepting the notion that a good person can make a "bad" choice [44].

Memorability

A memorable event lends context to a risk, thereby increasing its perceived danger [13]. The more memorable the risk, the greater the outrage [11]. Memorability is reinforced by media coverage. Increased outrage justifies increased media coverage, which increases recall of the risk, which results in increased outrage, and so forth [11]. While those opposed to mask wearing are a small minority, their media
exposure may have created the false notion that the anti-mask attitude is pervasive and widespread. Protests against masks occurred in several cities throughout the COVID-19 pandemic, and their reappearance is likely stimulated by social media and news coverage [38]. According to a Pew survey, only about 22% of Americans use Twitter, compared to 77% who use at least one type of social media [43]. Additionally, they discovered that Twitter users appear to be more radical in their political views, with only 10% of Twitter users accounting for 80% of all tweets [43].

The news media can be a good substitute for personal experience [11]. Even in the absence of direct contact with SARS-CoV-2, hearing about other people's experiences can instill fear of contracting COVID-19 if necessary precautions are not taken out in public [45]. "Mirror-like neurons" enable rats to feel pain when another rat receives an electronic shock [45]. Similarly, psychological research indicates a strong correlation between reading or watching news coverage of a disaster and post-disaster anxiety [45]. The affect heuristic, or decisions heavily influenced by emotional state, is based on learning processes that occur as a result of direct or indirect experience with danger [46].

Symbol is another important source of memorability [11]. In some countries, particularly in East Asia, where widespread mask use is seen as a selfless social norm, masks are thought to hold prosocial moral value [47]. Mask wearing in the United States, on the other hand, may be perceived as an antisocial act, with pre-pandemic ties to crime and danger [48, 49].

**Risk Perception**

Risk assessment entails determining an acceptable level of risk [13]. A critical component of risk assessment is risk perception—or an individual's perceived susceptibility to a threat [50]. According to health behavior models, adherence to recommended health protective behaviors may be contingent on individuals' risk perceptions [51]. By examining risk perception elements and their relationship to protective behaviors, one can gain a better understanding of how Americans responded to wearing face
masks during the COVID-19 pandemic. The interaction of multiple individual and social variables is used to interpret risk perception.

Individuals Variables

Emotion determines how individuals perceive the world and make important decisions. Emotions, in theory, serve to dissociate stimulus and behavioral response, enabling greater adaptability to environmental changes [52]. Individuals experience emotions as they constantly evaluate events or situations in light of their needs, values, and overall well-being (appraisal) [52]. The Component Process Model of Emotion classifies appraisal into four objectives that describe the main types of information required for adaptive emotional responses: 1) Relevance: How does this affect me of my social group? 2) Implications: What are the consequences of this event and how does it affect my immediate or long-term well-being? 3) Coping potential: How well can I adjust to the consequences? 4) Normative significance: What is the significance of this event mean in terms of how I identify with social norms and values? [52]. The outcome of the appraisal may be subjective to the individual and the situation, which explains why multiple people react differently to the same situation [52].

Contemporary risk perception theories propose that individuals perceive hazards in two ways: deliberative/analytically and affectively/experientially. The distinction between deliberative versus affective perceptions reflects the interaction of two antagonistic forces: the cognitive and emotional mind [53]. Cognitive processing is characterized by systematic, deliberate, and logical risk perceptions [46, 50, 52]. While deliberate risk perceptions are related to the perceived likelihood of experiencing a negative event, risk assessment is more closely related to emotions, intuition, and social differentiation than it is to rational ideals [13, 46, 50].

Affect, which refers to a particular quality of "goodness" or "badness," has been shown to be a strong predictor of protection motivation [46, 50]. Affective risk perception refers to the emotion felt when considering a hazard, such as the possibility of developing disease or illness [54]. Affective risk perceptions are described as being more efficient and faster than using analysis to navigate uncertain or
threatening environments [46]. When individuals are stressed, their knowledge is limited, and decisions must be made quickly, the preferred strategy is to rely on affect [46]. According to the findings of a recent study, affective risk perception mediated the relationship between an individual's affective attitude toward SARS-CoV-2 and protective behavior, such as mask wearing [46].

Social Variables

Risk perceptions are formed by group norms that reflect interpersonal experiences and circumstances [13]. Social norms are a critical component of behavior change and are thought to have elicited protective behaviors during the COVID-19 pandemic [22, 46]. Descriptive norms represent the subjective perception about what others do, while prescriptive norms reflect the expectation of what one is supposed to do [46]. Literature suggests cultural worldviews play an important role in the social construction of risk, guiding choices and behaviors through a desire to belong to groups that share the values that define personal identity [46]. The cultural worldviews of individualism-communitarianism and hierarchy-egalitarianism have gained prominence in explaining risk perception and individual attitudes [46]. Hierarchy reflects attitudes toward social structures that link authority to social positions based on explicit characteristics like gender, race, and class [46]. Egalitarianism focuses on fair distribution of wealth [46]. Individualism demonstrates attitudes against social institutions, highlighting the notion that people can take care of themselves without the government or society's help or intervention [46]. Communitarianism bestows society with the responsibility to ensure mutual well-being as well as the authority to prioritize collective interests over individual interests [46].

Individualism-communitarianism has been suggested to have a greater influence on the evaluation of COVID-19 than hierarchy-egalitarianism [46]. Social norms have been found to act as a moderator in the relationship between worldviews and adherence to protective measures, with one study emphasizing this role as an explanation for why individualistic people were less likely to comply to protective behaviors [46]. Additionally, individualism explained protective behaviors through a different mechanism involving social norms. Prescriptive norms, according to the Theory of Normative Social Behavior, will mitigate the
effect of descriptive norms on behavior – that is, when individuals believe they are expected to behave in a certain way by those they admire, they will be more likely to comply [46]. This effect was determined to be insignificant, implying that when a government authority recommends public health protection behaviors, the distinction between descriptive and prescriptive norms becomes more complicated [46]. With state and local governments enforcing mask orders, the line between what others do and what is expected of an individual may become increasingly vague. Furthermore, the authors stated that their findings indicate that those who believe society is not responsible for the collective well-being of others perceive COVID-19 as a lower risk. On the other hand, those who felt the government should do more, even at the cost of individual liberty and choice, expressed increased concern about COVID-19 and took additional precautions [46].

**Risk Attitudes**

Attitude refers to an individual's assessment of a particular behavior, whether favorable or unfavorable, taking into account the outcome of the behavior. Individuals differ in their risk attitudes, with some being more conservative than others when it comes to taking risks [13]. Risk attitudes, according to some analysts, are distinct from risk perception as a motivating factor in behavior, with the former referring to an underlying disposition toward risk [13]. Attitudes can range from complete avoidance to risk seeking [13]. This review found some of the primary reasons for wearing a mask to be self-protection and community responsibility, fear, anonymity, and compliance with expert recommendations. Barriers to wearing masks included the belief that they were unnecessary, difficulty navigating social situations, a variety of self-reported physical and psychological challenges, hardships imposed on groups due to safety concerns, crime and harassment, and a loss of personal identity and autonomy. The primary reasons cited are similar to those voiced in 1919 by the Anti-Mask League during the Spanish Flu, which campaigned against what they characterized "unhealthy mask ordinances" [38, 55]. The Anti-Mask League, frequently
referred to as "mask slackers," was a brief protest group whose members argued that masks were ineffective and inconvenient, and that mandating mask wear violated their civil liberties [38, 56].

**Motivators of Face Mask Compliance**

*Protect Self and Respect Others*

In some cases, the inherent desire to protect is a significant motivator for face mask compliance. According to focus groups, the most frequently mentioned reason for wearing a face mask was to protect others [57]. Several participants specifically referred to the safety of vulnerable individuals or family members, such as the elderly, infants, and those with pre-existing medical conditions [57]. Individuals are far more willing to make sacrifices when they feel the benefit justifies the risk [11]. Wearing a mask in public is considered a prosocial act because it protects others from viral infection by capturing the majority of respiratory droplets released by the wearer [58].

Prosocial behavior encompasses acts of empathy, altruism, cooperation, and solidarity [59]. Throughout the current pandemic, empathy has been shown to be a significant predictor of prosocial behavior, referring to a person's range of responses to other people's experiences [58]. Cognitive empathy is the process of adopting another person's perspective (i.e., psychologically placing oneself in another person's shoes) in order to comprehend and appreciate their point of view [60]. It is hypothesized that cognitive empathy reduces counter-arguing, group conflict, and discrimination [58, 60]. Affective empathy is defined as the capacity to connect with another person's emotional experiences along with a willingness to consider others' vulnerability [58, 60]. It is believed that affective empathy reduces anger during message processing, resulting in increased altruism and compassion [58, 60]. Research indicates affective empathy for those most at risk of contracting the virus increased motivation to take protective measures, whereas simply informing people about their importance did not [58]. This is consistent with recent findings that social distancing and wearing face masks in public are associated with prosocial behavior [58].
Community Responsibility and Social Norms

Masking is also motivated by a shared sense of responsibility [57]. Prosocial emotions influence both individual and group-based behavioral motivations. Intergroup emotion theory postulates that identification with a social group can result in the sharing of similar emotions and drive group behavior [59]. Emotional sharing can assist individuals in developing a shared worldview, which can then be used to organize interpersonal interactions within and across groups [59]. Although the emotion is initially felt on an individual level, the realization that others are experiencing the same thing lays the groundwork for community formation [59]. On the other hand, if members believe their group's values are under threat, group-based behavioral motivation can exacerbate polarization [61]. Numerous sociology professors expect recording and reporting anti-mask activists' angry outbursts appeals to individuals and groups who typically wear masks because it elicits a sense of justice, thus confirming in-group superiority [31].

Individuals take cues about their behavior motivation from those close to them, especially in novel and uncertain environments [62]. Masks have become a symbol of conformity for some Americans as a result of COVID-19 [63]. Conformity is classified as either a normative social influence (motivated by a desire to be liked) or informational social influence (motivated by a desire to be correct) [62]. According to a University of Pennsylvania study, a critical mass of 25% of participants is required to initiate social change, which may be relevant for influencing the use of face masks to the point where it becomes a widespread social norm [62, 64, 65]. This form of communal action conforms to collectivist cultural norms, such as the wearing of masks to protect others from illness [64]. Even in America's individualistic society, the desire to protect others is likely to remain a strong motivator [64].

Fear: Maskless Anxiety

The emotional toll that Americans have endured in the first 12 months of the pandemic may be permanently rearranging future behavior. There is growing anxiety among some who are afraid to go out in public without wearing a mask once effective vaccines are available and mitigation measures are lifted [66]. The classical conditioning process explains how individuals acquire phobias, as they learn to
associate a neutral stimulus with an unconditioned stimulus that elicits a fear response [67]. Once the association is established, what was once considered an unconditioned stimulus becomes conditioned, eliciting a conditioned response of fear that develops into a phobia [67]. Members of society may have developed a conditioned fear of social activities as a result of learning that they must avoid people to avoid contracting the virus [68]. Lisa Barrett, a neuroscientist and psychologist at Northeastern University, believes that as a result of the invisible threat posed by symptomless spreaders, people have developed a system for categorizing the unsettling sensation associated with being in a crowd or witnessing others violate COVID-19 social norms [45]. Once the brain establishes that an unmasked face is physically dangerous, it will sound alarms whenever it encounters one, as it has imposed a sense of contagion or threat on others [45]. Despite the pandemic's emotional intensity, research on other periods of collective stress indicates that the desire to avoid maskless situations may be temporary [45].

Individuals may require time to reset their expectations and normalize their activities after reintegrating into public socialization [68].

Anonymity: The Other Kind of Protection

Maskless anxiety may be exacerbated even more for a subset of people who have worn face masks not only for protection, but also to feel invisible. Face masks have unintentionally increased the confidence of introverts who suffer from anxiety disorders or skin conditions [69]. Masks provide a temporary reprieve from the anxiety associated with social interaction [70]. One Polish study published May 2020 examined the association between implementation of face mask restrictions on psychopathological manifestation, emphasizing an overall decrease in psychopathological symptoms and suggesting masking “might reinforce people’s sense of personal control, mitigate helplessness and moderate anxiety” [70, 71].

Masks create an illusion of anonymity, which has been shown to be an effective coping mechanism for social anxiety [66]. According to David Moscovitch, a psychology professor at the University of Waterloo, people who suffer from social anxiety are “uniquely and primarily concerned about characteristics of self that they perceive as being deficient or contrary to perceived societal expectations
or norms” [66]. Individuals who suffer from social anxiety may avoid public situations entirely to avoid negative feelings or physical manifestations of anxiety (i.e., blushing, sweating, or trembling) [70]. However, masking your expressions and even your identity reduces anxiety associated with social tasks [70]. Masks relieve self-imposed pressures to appear "perfect" by allowing the relaxation of beauty standards [70]. This may also mean running errands are now easier for those who suffer from conditions like adult acne, facial scarring, or skin disorders, as they eliminate the need to conceal the face with makeup [69]. Ultimately, Moscovitch describes the relief felt when mask wearing acts as a “safety behavior” rather than a solution to anxiety [66]. Individuals engage in safety behaviors in order to avoid experiencing feared consequences [66]. While masks may temporarily alleviate social anxiety, they may have unintended negative consequences over time [66]. This relief may mislead one into believing that masks are necessary to avoid judgment, which will become a problem when masks are no longer perceived as a necessary norm [66]. The issue is that masks are a temporary solution to a chronic condition and there is a risk of developing a dependency [66, 70].

Masks provide obscurity similar to what social media does, which has also been shown to reduce social anxiety [66]. Distancing one's identity from one's thoughts and behaviors can be liberating [70, 72]. One study demonstrated how concealing one's identity through activities such as wearing a mask or interacting in an anonymous chatroom can increase both prosocial (honesty and self-disclosure) and antisocial (agression and verbal abuse) behaviors [72]. This effect may contribute to the internet being perceived as hostile; as a result, there is a possibility that people will exhibit a milder version of the disinhibition effect commonly observed online, resulting in a lack of restraint and concern for whom they communicate with [49].

*Complying with Recommendations from Experts*

Requirements to wear face masks by businesses and recommendations from public health experts served as an additional motivator to wear masks [57]. In a December 2020 poll, two-thirds (66%) of adults in the United States stated that they "always” wore a mask when leaving their home if they couldn't socially
distance themselves [73]. Individuals who have direct experience are likely to be more cautious as society reopens. In the U.S., 43% of adults knew someone who was hospitalized or died as a result of COVID-19; interviews conducted in February and March 2021 revealed that approximately 1 in 5 people lost someone close to them during the pandemic [73, 74]. Age and gender appear to play a role in decisions around mask use. People aged 65 and over were the most likely to wear masks, with 80% stating that they always wore masks outside the home [73]. The percentages drop to 77% for those aged 55 to 64; 62% for those aged 45 to 54; 64% for those aged 35 to 44; and just 53% for those aged 18 to 34 [73]. Women (72%) were more likely than men (59%) to report wearing a mask "always," while men were more likely to report wearing one "rarely" (11%) or "never" (5%) [73]. Partisanship is also a significant predictor of mask compliance, with 71% of Democrats said they “always” wear masks compared to 61% of Republicans [73]. While political affiliation may have a direct effect on perception and use of face masks, it may also have moderating effects, such as conservative male's increased need for freedom, which may exacerbate their sense of masculinity [75].

Cooperation with norm-governed behavior and altruism are frequently displayed during emergencies or disasters [22]. A recent pre-registered experiment demonstrated how enforcing a mandatory face mask policy increased compliance despite only having a moderate level of acceptance [76]. In comparison to a voluntary policy, which was suggested to result in insufficient compliance and a sense of injustice, thereby exacerbating stigma, a mandatory policy was deemed an effective, equitable, and socially responsible solution for reducing airborne virus transmission [76]. Because mask wearing is a social contract, widespread adoption is necessary to avoid stigma [76]. When only the sick or vulnerable wear masks, they can become targets for fear and stigma [77].

**Barriers to Face Mask Compliance**

*Perceiving Masks as Unnecessary*

Face masks have been marred by ambiguity and inconsistent messaging, impeding their widespread adoption in the United States. Misinformation is defined as false information that is intentionally or
unintentionally disseminated, e.g., wearing a mask deprives the body of oxygen [78, 79]. Conspiracy theories and unconfirmed details about COVID-19 combine fabricated or false information with facts, confusing the public about which sources of information to trust. The spread of misinformation may be explained by the heuristic belief that significant events must have proportionately significant causes [22, 80]. According to surveys, there appears to be widespread endorsement of such false information, with nearly 85% of U.S. residents accepting at least one COVID-19 conspiracy theory as "probable" or "definitely" true [80]. While it has been argued that political affiliation, particularly conservatism, is associated with the acceptance of misinformation and conspiracy theories, it is possible that trust in science is the underlying factor driving this in the COVID-19 pandemic [80]. One cross-sectional study examined the believability of four widely held conspiracy theories/misconceptions about COVID-19, as well as the believability of the scientifically-accepted statement about COVID-19's zoonotic source, in relation to political affiliation among U.S. adults. According to their findings, political orientation was not a significant predictor of membership in any COVID-19 belief group, but trust in science was [80]. Individuals who believed in COVID-19 misinformation believed in multiple narratives, which may imply that believing in COVID-19 misinformation does not preclude believing in a credible scientific explanation [80].

Conflicting information is characterized as logically inconsistent statements, e.g., wearing a mask is an effective vs. ineffective way to prevent COVID-19 transmission [78]. The COVID-19 pandemic has been fraught with considerable disagreement between policymakers and health experts regarding a variety of issues, including the seriousness of the virus and efficacy of health policies in preventing viral spread [78]. Two significant factors that may result in contradictory health information are the method of scientific research, which incorporates incremental advancements and missteps, and journalistic standards, which emphasize conflict as a critical news principle [78]. According to the results of a nationally representative survey conducted in October 2020, approximately 75% of respondents indicated that they had recently heard contradictory information from health experts and politicians, with politicians
expressing more disagreement than health experts [78]. Numerous studies have found that contradictory health information causes negative emotional reactions as well as negative cognitive outcomes like frustration and backlash [78]. There is some evidence that the cognitive and emotional responses to such information may have behavioral consequences [78]. Conflict and disagreement may contribute to not only confusion and diminished trust in recommendations, but also decreased adherence with COVID-19 preventative behaviors [78].

**Difficulty Navigating Social Situations**

According to Alexander Toderov, a Princeton University psychologist and neuroscientist, people react almost instantly to unfamiliar faces, making judgments about the character, feelings, and attitudes of other people in less than a hundred milliseconds [77]. Humans perceive emotion via the entire face, which is why wearing masks can appear difficult. They impair the ability to perceive facial expressions and hear voices clearly, which are both necessary components of social connection [27]. Individuals may view the face as a source of critical social information such as trustworthiness, attractiveness, age, sex, and other aspects of personal identity [81]. This information enables us to comprehend spoken language and ascertain another person's emotional state.

Face masks conceal roughly 60%–70% of the human face [81]. Notably, masks conceal an important area of the face for nonverbal communication of emotional states, which accounts for 55% of all communication [81, 82]. Dr. Paul Ekman, a pioneer in the study of emotions and facial expressions, asserts that individuals typically exchange up to 10,000 nonverbal cues in less than a minute and that, while masks provide additional security, they sacrifice conversational proximity [83]. Different parts of the face are associated with distinct emotions. Because the eyes and mouth are found to be the most important components of facial expressions for recognizing emotions, expressions could be classified into “upper-face” and “lower-face” expressions [82, 84]. The top half of the face is a very transparent part of the body that is less subject to conscious control [83]. According to Paula Niedenthal, a psychology professor at the University of Wisconsin, humans tend to perceive emotions as more subdued without the
benefit of our lower half of the face [48]. When attempting to assess happy, disgusted, angry, or sad emotional states, occlusion of the lower face parts, particularly the mouth, proves difficult [81]. Several experimental studies have revealed that the mouth is pivotal in recognizing emotions, especially happiness [82, 85]. Happy infants appear less happy when their mouths are covered by pacifiers and smiling women appear less cheerful when their mouths are covered by veils, even when cultural biases against niqabs or pacifiers were accounted for [48, 86, 87]. Smiling eyes are difficult to perceive without the cue of an upturned lip, as well as other subtle changes in the face, according to Agneta Fischer, a social psychologist at the University of Amsterdam [77]. When in a neutral situation with someone unfamiliar, it is common to look for tiny cues like friendly or respectful facial expressions [77]. Because humans frequently imitate their peers' behavior, face masks may impair facial mimicry and behavioral synchrony, both of which contribute to the strengthening of social bonds and empathy [77, 85]. The loss of social information is exacerbated in individuals with hearing impairments, as masks impair lip reading and, to a lesser extent, sign language, which frequently relies on mouth movements [85].

While this complicates social interaction, research indicates that individuals are capable of quickly compensating for and adapting to voice or body language cues [77, 81, 88]. According to studies on individuals with facial paralysis, observers have a less favorable perception of those who are severely paralyzed, implying that the inability to read others' facial expressions makes people more suspicious [49, 89]. However, these same studies demonstrate that individuals with facial paralysis compensate for their inability to make facial expressions by exaggerating their voices and body language, expressing their emotions through more enthusiastic arm movements, larger gestures, and a greater emphasis on words, resulting in more favorable perceptions from observers [49, 89].

In light of the threat of stigma and racial profiling that has arisen since the introduction of masks, the lack of facial cues becomes a cause for concern. Despite the fact that such inferences are frequently incorrect and frequently serve to reinforce the observer's assumption, people frequently infer character traits such as trustworthiness or hostility from facial expressions [77]. Masks may also make it more difficult to re-
identify a previously seen (masked) face, which has been attributed to the reason criminals frequently wear face masks while committing crimes [85]. Black men were targeted for wearing masks in public at the start of the pandemic, and many fear increased police racial profiling [77]. Chinese-Americans have confirmed that they have been abused and discriminated against regardless of whether they are wearing masks [77]. Because the brain is wired to detect faces and process mental states in order to deduce another person's immediate intentions, wearing masks may naturally cause people to be more cautious and defensive, which may result in violence [88].

*Physical and Psychological Challenges*

Physical Challenges

Mask Fatigue and Headache

Mask fatigue can refer to a variety of situations, including growing tired of wearing masks and becoming exhausted as a result of wearing masks [90]. The new condition can be defined as the deficiency of energy that occurs as a result of prolonged use of a mask [90]. In healthy adults, mask fatigue may be considered a disorder if it impairs physical, mental, psychological, or social functioning [90]. Recently, news organizations have reported that some service employees required to wear face masks for extended periods of time suffer from headaches, shortness of breath, and anxiety [91]. Sheryl Nieds, a registered dental hygienist and operations manager at Madison Smile Solutions, noted in a post on the company's website that improper breathing can also result in headaches or fatigue [92]. Nieds states breathing through the nose filters the air that enters the lungs and also adds nitric oxide to the mix, causing the lung to expand and thus take in more oxygen and expel more carbon dioxide from the body [92]. It was also suggested that wearing a mask may lead one to believe they are not getting enough oxygen and gulp air through the mouth, which may result in unintentional hyperventilation [92]. Tight ear-loops may cause certain individuals to experience headaches that radiate from the ears into the temples, which could be caused by compression of the auriculotemporal nerve, which originates in front of and above the ear and ends in the scalp [61, 93].
TMJ and Neck pain

Some American Chiropractic Association members report that their patients that wear masks for extended periods of time during the day have experienced an increase in jaw pain, neck stiffness, eye tension, upper back pain, and headaches [94, 95]. “Masks can restrict a person's lower field of vision — especially if they are not properly fitted — causing them to tuck their chins in, shift their body position, and hold their necks and posture stiffly in order to maintain a line of sight,” an ACA announcement stated recently [94, 95]. According to Michael Karegeannes, physical therapist and owner of Freedom Physical Therapy Services, masks can constrict the jaw, more so if patients try to secure their masks by extending their chins forward or tensing their jaw muscles [93]. Karegeannes states individuals tend to subconsciously press down on their chin in an attempt to remove their mask, adjust position, or release some tension; when the jaw and facial muscles are continuously contracted or tense, they become fatigued and start to ache [93]. Tight ear-loops that pull on the ears can also cause pain to radiate from the ears, across the joints of the jaw, and into the face [93]. When individuals wear masks, they may feel compelled to breathe through their mouths, which leaves the jaw slightly open and causes tension in the muscles surrounding the jaw [93]. Karegeannes noted nasal breathing allows the jaw to rest more comfortably and stimulates the production of nitric oxide in the sinus passages, which causes blood vessels to dilate and smooth muscle tissue to relax [93].

Mask mouth

Dentists at One Manhattan Dental have observed inflammation in previously healthy gums and cavities in previously cavity-free patients, impacting approximately 50% of their patients [96]. Dentists have recently coined the term "mask mouth," which refers to a variety of oral side effects associated with prolonged use of masks [97]. According to the American Dental Association, dry mouth, or xerostomia, is a condition that occurs when there is insufficient saliva to keep the mouth moist [98]. Saliva is a necessary component to fight bacteria, cleanse teeth from food debris, and neutralize acids in the mouth that could lead to tooth decay and gum disease [96-98]. Prolonged use of a mask can result in mouth
breathing, which exacerbates dry mouth; they can also trap odors caused by poor oral hygiene or consuming pungent foods, resulting in bad breath [97]. An article published on Colgate.com noted that wearing a mask may alter the type and quantity of bacteria in the mouth, which can result in plaque accumulation and bleeding gums [97]. Dentists attribute these adverse effects to disrupted breathing patterns, dehydration, and reused air [96, 97]. One study conducted by PN Medical demonstrated wearing a mask can result in more rapid, shallow breaths taken through the mouth and chest, rather than the diaphragm [97, 99]. According to Aerosol and Air Quality Research, wearing a mask traps more carbon dioxide in the mouth, which has no toxicological effect on the body but may increase the acidity of the oral microbiome, potentially increasing risk of infection or inflammatory conditions such as gum disease [97, 100].

Mask-associated dry eye

Fogged-up glasses and sudden onset of eye dryness are both symptoms of what some eye care providers are referring to as "mask-associated dry eye," or "MADE" [101]. Some studies have suggested eye dryness associated with face coverings is most likely caused by expelled air from the top of the mask flowing over the surface of the eyes [101, 102]. Moving air dries out the tear film, a thin layer of fluid that coats the eye's surface, and likely accelerates evaporation; over time symptoms may manifest as ocular surface irritation or inflammation [101, 102]. MADE is thought to be a symptoms "accelerator" among individuals who already have dry eye or are at a higher risk of developing it [101]. According to ophthalmologist Darrell White in an interview with The Washington Post, individuals who spend an extended period of time staring at computer screens may be at risk, as they blink less frequently, resulting in dry or irritated eyes [101]. One study examining self-reported symptoms of MADE in the general population found nearly two-thirds of respondents reported experiencing dry eye symptoms on a regular basis, with over 26% reporting increased symptoms with mask wear [103]. Additionally, they confirmed women had a higher prevalence of dry eye and MADE than men [103]. While dry eye disease is more prevalent in older adults, the worsening of symptoms associated with mask use was not associated with
age in their sample [103]. Participants who wore glasses or contact lenses were more likely to experience dry eye symptoms than those who wore no correction, but there were no differences in self-reported MADE or correction type [103].

Mask-induced facial itch

Not much is known about mask-induced itch, however, one internet survey examined the prevalence, severity, and clinical characteristics of itch associated with face masks during the COVID-19 pandemic [104]. Approximately 20% of individuals that wore face masks reported experiencing itching [104]. Respondents who wore masks for extended periods of time also reported more frequent itching [104]. Similarly, another study discovered that extended mask use resulted in itching, redness, rash, dryness and peeling, burning, oily skin, and acne in individuals with underlying dermatological diseases [105].

“Maskne”

“Maskne”, or mask acne, has been a frequently associated with mask use. In general, the term "maskne" has referred to a group of skin conditions, including acne, rosacea, contact dermatitis, and folliculitis [106]. According to one report, the clinical understanding of maskne is generally observational, although it is thought to be linked to follicular occlusion syndrome and directly related to mechanical stress (pressure, occlusion, friction) and disruption of the facial microbiome (heat, pH, moisture) [107]. The skin contains oil, bacteria, and dead skin cells, which can accumulate and clog pores when wearing a mask [106]. Face masks also trap humidity generated by breathing and sweating, thus tropical climates and outdoor exposure are considered risk factors for acne-susceptible individuals [106, 107].

Facial sweat

Protective facemasks (PFMs) have been shown to impair convection, evaporation, and radiation processes, interfering with the respiratory and dermal thermoregulation mechanisms in humans [108]. The relatively small reported increases in core temperature associated with PFM use suggest that related perceptions of increased body temperature may be psychological or that local changes in brain temperature may be involved [108]. Due to the fact that the face and head are the most sensitive to
temperature sensations, they form a critical cooling structure [109]. PFM's that cover the mouth and nose obstructs the perioral and nasal region's greater cooling effect of facial skin temperature [109]. Numerous studies have found PFM's increase the temperature of the lips by 1.9ºC after 15 minutes without affecting the rest of the face or core temperature, which may have a significant effect on how people perceive thermal discomfort [109]. Increased facial skin temperature has a considerable effect on overall body heat sensations, as thermal receptor impulses from the face to the central nervous system are stronger than those from other areas of the body [109]. The face is more heat sensitive and may help maintain thermal homeostasis; for example, when a healthy individual's face was heated, local sweating on the leg increased threefold [109].

Psychological Challenges

Mask anxiety

The term "mask anxiety" has become a recent buzzword for any anxious thoughts or avoidance behaviors triggered by the stress of putting on a mask [110]. For some, wearing a face mask may cause anxiety or a sense of suffocation. Dr. Melissa Shepard, a psychologist, told Salon that this type of anxiety can manifest itself through an increased heart rate, shortness of breath, dizziness, and sweating [110]. Shepard states true mask anxiety sufferers almost always wear them, they are simply extremely uncomfortable while doing so; the societal trend toward establishing face masks as a new social norm may be exacerbating anxiety [110]. She noted that simply seeing others wearing masks can serve as a trigger, reminding individuals that they are living through a global pandemic [110].

Anxiety dreams

The naked stress dream has evolved over the last year, shifting from showing up in public without clothes to showing up without a face mask. According to media reports, this phenomenon is becoming more prevalent, with many individuals claiming to have experienced maskless stress dreams with a range of underlying emotions [111]. For some, fear stems from the prospect of breaching a social contract, while others are concerned with their personal health and safety [111]. The threat simulation theory dreaming
states dream consciousness is a defense mechanism that enables you to work through your fears in a low-risk environment to better prepare for and avoid a similar situation in real life [111, 112]. Another theory maintains that dreams enable individuals to process emotions they are unable or unwilling to process while awake [111]. Deirdre Barrett, psychologist and professor of psychology at Harvard Medical School, claims that being anxious during the day and having anxiety dreams are both characteristics that an individual develops over time and a response to a trigger, such as a pandemic, and as individuals adapt and learn new skills, they may end up dreaming about what they are attempting to learn [113].

Groups with Safety Concerns

Throughout the United States, individuals with disabilities have been confronted, threatened with arrest, or excluded from retail and food establishments for not wearing a mask [114]. To compound the problem, some mask protesters have attempted to circumvent business or local government mandates by claiming immunity under U.S. disability laws, exacerbating skepticism and mistrust toward those who have legitimate, but potentially obscure, reasons for not wearing a mask [114, 115].

Sensory conditions

Sensory disorders can occur as a result of nervous system disorders such as Autism or Alzheimer's disease [116]. Along with sensory intolerance, sensory conditions can manifest as impaired social and communication abilities, as well as repetitive behaviors, making mask wearing intolerable [117]. Numerous individuals on the autism spectrum are extremely sensitive to touch, particularly on the face. The textile-skin friction against the face, tugging of elastic on the ears, the smell of recycled air, and the intensified sensation of breathing can all be unpleasant sensations when wearing a mask [117]. Children with autism or other learning disabilities may have difficulty adjusting their routines to include mask wearing. Social communication difficulties can manifest as a deficit in perception abilities and an inability to read facial expressions. Alzheimer's disease patients may experience sensory deficits and perception difficulties, such as visual difficulties and an inability to recognize faces and emotions [118].
Disability or Disfigurement

Certain disabled individuals may have difficulty wearing a mask if they are unable to remove one from their face independently. Due to their limited mobility, individuals with cerebral palsy, for example, may be unable to place the elastic loops of the face mask over their ears. This may make wearing a mask impossible. Face masks may also exacerbate social awkwardness associated with facial disfigurement, thereby exacerbating the anxiety associated with exiting lockdowns [119].

Hearing impairment

Face coverings significantly affect communication for all people, but particularly for those who are deaf or hard of hearing. At least 5% of the world's population suffers from deafness and relies on lip reading and facial expressions to communicate [120]. By muffling voices and obstructing lip reading, masks exacerbate difficulties for a group of individuals who are already short on information. According to a recent study highlighted by the Hearing Review, a simple medical mask can reduce voices by 3 to 4 decibels, while N95 masks to reduce it by nearly 12 decibels [121, 122]. This can be especially difficult for the elderly, who are at greater risk to suffer from hearing loss and serious COVID-19 infection [121]. According to an online survey, nearly all respondents reported that wearing a face covering impaired their ability to hear, interpret, engage, and connect with the speaker, but the effect was enhanced when communicating in medical situations or for those with hearing loss [123]. Facial coverings were found to influence communication content, social connectedness, and enthusiasm for conversation; respondents reported increased anxiety in stressful situations, as well as exhaustion, frustration, and embarrassment for both the speaker and the listener during communication [123].

Low perceived susceptibility

Gender and age have a significant effect on the likelihood of an individual being observed wearing a mask [124]. A recent study found males and younger adults wore masks less frequently than other groups, however, business and state-wide mandates increased compliance by over 90% in all groups, including those who initially opposed wearing masks [124].
According to the literature, men are less likely than women to wear face masks [75, 124, 125]. While men are more likely than women to engage in riskier active health behaviors such as smoking, drinking, and substance use, men and women engage in comparable levels of passive health behaviors such as vaccination [75]. One meta-analysis found no correlation between gender and mask use, but a significant correlation between gender and perceptions of face masks [75]. Men were more likely to view face masks as an attack to their independence, whereas women were more likely to view them as unpleasant and uncomfortable [75]. A separate study discovered that men are more likely to perceive that COVID-19 will have a little effect on them and that they will quickly recover if infected [125]. Even though men are at a greater risk of death from COVID-19 infection than women, they were more likely to avoid wearing masks out of embarrassment, as a symbol of weakness, as uncool, or as stigmatizing [125]. Masks are especially unpopular with those who adhere to traditional masculine gender norms [124, 126]. Even after controlling for other variables such as partisanship and politics, recent research discovered that men and women who subscribe to “masculine toughness” stereotypes were equally likely to have negative affective responses to the concept of mask wearing [126]. Additionally, toughness predicted both positive and negative attitudes toward mask wear in men and women, with a stronger negative effect in men [126].

Age is a good indicator of public health practices, according to CDC survey data [127]. To minimize the risk of spreading and contracting COVID-19, older respondents were more likely to engage in certain behaviors or abstain from others [127]. Young adults were the slowest to develop new habits [127]. Additionally, they note that younger adults exhibited a lower likelihood of mitigation behaviors, which may be attributed to this age group's high rate of reported COVID-19 cases [127]. Due to the fact that older Americans are more likely to suffer from COVID-19 than younger Americans, younger adults may feel more comfortable going out in public without a mask [30].
Anonymity: Crime and Harassment

Crime

While anonymity can be a motivator for mask compliance, it can also be dangerous and dehumanizing. Similarly to how individuals feel empowered to express themselves online, it is possible that when individuals cannot see the entirety of another's face, they form a weaker connection and are thus more likely to act aggressively [72, 128]. Additionally, individuals may gain confidence as a result of their own faces being hidden. Halloween masks, psychologists discovered, increased children's willingness to steal not only candy, but also money [63, 72]. According to Scott Fraser, a psychologist who conducted the study in 1976, certain circumstances can motivate people to violate social norms [129]. Masks are worn at festivals throughout the world and appear to increase frivolity and inebriation. Individuals may be enticed to behave in ways they would not normally do due to the anonymity provided by a mask.

The idea of a society in which citizens hide their faces may pose considerable consequences for crime and security. One issue is masks allow individuals to conceal their identities, allowing those with nefarious objectives to do so without drawing suspicion [88]. Recent evidence suggests that criminal activity has increased in the United States and Western Europe in response to the enforcement of infection mitigation regulations. For example, Spain's interior ministry apprehended an ISIS terrorist hiding in the town of Almeria after escaping Syria, concealing himself with a mask [88]. Mass mask wearing may also impose problems when conducting criminal investigations, as facial recognition has become an key component of criminal identification [88]. Obscuring faces complicates law enforcement efforts, such as determining what constitutes suspicious behavior; several states have only recently made it illegal to conceal one's face during a protest [88, 130]. Police have already been admonished for being heavy handed during the pandemic, and any new criteria may be an additional source of concern for minority groups [88].

Harassment

Masking has helped minimize workplace abuse, but some argue that they provide more ammunition for harassers. There have been an unprecedented number of outright assaults in the United States,
exacerbated by the stress of a global pandemic and the intense polarization surrounding security measures. Throughout the duration of the pandemic, nationwide violence and harassment as a result of mask enforcement have ranged from black eyes and stitches to thousands of dollars in property damage and death [19, 21]. Certain establishments have been forced to temporarily close their doors due to the constant barrage of attacks by patrons who refuse to wear masks [131]. A Service Employees International Union survey shared with Business Insider last July found that among four thousand McDonald’s workers, 44% said they had been verbally or physically attacked after confronting customers who weren’t wearing masks [21, 132].

One Fair Wage, a group dedicated to ending subminimum wage in the United States, released a report detailing how service industry employees fared during the pandemic, revealing lower wages, increased health-related fears, and increased sexual exploitation [133, 134]. Although harassment has always been a problem in an industry where low-wage workers rely on tips, 43% of female food service respondents reported receiving or witnessing inappropriate sexual remarks related to COVID-19 protocols, such as mask wearing or physical distancing [133-135]. According to the survey, "Take off your mask," together with 250 other similarly obnoxious remarks, has become the latest refrain to ambush several service workers [134, 135].

In an opinion piece written by the Washington Post, some employees report that masks have inadvertently forced them to choose between personal respect and earning money through tips [133]. Frowns and grimaces have been rendered invisible, possibly removing some of the guilt that previously deterred inappropriate customers [133]. Research has shown that individuals generally desire control, and they are willing to misperceive reality to preserve a sense of power [136]. According to Karla Altmayer, co-director of Healing to Action, harassers engage in aggressive behavior in order to assert ownership, authority, or masculinity, which may be currently exacerbated by the stress of the pandemic [128].
**Personal Identity and Autonomy**

Subjective understanding, which specifically relates to how individuals perceive events in their environment and how those experiences contribute to satisfying their fundamental needs, is often at the root of human action [61]. Mask-wearing behaviors and obedience may be based on meeting these psychological needs [61]. One of these fundamental psychological needs is autonomy, or the desire to have free will and control over one's behavior, and when people lose their sense of autonomy or personal freedom, a series of negative responses occur [61]. The need to wear a mask is seen by many mask protestors as a violation of their civil rights [30]. Unlike other public health regulations, such as seat belts, the current situation forces the public to follow a specific behavior without going through the traditional legislative process [30]. According to surveys conducted in the United States and Canada, the majority of people (84%) wear masks to protect themselves against COVID-19; the 16% who do not wear masks to protect themselves scored higher on most measures of negative attitudes toward masks [38]. Negative attitudes toward face masks have been demonstrated to be centered on the belief that they are ineffective at curtailing the spread of COVID-19 and psychological reactance (PR), or anger at the idea of being forced to wear face masks [38]. These central beliefs have been associated with other anti-mask attitudes, including hostility toward COVID-19 vaccines, the belief that the COVID-19 threat has been overstated, apathy toward social distancing, and political conservatism [38]. The findings regarding PR are significant because they are likely to reinforce other anti-mask attitudes, as individuals with strong PR react with anger and counter-arguments when their values are confronted, reinforcing their anti-mask beliefs [38]. It's also worth noting that mask wearers are similarly enraged if they're told they can't wear a mask when they wanted to [137].

**Psychological Reactance Theory**

Psychological reactance theory (PRT) is founded on the assumption that individuals value their autonomy, freedom, and choice [60]. Thus, psychological reactance is thought to occur when an external stimulus (mass messages persuading you to wear masks) is perceived to jeopardize, obstruct, or eliminate
an individual's freedom of choice [60]. Reaction is a motivational state prompted by a combination of anger and negative cognitions that occurs in response to a threat to one's liberty, and is directed toward reclaiming threatened or lost liberties [60]. Because advertisements and messaging explicitly urged people to wear protective masks during the pandemic while indirectly discouraging unprotective behaviors (not wearing a mask), promotional health messages during the pandemic may naturally be interpreted as “freedom threats” [60].

To restore their rights, people can take direct or indirect action. Direct restoration can include participating in the admonished behavior, such as not wearing a mask in public [60]. In order to reclaim feelings of control and choice, indirect restoration may take the form of raising one's liking for the threatened choice, derogating the source of the threat, denying the threat's presence, or exercising similar freedoms [60]. Individuals can "increase their liking" for not wearing masks by associating with those who do not wear masks, "derogate" the source of the mask message, "deny" that the pandemic is a serious problem, or "exercise related freedoms" such as not complying with social distancing guidelines to reclaim their sense of power in the context of mask wearing.

Psychological Reactance and Personality

Individuals who are highly reactant are resistant to laws and regulations, have a strong desire for autonomy, are extremely defensive, and have little regard for social norms [60]. Reactive individuals are more likely to engage in risky health behaviors [60]. The proclivity for PR has been associated with a variety of phenomena, including antisocial and narcissistic personality traits, as well as political conservatism [38].

Individuals with a higher level of dark triad traits such as machiavellianism, narcissism, and psychopathy, as well as a lower level of agreeableness, were less likely to adhere to COVID-19 containment steps [138]. These characteristics are also known as antisocial symptoms due to their prevalence in individuals diagnosed with Antisocial Personality Disorder (ASPD) [138]. According to new research from Brazil,
individual antisocial traits, particularly a lack of empathy and an increase in callousness and risk taking, are directly related to enforcement and containment measures [138].

Government policies that restrict individual liberties are more likely to generate PR [38]. According to public opinion surveys, conservatives are less likely to wear masks. This may be because Republican political leaders were initially reluctant and mocked those who did, as well as citizens with politically conservative ideologies tend to oppose government regulations (i.e., attempts to make masks mandatory) [38].

**Risk Behavior**

**Risk Assessment and Behavioral Intention**

To assess whether a risk is acceptable, the public must be informed about the risk in an understandable manner [13]. Risk selection is not a binary decision between two mutually exclusive alternatives in which an individual chooses one level of risk over another; alternative paths are frequently weighed, and the manner in which they are weighed is unique to the individual [13]. Both the intention to wear a face mask in public and witnessing others do so are significant predictors of compliance with public health recommendations [139]. To examine the factors that motivate and inhibit public use of cloth face masks, one study combined two widely used models of health behavior: the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) [139]. The HBM is an explanatory model that incorporates six constructs that have been shown to be associated with and predict health behavior, including perceived susceptibility, severity, and threat, as well as perceived benefits of action, perceived barriers to action, cues to action, and self-efficacy [139]. The TPB is a theory of change that considers three critical predictors of behavioral purpose: attitude, subjective norm, and perceived control [139]. Behavioral intention mediates the relationship between predictors (attitude, subjective norm, and perceived behavioral control) and behavior engagement [139]. It has been proposed that observing others engage in
behavior (descriptive norms) serves as a moderator in the relationship between intentions and behavior [139]. The study found that theoretical predictors of cloth mask use were associated with people's intentions to wear them in public, and that seeing others wearing masks may increase the likelihood that one's intentions will manifest as behaviors [139]. The phenomenon may be most noticeable for activities that are relatively new, such as the use of face masks during the COVID-19 pandemic in the United States [139].

Making Decisions About Risk: Cognitive Biases

Decision making is a dynamic cognitive process that is exacerbated during times of danger or uncertainty, such as the current pandemic [13]. The effectiveness of the COVID-19 pandemic response is determined by the decisions and actions of government officials, scientists, and the general public. Insights from behavioral economics can be used to describe cognitive biases individuals may be exhibiting during the current crisis. David Kahneman, 2002 Nobel Memorial Prize in Economic Sciences, revolutionized the field of behavioral economics with the discovery of cognitive biases that affect human judgement [140]. Research led by David Kahneman and Amos Tversky revealed individuals rely on heuristic principles to reduce the complexities associated with assessing probabilities and predicting values to simplify the decision making process [141]. While these heuristics are beneficial, they may also result in significant errors [141]. In the absence of key scientific evidence about the novel virus, heuristics and cognitive biases can play a large role in decision making [142]. Throughout the pandemic, heuristics may have hampered rational decision-making by preventing people from acting according to their intentions, or they may have automatically aligned with behavioral intentions.

Availability Heuristic

Availability bias describes the proclivity to estimate the probability of future events based on easily recalled examples of such event [140, 143, 144]. Individuals frequently recall their family members, friends, and acquaintances’ experiences, and thus may form an opinion about the severity of COVID-19 and the necessity of infection protection measures based on the experiences of those in their immediate
circle [145]. Given that the last major pandemic in the United States occurred in 1918, availability bias may have contributed to the country's initial dismissal of the pandemic's seriousness due to a lack of readily accessible sources of memory [143]. In general, the availability heuristic results in poor decision making because misleading information is more likely to come to mind than accurate information [140].

**Affect Heuristic**

The affect heuristic refers to the tendency for people who are extremely positive about an activity to judge the risk as low, thereby underestimating risk [146]. Americans are currently suffering from behavior fatigue as a result of their more than year-long adherence to mitigation efforts and are ready to resume their normal lives.

**Social Norms**

Social norms are unwritten rules for acceptable behavior within a group or society [144]. People's risk assessments and support for COVID-19 prevention are influenced by their values and identities. To help reaffirm desired behaviors during the pandemic, celebrities and other influential community members have been outspoken about their adherence to public health guidelines, like staying home and wearing a mask [144].

**Status Quo Bias**

The current situation, or status quo, is taken as a reference point and any deviation from it is perceived as a loss [144]. The status quo bias makes it difficult for people to change their habits, with respect to behaviors like social distancing and mask wearing.

**Representativeness**

Representativeness bias describes the tendency to estimate the likelihood that an uncertain event will occur based on its similarity to a certain event [144]. This causes people to exaggerate the likelihood of low-risk events, such as plane crashes or terrorist attacks, while underestimating the likelihood of high-risk events, such as contracting a virus during a pandemic [143]. Humans employ the representativeness
heuristic to determine which group individuals are more likely to belong to [145]. Additionally, diverse social environments have varying effects on human fears of disease, resulting in public misperceptions of risks that influence behaviors and subsequent decision-making [143].

**Confirmation bias**

The term "confirmation bias" refers to the tendency to seek out facts that corroborate one's existing beliefs while ignoring data that contradicts them [142, 147]. This can be demonstrated by concentrating on evidence from countries with strict lockdowns and prevention measures, such as face mask use, that saw improvements in infection trajectory, while ignoring evidence from countries with laxer policies but identical pandemic trajectories [142]. Confirmation bias can also be seen in the polarization that has characterized the pandemic. As groups come to different conclusions based on their political ideology, they can self-select partisan news outlets, or like-minded “echo chambers”, that reinforce these beliefs [22].

**Optimism bias**

Optimism bias is the idea that negative events will happen to you less often than they will to others [22]. This may cause people to underestimate their chances of contracting COVID-19, leading to increased risk-taking [13, 22]. This can be seen throughout the pandemic, with groups of people in the United States, particularly young adults and men, underestimating their chances of contracting the virus and thus disregarding public health warnings and going without face masks [142].

**Anchoring**

Anchoring bias refers to an individual's tendency to place a premium on the first piece of evidence presented to them and then use that evidence to form all subsequent judgments or opinions, failing to adjust as new information becomes available [13, 145, 147]. Inaccurate information disseminated at the start of the pandemic may continue to influence behavior in the future. Despite credible evidence that masks reduce viral transmission, the U.S. Surgeon General's incorrect claim in March 2020 that masks are
ineffective, combined with the slow adoption of masks by top government officials, may contribute to affective behavior 12 months later [145].
Chapter IV: Conclusion

Summary of Findings

This review demonstrates the multifaceted nature of health behavior, a complex phenomenon influenced by a variety of factors, including risk perception, attitudes and intentions toward a specific behavior, as well as potential biases and predictors inherent in assessing a specific behavior.

The widespread and consistent use of face coverings continues to be a challenge as individuals navigate physical, psychological, and social discomfort. While wearing a mask has not been shown to cause clinical changes in healthy adults, it does have an effect on personal comfort and feelings of autonomy.

Messaging has presented a unique set of challenges in the context of mitigating viral transmission. It is natural to look up to and emulate trusted leaders during times of crisis but determining which actions to emulate has been difficult throughout the pandemic. A concerning trend has emerged in which politics takes precedence over public health, rather than public health taking precedence over political agendas. Public and government officials are critical in disseminating a single message (to wear a mask), which necessitates a careful examination of the reasons for noncompliance and tailoring approaches to the distinct needs of targeted communities. The cumulative evidence from this review suggests very different communication strategies are required, in varying cultural contexts, in the fight against COVID-19.

Concentrating on protecting others, aligning with the recipients’ values, and appealing to social norms and group approval are all possible factors to consider when attempting to successfully change audience attitudes toward the use of face masks and other protective health measures.

Limits of Findings/Study

Due to the inherent challenges associated with utilizing grey literature, there are several limitations to this review that should be acknowledged. First, the nature of identifying and acquiring grey literature sources may presuppose the possibility of search results being biased. Future research should employ a systematic
search strategy to ensure that as much bias as possible is eliminated. Second, data collection was entirely via web-based platforms, which may limit the reproducibility of this review due to the dynamic nature of website domains and the location-based features of the search engines used. Future research might include data collection techniques, such as consulting content experts to identify additional items for possible inclusion in the review. Third, due to the varied formats and audiences of grey literature, additional research may be necessary before generalizing findings to all American citizens. Finally, it is worth noting that the pandemic’s rapid evolution undoubtedly influenced the content and quality of sources reviewed during the period of literature retrieval. Further, given the novelty of COVID-19, the relevance of the findings and conclusions in this review may change as evidence accumulates and science gains a better understanding of the SARS-CoV-2 virus.

Notwithstanding these limitations, the present review utilized previously published and unpublished work to offer a unique perspective on behavioral intention in this unprecedented setting. Due to the rapid emergence of COVID-19-related issues, relying on peer review will likely result in a delay in public health officials' understanding of the problem and subsequent recommendations due to the lengthy period between research and publication. Additionally, grey literature provides access to important research that may never be published, giving academic studies that rely heavily on research a personal voice and emotional context.

**Conclusions Based on the Study**

In general, it's critical to recognize that no issue involving human beliefs, attitudes, or behavior will ever have a one-size-fits-all solution. Public health experts and political leaders must recognize that rapidly implementing widespread public health recommendations, particularly those that are unfamiliar in the United States, is an unrealistic and potentially costly strategy for changing public behavior. Understanding the underlying factors that influence public health behaviors is critical, as mask
compliance has been linked to compliance with other public health recommendations, such as vaccination.

The threat of SARS-CoV-2 is unlikely to go away anytime soon. Although vaccines are expected to put an end to COVID-19, the country should be prepared for the possibility that they will be ineffective as the virus continues to mutate. As society reopens, it is critical to remember public health recommendations and preventative measures for viral containment so that we can continue to protect one another from infection. We are all confronted with challenges during this unprecedented period of transition. The pandemic not only emphasizes a shared identity by putting everyone at risk, but it also fosters a sense of shared fate.

**Relevant Recommendations for Further Research**

Sustaining public health initiatives is frequently challenging because they entail personal sacrifice and do not provide immediate gratification. If COVID-19 continues to cause severe infection and masks are recommended for the general public, additional research is necessary to determine the effects of face masks on daily activities and in special populations. Even after the pandemic, the concept of masks for the containment of illness may persist, potential applications for the upcoming flu season and future respiratory illnesses.

Future research should concentrate on ways to increase mask use, alleviate discomfort, and create distinctive messaging that unites individuals around the common goal of mitigating and eliminating COVID-19. Trials examining the fit and comfort of various types of masks during a variety of activities would provide the public with additional choices and freedom of expression, thereby ameliorating the threat of losing personal autonomy.
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VI. APPENDIX

Table 1. Systematic review stages

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Identify and clearly define the question the review will address.</td>
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<tr>
<td>2.</td>
<td>Determine the types of sources and data that will answer the question.</td>
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<tr>
<td>3.</td>
<td>Search the literature from electronic databases and search engines to locate relevant sources.</td>
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<tr>
<td>4.</td>
<td>Sift through all the retrieved sources in order to identify those that meet the inclusion criteria and those that do not should be excluded.</td>
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<tr>
<td>5.</td>
<td>Extract the relevant data or information from the sources.</td>
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<tr>
<td>6.</td>
<td>Critically appraise the sources by assessing the source quality in relation to the review question.</td>
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<tr>
<td>7.</td>
<td>Synthesize findings from the sources.</td>
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<td>8.</td>
<td>Consider potential limitations.</td>
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Adapted from Briner and Denyer (2012) [15].

Table 2. Initial broad review questions

<p>| | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>1.</td>
<td>Is public policy fueling public dissonance?</td>
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<tr>
<td>2.</td>
<td>Has regional variability of enforcement of face mask mandates/policies influenced community conflict and acts of defiance?</td>
</tr>
<tr>
<td>3.</td>
<td>What region of the United States leads the country in mask-wearing?</td>
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<tr>
<td>4.</td>
<td>Are there common social, cultural, or political values associated with these areas?</td>
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<td>5.</td>
<td>What professional guidance and state mandates have been implemented in these areas?</td>
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<td>6.</td>
<td>How has misinformation and mixed messaging influenced acceptance of public health intervention strategies?</td>
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<tr>
<td>7.</td>
<td>What are the motivators to wearing face masks?</td>
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<tr>
<td>8.</td>
<td>What are the barriers to wearing face masks?</td>
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<tr>
<td>9.</td>
<td>Is there a difference in personality among those who comply or do not comply to public health guidance?</td>
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<tr>
<td>10.</td>
<td>What are the social implications of mask use?</td>
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<tr>
<td>11.</td>
<td>What are the physical implications of mask use?</td>
</tr>
<tr>
<td>12.</td>
<td>What are the physiological implications of mask use?</td>
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<tr>
<td>13.</td>
<td>What groups are unable to, or struggle with, mask wear?</td>
</tr>
</tbody>
</table>
Table 3. Inclusion and exclusion criteria

<table>
<thead>
<tr>
<th>Selection criteria</th>
<th>Journal database</th>
<th>Grey literature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inclusion</strong></td>
<td>Peer-reviewed research articles, book chapters, review papers, dissertations</td>
<td>Annual or activity reports, theses, preprints, newsletters, presentations, polls, blogs</td>
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<tr>
<td></td>
<td>Time frame restricted to after 2020 (April 6, 2020 if applicable)</td>
<td>Without time frame restrictions</td>
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<tr>
<td></td>
<td>Priority given to articles targeted towards attitudes and perspectives of individuals and/or communities within the United States</td>
<td>Priority given to sources targeted towards attitudes and perspectives of individuals and/or communities within the United States</td>
</tr>
<tr>
<td><strong>Exclusion</strong></td>
<td>During title screening</td>
<td>Articles missing keywords in titles</td>
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<tr>
<td></td>
<td>During abstract screening</td>
<td>Generic sources that were related to the functionality of face masks as personal protective equipment, sources related to face mask efficacy</td>
</tr>
<tr>
<td></td>
<td>During full-text screening</td>
<td>Sources that were not related to the research question in that they were not relevant to preventive or avoidant face mask compliance behavior, or they did not describe social, psychological, or demographic characteristics associated with face mask compliance behaviors</td>
</tr>
</tbody>
</table>
Figure 1. Literature review search plan

Table 4. The Sandman formula and definition of risk perception

\[ R \text{ (perceived RISK)} = H \text{ (measurable HAZARD)} + O \text{ (Outrage or sense of injustice)} \]

**Risk perception.** The subjective judgement that people make about the characteristics and severity of a risk; formed by two components: hazard and outrage

**Hazard (the technical aspect).** Combines the probability of a certain event occurring with the severity of the outcome.

**Outrage (the subjective aspect).** Focuses on the situation as opposed to the extent of risks. This includes the nature of the risk and the way it is managed.

Source: [17]
Table 5. Source list by review topic

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<tr>
<th>Source Type</th>
<th>Journal Article</th>
<th>Web Page</th>
<th>News Article</th>
<th>Magazine</th>
<th>Blog</th>
<th>Report</th>
<th>Book</th>
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<tr>
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<td>Outrage Factor: Knowability</td>
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<td><strong>Risk Attitudes</strong></td>
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<td>“Maskne”</td>
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Figure 2. Review theme flow chart