

# The Psychology of Pandemics

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## Keywords

pandemics, COVID-19, psychopathology, social distancing, vaccination  
hesitancy, face masks

## Abstract

This article reviews the current state of knowledge and promising new directions concerning the psychology of pandemics. Pandemics are disease outbreaks that spread globally. Historically, psychological factors have been neglected by researchers and health authorities despite evidence that pandemics are, to a large extent, psychological phenomena whereby beliefs and behaviors influence the spreading versus containment of infection. Psychological factors are important in determining (*a*) adherence to pandemic mitigation methods (e.g., adherence to social distancing), (*b*) pandemic-related social disruption (e.g., panic buying, racism, antilockdown protests), and (*c*) pandemic-related distress and related problems (e.g., anxiety, depression, posttraumatic stress disorder, prolonged grief disorder). The psychology of pandemics has emerged as an important field of research and practice during the coronavirus 2019 (COVID-19) pandemic. As a scholarly discipline, the psychology of pandemics is fragmented and diverse, encompassing various psychological subspecialties and allied disciplines, but is vital for shaping clinical practice and public health guidelines for COVID-19 and future pandemics.

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## 1. INTRODUCTION

Pandemics are outbreaks of infectious diseases that spread globally, afflicting millions of people. Epidemics, in comparison, are lesser, more localized outbreaks, limited to a few countries. Pandemics typically arise from some form of emerging infectious disease, that is, a disease for which most people have no preexisting immunity. Historically, the importance of psychological factors in pandemics has been neglected by researchers and health authorities, despite evidence that pandemics are, to a large extent, psychological phenomena in which beliefs and behaviors influence the spread of disease, distress, and social disruption. Psychological factors are important in determining (*a*) adherence to pandemic mitigation methods (e.g., social distancing such as the closures of places of public gathering, mask wearing, vaccination uptake), (*b*) pandemic-related socially disruptive events (e.g., panic buying, racism, protest rallies against social restrictions), and (*c*) pandemic-related distress and associated problems such as anxiety or mood disorders, contamination-related obsessive-compulsive disorder (OCD), prolonged grief disorder, and posttraumatic stress disorder (PTSD) (Taylor 2019).

The psychology of pandemics has emerged as a distinctive field of research and applied science during the coronavirus 2019 (COVID-19) pandemic. As a scholarly discipline, the psychology of pandemics is fragmented, encompassing numerous psychological subspecialties and allied disciplines. There is no unifying theory underlying the psychology of pandemics, and it is doubtful that such a theory could be devised, given the diverse phenomena associated with pandemics. Nevertheless, the psychology of pandemics, as a field of investigation, is vital for understanding and treating pandemic-related psychopathology and for shaping public health guidelines for managing pandemics and associated problems. The purpose of this article is to present an overview of this emerging field and highlight important developments.

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**Pandemic:** an epidemic of infectious disease that spreads globally

**Social distancing:** a strategy where people are asked to keep a safe distance from one another to limit the spread of infection

**Panic buying:** urgent purchasing of large quantities of supplies because of fears of impending shortages

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**Conspiracy theories:** beliefs that shadowy individuals or organizations are conspiring to exploit the population or cover up some misdeed

## 2. NOMENCLATURE AND NOTABLE PAST PANDEMICS

### 2.1. Naming Pandemics: Labels Matter

Throughout this article, I discuss several important pandemics and relevant epidemics. For the most part, the article uses conventional names (e.g., Spanish flu) because they will be familiar to most readers. However, labels matter. It is ill-advised to name pandemics after places, peoples, or animals, because that can lead to xenophobia, racist violence, and the needless culling or destruction of animals (Ball & Maxmen 2020, Taylor 2019).

### 2.2. Notable Pandemics and Other Outbreaks

There have been numerous pandemics over the course of human history (Snowden 2019). Pandemics and other outbreaks that illustrate various outbreak-related psychological phenomena include the following: the bubonic plague or Black Death (multiple outbreaks, e.g., 1346–1356; attributed to *Yersinia pestis*), Russian flu (1889–1890; attributed to the H2N2 or H3N2 influenza virus or possibly the OC43 coronavirus), Spanish flu (1918–1920; H1N1 virus), the 1957 flu pandemic (1957–1958; H2N2 virus), the 1968 flu pandemic (1968–1969; H3N2 virus), HIV/AIDS (1981–present), severe acute respiratory syndrome (SARS) (2002–2004; an epidemic of SARS-CoV-1), Middle East respiratory syndrome (MERS) (2012–present; an epidemic of MERS-CoV), swine flu (2009–2010; H1N1 virus), the Zika virus pandemic (2015–2016), and the COVID-19 pandemic (2019–present; SARS-CoV-2).

### 2.3. COVID-19 Compared with Past Outbreaks

Pandemics or outbreaks tend to have their own characteristic signatures, such as their historical and sociocultural characteristics and the properties of the disease causing the outbreak. Nevertheless, many of the basic psychological phenomena observed during COVID-19 were apparent in past pandemics or outbreaks. These phenomena include the role of the news media in both calming and alarming the populace; the rise of anticipatory anxiety ahead of the arrival of infection in one's community; the rise of xenophobia, rumors, and conspiracy theories; panic buying; the development or worsening of psychological disorders (e.g., mood and anxiety disorders); protests over social distancing restrictions and related mandates; the rise of quack cures and profiteering; and the occasional rioting and violent protests but, more commonly, a rise in altruism as people come together in their communities to help one another (Taylor 2019).

Important differences between COVID-19 and past pandemics include, for COVID-19, the 24/7 news cycle and social media and advances in medical management (e.g., ventilators). Not all past pandemics or outbreaks had significant impacts on mental health. Although COVID-19, the Russian flu, the Spanish flu, and SARS outbreaks had significantly deleterious impacts, other pandemics, such as the 1957 and 1968 influenza pandemics, had relatively little impact (Honigsbaum 2020). Differences are likely due to a range of factors, including disease lethality and contagiousness, whether the disease is familiar or novel, whether it kills in gruesome or excruciating ways, and the extent to which health authorities and the news media react with alarm (Snowden 2019).

## 3. HOW DO PANDEMICS SPREAD?

### 3.1. Patterns of Human Aggregation

Pandemics are dynamic events spread by human networks, such as established trade routes, commuter travel networks, and networks of interpersonal contact. Pandemics often occur in

waves, caused in part by fluctuations in patterns of human aggregation. This occurs, for example, as part of seasonal movements of people away from and then into contact with one another, as when schools close for the summer and then reopen (Herrera-Valdez et al. 2011). Crowded city living conditions and rapid mass transit facilitate the spread of infections, especially those spread by sneezing or coughing. People living at the urban–wildland interface as well as people trading in wild or exotic animal products (e.g., bushmeat) are at risk for coming into contact with animal viruses that have mutated such that they can infect humans.

### 3.2. Superspreading

Pandemics and other outbreaks are exacerbated by superspreaders and superspreading events. Superspreaders are people who disproportionately contribute to the spreading of infection. They tend to be people who neglect basic hygiene (e.g., neglect to cover coughs) and come into contact with large numbers of people due to either social activities or occupational roles (Temime et al. 2009). Superspreading is especially likely to occur for diseases with incubation periods of several days or more, so that people are asymptomatic (i.e., unaware that they are infected) but contagious. Superspreading events, which were documented during COVID-19, SARS, and the Spanish flu (Lewis 2021b, Taylor 2019), typically occur in crowded, poorly ventilated venues in which social distancing is not possible and people are not taking precautions such as wearing masks. People who deny, dismiss, or trivialize the importance of pandemic infection are especially likely to attend social gatherings that become superspreading events (Taylor et al. 2020d).

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#### Superspreaders:

people who disproportionately contribute to the spread of infection

#### Superspreading

**events:** events such as large gatherings in poorly ventilated spaces, which lead to large numbers of cases of infection

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## 4. PANDEMIC-RELATED STRESSORS

### 4.1. Uncertainty: A Pervasive, Abstract Stressor

Numerous uncertainties are associated with pandemics. Examples include whether a disease outbreak will become a pandemic, how dangerous it will be, whether there are effective prophylactic measures, how long the pandemic will last, who is infected (e.g., who is an asymptomatic carrier), and whether the pandemic is truly over. The abundance of news information adds to the uncertainties, including uncertainties about which news stories or rumors are accurate and which are not. Uncertainties are exacerbated when community leaders or health authorities prove to be dramatically wrong in their predictions about the outbreak (e.g., grossly underestimating its seriousness) and when their recommendations are inconsistent (e.g., inconsistent advice about the need to wear masks). In order to cope with pandemics, people need to be able to tolerate uncertainties.

### 4.2. Specific, Concrete Stressors

There are various pandemic-related stressors and potentially associated forms of psychopathology. Examples include (a) trauma exposure (e.g., exposure to death or life-threatening infection) and trauma-related disorders such as PTSD; (b) exposure to infection and the development of contamination-related OCD; (c) the loss of loved ones, potentially leading to prolonged grief disorder; (d) threats to, or loss of, occupation and income (e.g., due to workplace closures), leading to many potential problems (e.g., anxiety and mood disorders, substance use disorders); and (e) persistent direct effects of the infection itself, such as chronic dyspnea or fatigue (i.e., the stress of chronic disease). A further stressor concerns the disruption of rituals, for example, being unable to attend weddings or funerals, or being unable to bury the dead according to one's cultural or religious practices due to things like shortages of coffins (Taylor 2019). Additional stressors

#### Lockdown:

a neologism referring to shelter-in-place social distancing in which people are required to stay at home as much as possible

#### Risk communication:

communication from health authorities or other leaders to the public concerning disease risk and management

#### Hygiene theater:

excessive cleaning and disinfecting that are intended to reassure the public but can lead to a false sense of security about infection

include exposure to graphic media depictions of fatalities. The stressors can have cumulative effects, which can increase the odds that trauma exposure will precipitate PTSD (Taylor 2017).

## 5. IMPORTANCE OF PSYCHOLOGICAL FACTORS

### 5.1. The Psychological Footprint Is Bigger Than the Medical Footprint

The psychological footprint of pandemics tends to be larger than the medical footprint, in that psychological effects are more pronounced, widespread, and longer-lasting than the purely somatic effects of infection. For instance, in a study of more than 6,500 adults from the USA and Canada surveyed in early 2020 during lockdown, approximately 20% had elevated anxiety and depressive symptoms, whereas only 2% had been diagnosed with COVID-19 (Taylor et al. 2020a). For every COVID-19 fatality, there is an average of five bereaved immediate family members (Verdery et al. 2020), which further underscores the fact that pandemics can have wide-reaching psychological effects.

### 5.2. Dual Goals of Pandemic Management

Pandemic management has two broad goals: (a) Encourage people to take the pandemic seriously and to adopt the recommended pandemic mitigation practices such as social distancing and (b) encourage these practices without precipitating mass panic. Psychology is central to both goals. Governments and health authorities have long expressed concerns about pandemic-precipitating mass panic, reflecting the tendency for government leaders to regard crowds as sources of irrational thinking and dangerous behavior (Tomes 2010). While many people might become highly anxious or engage in panic buying during a pandemic, mass panic tends to be rare (Taylor 2019).

Pandemic mitigation involves risk communication in which health authorities and other community leaders inform the public about the degree of risk posed by a pandemic and what mitigation strategies will be implemented. Risk communication involves recommending to the public various hygiene practices (e.g., handwashing, covering coughs), social distancing strategies (e.g., remaining 6 feet apart from strangers when out in public), stay-at-home recommendations or mandates, and mask wearing and vaccination, as well as ordering the strategic closures of places of congregation such as bars, restaurants, places of amusement (e.g., cinemas), schools, and churches. Clearly, people need to agree to adhere to these pandemic mitigation methods for them to work.

Sometimes pandemic mitigation methods are more important for calming the public than for reducing the risk of infection. During the COVID-19 pandemic, in the early months of 2020, health authorities emphasized the importance of cleaning and disinfecting surfaces and objects (fomites) that might be contaminated with the coronavirus. In later months, as research accumulated, it became apparent that contaminated surfaces or objects were not as important as once thought, and that infection was spread primarily through droplets or aerosols (coughing, sneezing) (Goldman 2020). In fact, the World Health Organization reported that there is limited evidence of SARS-CoV-2 being transmitted via contaminated surfaces (Lewis 2021a). Yet, vigorous cleaning and disinfecting persisted; trains, buses, and public spaces were vigorously cleaned, and frequently touched objects (e.g., hand railings) were scrubbed and sanitized. This excessive cleaning was dubbed “hygiene theater” (Thompson 2020). It served more to reassure the public than to reduce the spread of infection.

### 5.3. Beliefs About Causes of Disease

Beliefs about the causes of disease influence the choice of pandemic mitigation methods. What distinguished COVID-19 and the Spanish flu from other pandemics was that public health

authorities implemented social distancing measures at unprecedented levels of intensity (WHO 2021). These methods were based on the germ theory of infection, that is, the idea that microbes spread infection. The situation was different during the Russian flu pandemic, in that the miasma theory disease predominated. That theory assumed (erroneously) that diseases were spread by noxious mists or vapors, especially at night. Accordingly, during the Russian flu, social distancing was not implemented. People sought to avoid infection by avoiding exposure to night air (Baldwin 2003).

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**Dark personality traits:** antisocial personality traits including narcissism, psychopathy, and Machiavellianism

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## 6. IMPACT OF THE MEDIA

Reports circulated in the news media and on social media influence how the public perceives and reacts to health threats (Fung et al. 2011, Kilgo et al. 2019). COVID-19 arose in an era of social media and global digital interconnectivity that, in some countries, led to waves of anticipatory anxiety that preceded the actual arrival of the coronavirus (Taylor et al. 2020a). The situation was similar in 1889 during the Russian flu, which was the first pandemic to occur in an era of cheap, mass-circulation newspapers and global communication via telegraph. Thus, the Russian flu was the first pandemic to be widely reported in the daily press. That led the public to learn about the pandemic before it had arrived in their countries, leading to anticipatory anxiety ahead of the actual arrival of the virus (Kempińska-Mirosławska & Woźniak-Kosek 2013).

The media were criticized for exaggerating the dangerousness of past outbreaks, including the SARS outbreak and the swine flu pandemic (Taylor 2019). Analyses of media reports during the swine flu pandemic suggest that the media contributed to heightened risk perceptions primarily through the high volume of coverage, an unbalanced emphasis on dangers, and less attention to things people could do to stay safe (Klemm et al. 2016). News stories circulated on social media can lead to further sensationism because social media users selectively share news stories, meaning that lurid stories are more likely to be shared than accurate but pallid stories. Media sensationalism can have polarizing effects; some people tend to become highly anxious about the disease threat, while others dismiss the threat as exaggerated (Taha et al. 2013). People who think media reports are exaggerated are less likely to adopt the health behaviors recommended by health authorities (Rubin et al. 2009).

## 7. COPING RESPONSES: ADAPTIVE, MALADAPTIVE, INEFFECTIVE, AND EXPLOITATIVE

### 7.1. Coping Strategies

People exhibit a range of strategies to cope with pandemic stressors, such as the stress of lockdown (Taylor et al. 2020a). Coping strategies can be adaptive, maladaptive, ineffective (illusory), and even exploitative. Examples of maladaptive coping with the stress of lockdown include substance abuse and overeating. Adaptive methods involve setting a routine for oneself, spending time connecting with people via electronic means, and focusing on the positive aspects of the situation. Some coping strategies are ineffective in preventing infection, providing, at best, an illusion of control over the threat. Panic buying of toilet paper and hygiene theater are two examples. Pandemics are also associated with an increase in religious coping, that is, increases in praying and other religious observances (Boguszewski et al. 2020). Research on so-called dark personality traits offers evidence of pandemic-related exploitative coping, in which a stressful situation is exploited for one's personal gain. Dark traits include narcissism (inflated entitlement), Machiavellianism (deceitful, unscrupulous behavior to exploit a situation), and psychopathic traits (e.g., callousness, ruthlessness).



## 7.2. Folk Remedies, Quack Cures, and Profiteering

Many people turn to quack cures and dubious folk remedies during pandemics and other outbreaks. During the SARS outbreak, for example, there were various folk remedies, all ineffective, such as cigarette smoking and diets of turnips, vinegar, or kimchee (Cheng 2004). During COVID-19, drinking garlic-infused water and smoking cigarettes were folk remedies. Some entrepreneurs were quick to turn the disease outbreaks to their advantage, such as by marketing bogus immunity boosters for COVID-19 (McMeekin & Shah 2020). Various motives drive people to seek dubious or frankly bogus cures, including imitation, conformity, a desperate need to feel in control of the threat, and indiscriminate reliance on authority figures such as parents or political leaders. Some people try to hedge their bets by pursuing both mainstream and fringe medicine (Taylor 2019).

## 7.3. Desperate and Dangerous Cures

During pandemics people have pursued desperate and dangerous cures in an attempt to stay safe. Poisoning due to drinking hydrogen peroxide occurred during Spanish flu, based on the dangerously erroneous belief that if disinfectants kill germs, then you can protect yourself by consuming the products (Taylor 2019). Reported poisonings during COVID-19 included people consuming hand sanitizer and disinfectants, attributable in part to misinformation circulated on social media (Grasso et al. 2021). These events highlight the harmful effects of misinformation and misconceptions during pandemics.

## 7.4. Panic Buying

Pandemics are often associated with panic buying, which is when people suddenly purchase large quantities of food, pharmacy supplies, and so forth because of fears that shortages or restricted access might occur (Taylor 2021). Panic buying during COVID-19 regularly occurred when people were told that they had to go into lockdown as part of community-wide pandemic mitigation strategies. Empirically, episodes of panic buying tend to last 7–10 days (Keane & Neal 2021) and are likely initiated by highly fearful people, leading to fear contagion among other shoppers (i.e., fear of missing out) that is amplified by dramatic photographs and videos circulated on the news media and social media of frantic, overpurchasing shoppers (Taylor 2021). Thus, panic buying is driven by the behavior of shoppers and not by a threat to the supply chain. However, the fear of scarcity creates real but short-term scarcity as supplies in stores are temporarily depleted. Evidence further suggests that people with dark traits seek to exploit the situation by purchasing large quantities of items (e.g., hand sanitizer) with the intent of reselling them at inflated prices (Taylor 2021). “Don’t panic!” messages from community leaders are ineffective or counterproductive (see Taylor 2021).

# 8. MISINFORMATION, PROTEST, AND REBELLION

## 8.1. Rumors and Conspiracy Theories

Rumors are narratives of unknown reliability about some important issue, passed from person to person. Rumors help people make sense of an ambiguous situation and offer guidance about how to respond. However, unchecked false rumors can lead to undue fear, hostility, suspicion, and social disruption. Conspiracy theories are extreme kinds of rumors in which important events are explained in terms of secret plots by powerful, often shadowy individuals or organizations. Belief in conspiracy theories is widespread (Douglas et al. 2019).



A prototypic infection-related conspiracy theory, persistently resurrected to “explain” each new pandemic or outbreak, is that the infectious agent is a bioweapon intended to cull and control the population (Cohn 2017, Taylor 2019, Taylor et al. 2020d). Conspiracy theories are not trivial. During the Ebola and cholera outbreaks there were conspiracy theories that the disease was caused by medical staff, which in some instances led to the assault and murder of health care workers (HCWs) (Cohn 2017).

Conspiracy theories, just like rumors in general, tend to arise during times of uncertainty about important events. The tendency to believe in conspiracy theories is correlated with a range of variables, including poor media literacy (i.e., difficulty discerning true from fake news), narcissism, suspiciousness, and rejection of conventional science in favor of pseudoscience (Douglas et al. 2019). Conspiracy theories are resistant to refutation because conspiracy theorists often conclude that the person challenging the theory is actually part of the conspiracy. People in the community can be inoculated against conspiracy theories by informing them about the theory and then providing arguments about why the theory is wrong (Douglas et al. 2019). The problem with this approach is that the inoculation process broadens the audience, giving the theories needless and potentially counterproductive public attention.

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### Psychological

**reactance:** a trait or state variable in which perceived threats to one's freedom, choices, or autonomy elicit anger, resistance, and rebellion

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## 8.2. Psychological Reactance

The mitigation of pandemics requires that people agree to restrict or forfeit some of their freedoms, for the short term. This involves limitations on one's freedom of choice and constraints on how one should behave, for example, agreeing to remain at home (lockdown) or agreeing to cover one's face with a mask or get vaccinated. If people understand the importance of such measures, most are willing to comply for the greater good (Taylor & Asmundson 2021). However, a vocal minority of people vigorously object to such restrictions. The objections arise for various reasons, but a common theme involves the concept of psychological reactance, which plays a role in many kinds of pandemic nonadherence behaviors, including nonadherence to masks, vaccines, and social distancing (Taylor & Asmundson 2021).

Psychological reactance is a motivational response to rules, regulations, or attempts at persuasion that are perceived as threatening one's sense of control, autonomy, or freedom of choice (Brehm 1966). The perceived threat motivates the person to assert their freedom by rejecting attempts at persuasion, rules, regulation, and other means of control. Thus, when psychological reactance is evoked it is characterized by counterarguments and anger. The tendency to experience psychological reactance is a trait correlated with a range of phenomena including antisocial and narcissistic personality traits (Lewing & Caraway 2019) and political conservatism (Irmak et al. 2020). The latter is not surprising, given that conservative ideology strongly favors limited government control over the lives of citizens (Irmak et al. 2020).

## 8.3. The Anti-Mask League

Messages from health authorities that order people to adopt a given behavior, such as wearing masks, can elicit psychological reactance, thereby undermining the intent of the message. Most people have complied with the recommendation to wear masks during COVID-19, at least up to the time of writing (late 2021). A small but vocal minority of people (10–15%) have objected to wearing masks during COVID-19 (Taylor & Asmundson 2021). Objections to the recommended or mandated wearing of masks have been prominent in the news media and social media, which in some instances led to physical violence between so-called maskers and antimaskers (Taylor & Asmundson 2021). The objection over the mandated wearing of masks is not new. During the

## Vaccination

**hesitancy:** reluctance or frank refusal to get vaccinated, arising from any of a range of negative attitudes about vaccines

## Pandemic fatigue:

a burnout-related amotivational syndrome, characterized by emotional exhaustion and disregard for social distancing, arising from prolonged pandemic-related restrictions on socialization

Spanish flu pandemic, opposition to wearing masks occurred in San Francisco in 1919, when authorities proposed that masks become mandatory in public places. In response, the Anti-Mask League was formed. In this short-lived protest movement, a small group of vocal protesters argued that masks were ineffective and inconvenient and that mandated masks violated their civil liberties (Dolan 2020). These are essentially the same reasons given by antimaskers during COVID-19 (Taylor & Asmundson 2021).

## 8.4. Antivaccination Attitudes

Vaccination hesitancy—the reluctance or frank refusal to be vaccinated—is among the top 10 global health threats (WHO 2019b). Vaccination hesitancy has been an ongoing problem for seasonal influenza and was a significant problem during the 2009 swine flu pandemic and COVID-19 (Taylor 2019, Taylor et al. 2020c). To understand why vaccination hesitancy occurs, it is important to identify its motivational roots (attitudes or reasons), which can be addressed to improve vaccination uptake. The main reasons associated with vaccination hesitancy are (*a*) concerns that the risks outweigh the benefits, (*b*) belief that vaccination is unnecessary, (*c*) preference for natural immunity, and (*d*) belief in vaccination conspiracy theories (e.g., belief that vaccination is a moneymaking scam perpetrated by Big Pharma) (Hornsey et al. 2018, Taylor et al. 2020c).

Psychological reactance also plays a role in vaccination hesitancy, especially if people feel that they are being pressured by government authorities to be vaccinated (Taylor 2019). Misinformation from social media and other sources can fuel antivaccination attitudes. In principle, different public health messaging strategies could target each source of vaccination hesitancy. For example, “Do it for the herd” education programs can encourage vaccination among people who see themselves as personally impervious to the pathogen; they are encouraged to get vaccinated as a way of keeping their communities safe (Hornsey et al. 2018). Various methods have been used for improving vaccine uptake, as reviewed in detail elsewhere (Taylor 2019).

## 8.5. Lives Versus Livelihoods: Protests over Government Restrictions

Social distancing and related government restrictions on socializing are costly on an emotional level because humans, who are naturally sociable, are forced to remain apart. Adherence to these restrictions tends to deteriorate over time (Taylor 2019). As a long-term strategy, that is, over a year or more, social distancing and related restrictions are questionable options because of their toll on the economy and on mental health of communities. As these restrictions drag out, protests and other forms of rebellion become more prevalent. This occurred during the Spanish flu and COVID-19; in both pandemics there were protests against the closing of places of congregation such as clubs, stores, and churches (Becker 2020, Taylor 2019, Tómes 2010). Governments reacted by becoming increasingly heavy-handed, such as by imposing fines and making arrests (Chicago Tribune 1918, Labine 2021).

## 8.6. Pandemic Fatigue

Pandemic fatigue refers to a progressive decline in motivation to follow health guidelines that occurs over the months in which social distancing and other restrictions are in place (WHO 2020). During COVID-19, a survey of more than 7,000 US adults found that pandemic fatigue was expressed primarily in decreases in compliance with the following: (*a*) remaining in residence except for essential activities or exercise, (*b*) having no close contact with nonhousehold members, (*c*) not having visitors over, and (*d*) avoiding eating at restaurants (Crane et al. 2021).

Pandemic fatigue is a burnout-related problem (WHO 2020). Burnout was originally conceptualized as a work-related condition but has since been applied to other areas of life. Burnout, characterized by emotional exhaustion and other symptoms, is caused by prolonged exposure to stress (Maslach & Leiter 2016). Chronic stressful life conditions, such as stressors encountered during lockdown (Taylor et al. 2020a), can contribute to emotional exhaustion. Reinvigorating people to follow social distancing and other guidelines requires input from all levels of society: individuals, communities, and governments. Various strategies have been proposed (WHO 2020).

---

**Burnout:** a state of emotional, mental, and physical exhaustion arising from prolonged, intense stress

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## 9. PANDEMIC-RELATED PSYCHOPATHOLOGY: AN OVERVIEW

### 9.1. COVID-19

Pandemic-related stressors can exacerbate various types of mental health problems. Accordingly, it was not surprising that the severity of such disorders tended to be exacerbated during COVID-19 and other pandemics (Asmundson et al. 2020). However, clinically significant anxiety or depression also occurred in some people with no prior history of anxiety or mood disorders (Robillard et al. 2021). Over the course of COVID-19 there has been a progressive deterioration in mental health as government pandemic mitigation restrictions are drawn out. Most people are resilient, but a substantial minority are emotionally affected (Prati & Mancini 2021). Deterioration in mental health involves mainly increases in depression but also increases in anxiety, insomnia, and substance abuse (Prati & Mancini 2021). Longitudinal studies during COVID-19 have revealed that depressed mood tended to persist or progressively worsen whereas anxiety levels tended to fluctuate; for example, anxiety rose as cases of infection increased and diminished as infection rates abated and social distancing restrictions were eased (Yarrington et al. 2021).

Deterioration of mental health during 2020 was linked to a range of factors, notably the restrictions placed by lockdown and associated effects such as reductions in both income and physical activity (Prati & Mancini 2021). Lockdown required many people to work from home. Working from home can be stressful if the home environment is not conducive to this arrangement, such as when one is working from home while also caring for young children. The stressful effects of lockdown were moderated by the buffering effects of social support (Sommerlad et al. 2021).

After communities were released from lockdown, mental health tended to improve on average, even when other pandemic restrictions (e.g., prevention of social gatherings) were still in place and vaccines had not yet become available (Richter et al. 2021). However, not all people are likely to recover from the stress of the pandemic. Forecasting modeling from England in 2020 suggested that approximately 20% of the population would need either new or additional mental health support as a direct consequence of COVID-19 (O'Shea 2020). The long-term mental health effects of COVID-19 may not be apparent until many years after the pandemic is over. These could include long-term effects of disrupted education and restricted socialization opportunities for children, as well as long-term effects of job loss for adults.

### 9.2. Other Outbreaks

Past pandemics and outbreaks, such as the Russian flu, Spanish flu, swine flu, and SARS, were associated with widespread increases in emotional distress (Bristow 2012, Honigsbaum 2013, Taylor 2019). In the years following the SARS outbreak there was a rise in mental disorders in people who had acquired SARS in comparison to those who had not been infected (Tzeng et al. 2020). During the Spanish flu there was evidence of a rise in pandemic-related anxiety and depression (Bristow 2012). In the years following both the Russian and the Spanish flu

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#### COVID stress

**syndrome:** an adjustment reaction involving fear of infection and associated features

#### Intolerance of uncertainty:

a personality trait defined by the tendency to become anxious about uncertainties in life

#### Perceived vulnerability to disease:

a trait defining the extent to which a person regards themselves as susceptible to infectious disease

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pandemics there were increases in first-time admissions to psychiatric hospitals (Mamelund 2010). In comparison to these outbreaks, during the 1957 and 1968 influenza pandemics there was very little evidence of widespread distress (Honigsbaum 2020). The comparative mildness of these outbreaks, combined with the lack of government restrictions such as lockdowns or school closures and the lack of media attention, may have accounted for the relative lack of public anxiety.

## 10. SPECIFIC CLINICAL CONDITIONS ASSOCIATED WITH PANDEMICS

### 10.1. Fear of Infection

Historical descriptions of pandemic-related excessive fears have, in many ways, resembled contemporary definitions of specific phobias, in which fear, avoidance, and anticipatory anxiety were cardinal features (Taylor 2019). However, there were indications from previous outbreaks that fear of infection was part of a broader constellation of symptoms. Research on past pandemics (e.g., Zika, swine flu) and SARS showed that fear of infection was correlated with obsessive-compulsive contamination symptoms (i.e., health-related checking and reassurance seeking) and with traumatic stress symptoms (i.e., pandemic-related nightmares or intrusive thoughts) (Taylor et al. 2020a). To further investigate the nature and breadth of a COVID-19-related fear syndrome, we developed the COVID Stress Scales (Taylor et al. 2020b), which consist of five correlated factors forming a COVID stress syndrome: (*a*) fear of becoming infected with SARS-CoV-2, (*b*) COVID-19-related xenophobia (i.e., fear of coming into contact with foreigners for fear that they might be infected), (*c*) fear of the personal socioeconomic consequences of the pandemic (e.g., wage loss), (*d*) compulsive checking and reassurance seeking about pandemic-related threats, and (*e*) traumatic stress symptoms about the pandemic (e.g., nightmares, intrusive thoughts).

A series of analyses indicated that fear of becoming infected is at the core of the syndrome (Taylor et al. 2020a). Severity of the syndrome is correlated with a range of preexisting (pre-COVID-19) emotional vulnerability traits (discussed in Section 13, below) such as intolerance of uncertainty, negative emotionality, and heightened perceived vulnerability to disease (Taylor et al. 2020a, Taylor et al. 2020b, Taylor et al. 2021b). Severe scores on the scales, combined with functional impairment due to COVID-19-related distress, are indicative of a COVID stress *disorder* (Asmundson & Taylor 2020). This disorder represents a combination of symptoms that do not neatly fit into diagnostic categories of major anxiety-related disorders because it combines elements of various disorders (e.g., OCD, PTSD, specific phobia). Instead, COVID stress disorder is best conceptualized as an adjustment disorder, where symptoms wax and wane over time in relation to the perceived degree of threat posed by COVID-19 (Asmundson & Taylor 2020). Adjustment disorders are not trivial; some develop into chronic, progressively intensifying psychopathology (Bachem & Casey 2018). Further research is needed to investigate the extent to which this occurs for the COVID stress syndrome and whether future pandemics will be associated with similar syndromes. Currently, findings support the view that pandemic-related fear is more than simply a monophobia; fear of infection is a key element of a broader constellation of psychopathology.

### 10.2. Obsessive-Compulsive Disorder

Research indicates that OCD is caused in part by gene–environment interactions, where vulnerability genes interact with particular environmental stressors (Taylor 2011). Pandemics are such stressors, potentially interacting with genetic factors associated with contamination-related obsessions and compulsions to yield new, or newly worsened, contamination-related OCD. Thus, during COVID-19 there has been an increased in obsessive-compulsive symptoms such as

checking the cleanliness of surfaces, cleaning, and avoidance of germ-related places or situations (Davide et al. 2020). In addition to giving rise to or worsening OCD, pandemics can interfere with treatment for the disorder. Effects of cognitive behavioral therapy (CBT) for OCD, involving exposure and response prevention, were attenuated during the COVID-19 pandemic (Storch et al. 2021), likely due to a range of factors including disruptions in access to treatment and reluctance to engage in exposure therapy (e.g., touching contaminated surfaces) because of fears of becoming infected with SARS-CoV-2. The COVID-19 pandemic did not appear to interfere with pharmacotherapy for OCD (Sharma et al. 2021), suggesting that pharmacotherapy should be the first-line treatment for OCD during the pandemic (Fineberg et al. 2020).

### 10.3. Posttraumatic Stress Disorder

PTSD can be triggered by traumatic pandemic-related stressors, such as exposure to widespread death, the death of loved ones, or personal life-threatening experiences such as severe infection (Taylor 2019). A meta-analysis of survivors of MERS and SARS estimated the rate of virus-related PTSD to be 32% (Rogers et al. 2020). Meta-analytic estimates of PTSD prevalence during COVID-19 have varied widely, from 5% to 50% (e.g., Arora et al. 2020, Yuan et al. 2021), with findings suggesting that PTSD during COVID-19 is more prevalent among HCWs and COVID-19 patients in comparison to the general population (Yuan et al. 2021). Very few studies of COVID-19, SARS, or MERS assessed PTSD using structured clinical interviews, which is the diagnostic gold standard. An exception was a study of patients presenting to a hospital emergency department with COVID-19, most of whom were severely ill and hospitalized. During their convalescence from COVID-19, the patients were assessed with a diagnostic psychiatric interview (Janiri et al. 2021). The prevalence of PTSD was 30%. Risk factors for COVID-19-related PTSD are female gender; past history of psychiatric disorders; delirium or agitation during the acute phase of COVID-19 infection; and persistent COVID-19 symptoms (i.e., long COVID), commonly fatigue and dyspnea (Janiri et al. 2021). Female gender, delirium, and a past history of psychopathology are previously established risk factors for PTSD in general (Taylor 2017).

### 10.4. Prolonged Grief Disorder

A consequence of the COVID-19 pandemic, as in many other pandemics, is an increase in bereavement and therefore an increase in the prevalence of prolonged grief disorder [as diagnosed in the *International Statistical Classification of Diseases and Related Health Problems*, Eleventh Edition (ICD-11)], also known as persistent complex bereavement disorder (in the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition). This is a severe, chronic grief reaction characterized by persistent yearning for and preoccupation with the deceased, in addition to intense emotional distress about the loss (e.g., intense sadness, guilt, anger, blame) (Shear & Gribbin 2016). Prolonged grief disorder is likely to afflict a large number of people as a result of COVID-19 because of (a) the high lifetime prevalence of the disorder among the bereaved (10%) (Lundorff et al. 2017) and (b) the number of people bereaved as a result of COVID-19; for every COVID-19 death there is an average of five bereaved immediate family members (Verdery et al. 2020). Cognitive behavioral interventions show promise in treating prolonged grief disorder (Iglewicz et al. 2020).

### 10.5. Addictive Behaviors

Little is known about pandemic-related addictive behaviors in past pandemics. Substance use and abuse have increased substantially during COVID-19, including increases in alcohol, cannabis, and opiates (Taylor et al. 2020e). Substance use and abuse are associated with various

pandemic-related stressors, including the stress of social restrictions, such as the extremes of crowding or isolation; child care challenges; and pandemic-related socioeconomic stressors (MacMillan et al. 2021, Taylor et al. 2020e). During COVID-19 there has also been an increase in video gaming disorder and internet gaming disorder among adolescents, likely reflecting attempts to cope with the stress and boredom of lockdown (Teng et al. 2021). When in-person gambling was thwarted due to the closure of casinos, people with gambling disorder tended to either move to online gambling or replace gambling with substance abuse (Xuereb et al. 2021).

## **11. BURNOUT AND MORAL INJURY AMONG FRONTLINE WORKERS**

### **11.1. Burnout**

Workplace-related burnout, as defined in ICD-11 (WHO 2019a), is a syndrome arising from chronic workplace stress that has not been successfully managed. Burnout is characterized by (a) feeling exhausted or depleted of energy; (b) having a diminished commitment to or involvement with one's job, or negative or cynical attitudes toward one's job; and (c) feeling a sense of ineffectiveness and lack of accomplishment. Workplace-related burnout among HCWs is a long-standing problem that worsens during health crises such as pandemics, especially for frontline workers involved in the care of infected patients (Chor et al. 2021). Work-related factors linked to high levels of burnout among HCWs include heavy workload and high job demands, working in unsafe settings (e.g., lack of personal protective equipment), lack of training and experience, limited opportunities for downtime (i.e., limited time for sleep, recreation, or time with friends or family), and lack of support from peers and management (Morgantini et al. 2020).

### **11.2. Moral Injury**

A phenomenon related to burnout is moral injury, which refers to the psychological, social, and spiritual impact of events involving betrayal or transgression of one's own deeply held moral beliefs and values occurring in high-stakes situations (Litz et al. 2009). Events or situations leading to moral injury are an unavoidable part of clinical practice, where patients are numerous and resources are comparatively scarce. Moral transgression events can involve people doing or failing to do something, or witnessing such transgressions unfold without being able to remedy the situation. Severe stressful moral situation can involve, for example, an HCW having to decide which patients receive lifesaving resources in limited supply, such as ventilators. Moral injury is associated with shame, guilt, anger, and despair (Phoenix Australia 2020). People experiencing moral injury may lose faith in their profession, workplace, and leaders (Phoenix Australia 2020). Moral injury can occur with or without burnout, but it is part of a broader constellation of work-related stressors encountered by HCWs, including stigma from anxious but ill-informed members of the public who fear that HCWs are sources of infection (Taylor 2019).

### **11.3. Managing Burnout and Moral Injury**

Both burnout and moral injury are risk factors for job turnover and absenteeism as well as for various mental health problems including PTSD, anxiety disorders, mood disorders, and substance use disorders (Phoenix Australia 2020). Burnout and moral injury have also been implicated in HCW suicide. Burnout is also a safety issue for patients in that it may undermine the ability of HCWs to provide optimal treatment. Treatment of burnout and moral injury requires both structural resources (i.e., a safe, adequately supplied work environment, where



stressors are minimized) and organizational support, social support (including peer support), and individual-focused interventions. Promising forms of the latter include CBT, self-care interventions, and stress management (Mollica et al. 2020).

## 12. SUICIDE

### 12.1. Does Suicide Increase During Pandemics?

Wasserman (1992) argued, on the basis of Durkheim's theory about suicide, that pandemics involving social restrictions should lead to an increase in suicide because pandemic containment measures decrease social integration, interaction, and support. This suggests that the side effects of social restrictions (i.e., decreased social contact) could be lethal. However, determining the cause of suicide can be difficult. During COVID-19, for example, there has been an increase in drug overdose deaths (CDC 2020). It can sometimes be difficult to determine whether overdose is deliberate or accidental. In other cases, the intent is clearer, such as when there is a suicide note. The determination of whether a death is a suicide depends largely on the accuracy of coroners' reports. Accordingly, the following findings need to be interpreted with caution.

The Russian flu coincided with a marked rise in suicide (Honigsbaum 2010). An analysis of 1910–1920 US Census data revealed that suicide rates increased during the Spanish flu, even after controlling for the effects of the coincident World War I (Wasserman 1992). Social distancing (e.g., school and business closures) predicted suicide rates during the Spanish flu (Stack & Rockett 2021), presumably through lowering social interaction and social support in the context of increasing financial hardship. During the SARS outbreak in Hong Kong and Taiwan, there were increases in suicides among seniors (Chan et al. 2006, Tzeng et al. 2020). During the swine flu pandemic in South Korea, a time-series investigation found that the development of influenza-like illness was linked to suicide (Jung et al. 2021). Collectively, these findings suggest an increase in suicide during pandemics and related outbreaks. The impact of pandemics on suicide likely depends on a variety of factors, including the mitigation measures and other barriers to self-harm. Suicide rates may vary across pandemics and across time periods during a given pandemic (e.g., early versus late in a pandemic).

The relationship between COVID-19 and suicide is less clear because, as of late 2021, the pandemic was still ongoing. The research had so far failed to resolve into a clear picture about the relationship between COVID-19 and suicide, with studies reporting increases, no changes or decreases, or a fluctuating pattern during the first year of the pandemic (e.g., Czeisler et al. 2020, Radeloff et al. 2021). A coherent picture of the relationship between COVID-19 and suicide might not emerge for years.

### 12.2. Health Care Worker Suicide

HCWs tend to have higher suicide rates than the general population, regardless of whether a pandemic is occurring (Dutheil et al. 2019). These workers are often reluctant to seek mental health services because of career concerns, work culture, or a predisposition toward self-reliance (Duarte et al. 2020). During both the COVID-19 and Spanish flu pandemics there were many cases in which physicians, nurses, paramedics, and other HCWs committed or attempted suicide (Berger 2020, Mortier et al. 2021). Risk factors for suicidal ideation or attempts included (a) being a frontline worker coming in contact with pandemic patients; (b) having a suspected or confirmed pandemic infection and fearing transmitting this infection to others, including loved ones; (c) having a preexisting mental disorder; (d) having relationship or career difficulties; and (e) experiencing work-related stress, burnout, and moral injury (Duarte et al. 2020, Mortier et al.



2021). It is unclear whether the suicide rate of HCWs increased during COVID-19 in comparison to prepandemic periods. Nevertheless, there have been numerous reports of physicians and other HCWs taking their lives because they felt unable to provide adequate care for COVID-19 patients (Moutier et al. 2021).

### 12.3. Suicide Mitigation

Suicide mitigation during COVID-19 has involved a variety of methods, including public education, government assistance to offset economic stressors, e-health resources (e.g., internet-based stress management advice), telephone hotlines, and preemptive approaches targeting at-risk populations, such as resiliency training for HCWs and outreach programs for socially isolated seniors (Moutier et al. 2021). The methods for reducing burnout and moral injury, as discussed above, may also reduce HCW suicide.

## 13. VULNERABILITY FACTORS FOR PANDEMIC-RELATED PSYCHOPATHOLOGY

### 13.1. Biopsychosocial Etiology

Vulnerability factors for pandemic-related psychopathology include the biopsychosocial factors for psychopathology in general. A range of factors can contribute to pandemic-related worsening or new onset of psychological problems. Traumatic stressors during a pandemic (e.g., exposure to death or personal life-threatening infection) are examples. In other cases, gene–environment interactions may be in play, as discussed above regarding OCD. Cognitive factors such as dysfunctional beliefs and misinterpretations about health-related stimuli can also play a role in exacerbating pandemic-related negative emotions, including health anxiety. Cognitive behavioral factors in pandemic-related anxiety are discussed in detail elsewhere (Taylor 2019). Particular personality traits are also important for our understanding pandemic-related psychopathology.

### 13.2. Personality Traits

Several traits have been linked to the proneness to experience negative emotions in response to stressors. The traits that appear most promising for understanding pandemic-related psychological phenomena are discussed in the following sections.

**13.2.1. Negative emotionality.** Negative emotionality (neuroticism) is the tendency to experience negative emotions. This broad trait appears to confer vulnerability to many kinds of psychopathology (Brandes et al. 2019). Negative emotionality predicted fears of infection in past pandemics and outbreaks (Taylor 2019) and is associated with heightened anxiety during COVID-19 (Taylor et al. 2021a). Research supports a bifactor model of negative emotionality, consisting of a general factor (negative emotionality) in addition to distinct, but correlated, narrow factors (Brandes et al. 2019). Narrow factors or traits include the intolerance of uncertainty.

**13.2.2. Intolerance of uncertainty.** Pandemics are associated with all kinds of uncertainties, and people who are intolerant of uncertainty are therefore likely to become highly anxious during pandemics (Taylor 2019). People who are highly intolerant of uncertainty have a strong desire for predictability and tend to worry about uncertainties (Birrell et al. 2011). A high degree of intolerance of uncertainty is associated with a range of clinical conditions, including mood and

anxiety disorders, OCD, and excessive health anxiety (Rosser 2018, Shihata et al. 2016). People who are intolerant of uncertainty try to reduce uncertainty by checking and reassurance seeking (Shihata et al. 2016). This may involve repeatedly checking the internet for medical information or persistently seeking reassurance from doctors (Fergus 2015). During COVID-19, high levels of intolerance of uncertainty were associated with the COVID stress syndrome (Taylor et al. 2020a), panic buying (Taylor 2021), and maladaptive coping and high levels of distress during lockdown (Rettie & Daniels 2021, Taylor et al. 2021a). CBT for generalized anxiety disorder is efficacious in reducing the intolerance of uncertainty (Talkovsky & Norton 2016).

#### Behavioral immune system (BIS):

a psychological system designed to detect cues to potential infection and motivate escape or avoidance behavior

**13.2.3. Boredom proneness.** Boredom is an unpleasant state of being weary and restless, where time drags and nothing maintains one's interest or focus of attention (Goldberg et al. 2011). Boredom is triggered by unstimulating environments, including lockdown, quarantine, and other restrictions that limit social interactions. Boredom motivates people to seek out new experiences, even if those experiences have negative consequences (Bench & Lench 2019). Boredom proneness is a trait characterized by the tendency to readily become bored in a wide range of situations (Farmer & Sundberg 1986). Boredom proneness is correlated with (a) the tendency to experience negative emotions such as depression, anxiety, and irritability (Sommers & Vodanovich 2000); (b) substance use disorders and related conditions such as problem gambling, mobile phone addiction, and internet addiction (Skues et al. 2016, Yang et al. 2020); (c) low adherence to home-schooling during pandemic-related school closures (Martarelli et al. 2021); and (d) the tendency to disregard social distancing guidelines (Boylan et al. 2021). Little is known about the best way to reduce boredom proneness. It is negatively correlated with mindfulness (Regan et al. 2020), which raises the question of whether training in mindfulness might reduce boredom proneness.

**13.2.4. Stress-buffering traits.** Trait optimism and trait resilience are buffering factors against stressors in general (Coelho et al. 2018, Connor & Davidson 2003). Research conducted during COVID-19 suggests that trait optimism and trait resilience modulate (inhibit) the effects of negative emotionality on COVID-19-related distress such as the COVID stress syndrome (Taylor et al. 2021a). Theoretically, it might seem that introversion would be stress buffering during lockdown, because introverted people prefer not to be in highly social environments. On average, however, introverts were no more likely than extraverts to cope better with lockdown during COVID-19, most likely because people desiring high levels of social interaction during lockdown could meet these needs via social media and other electronic means (Taylor et al. 2021b).

### 13.3. The Behavioral Immune System

Pathogens such as viruses are too small to be directly observed, so a person's biological immune system is insufficient for avoiding exposure to these agents. It is necessary to use perceptible cues to detect and avoid pathogens. Such cues include noxious smells and visual cues like the presence of people coughing or sneezing. The behavioral immune system (BIS) is conceptualized as a system for detecting such cues. When such cues are detected, emotional reactions (e.g., fear, disgust) are triggered to motivate the person to avoid or escape (Schaller & Park 2011). Individual differences in BIS sensitivity are indicated by a person's perceived vulnerability to disease (Duncan et al. 2009). People scoring high on this trait tend to be excessively worried about becoming infected during a pandemic as well as about their health in general (Taylor et al. 2020a). Perceived vulnerability to disease is also tied to racism. A common way of acquiring serious infections is from other people, especially when foreign groups intermingle, where one group introduces a disease that the other group has never encountered and so has no preexisting

#### Long COVID:

persistent symptoms after the person has recovered from the acute infection of SARS-CoV-2

immunity. Given that many infections are transmitted through interpersonal interactions, the BIS is said to have evolved to influence social attitudes and interactions, including ethnocentrism and xenophobia (Schaller & Park 2011). Indeed, research shows that when people feel threatened about becoming infected with some pathogen, they tend to avoid or stigmatize out-groups (i.e., a group which a person does not belong to or identify with) (Taylor 2019). Thus, out-groups are blamed for causing or spreading diseases, such as being blamed for lack of hygiene, education, self-control, or other factors such as cultural practices (Gilles et al. 2013). People who are most frightened of infection are most likely to avoid foreigners and have negative attitudes toward such people (Taylor 2019, Taylor et al. 2020a). Accordingly, during times of pandemic there will be a general increase in stigmatization and xenophobia, where foreigners and other out-groups are unfairly blamed for being sources of infection (Man 2020, Murray & Schaller 2012, Taylor 2019).

## 14. NEUROLOGICAL AND SOMATIC ASPECTS

Infectious agents causing pandemics have the potential to invade the central nervous system, producing acute effects (e.g., delirium) and potential long-term effects after the infection has passed (postviral syndromes). During the Russian flu pandemic and COVID-19 there were reports of people developing postviral pain conditions including neuralgia and new-onset daily persistent headache (Honigsbaum 2013, Rozen 2020). There was evidence of postinfection chronic fatigue after SARS, MERS, COVID-19, and the Russian flu (Ahmed et al. 2020, Smith 1995). Neurological symptoms of COVID-19 tend to abate over a period of months (Kacem et al. 2021).

There is evidence for other long-term effects of COVID-19, SARS, MERS, and the Russian flu, for example, persistent breathlessness, concentration difficulties, and depression (Ahmed et al. 2020, Turner 1919). For COVID-19, the odds of having persistent symptoms—so-called long COVID—is associated with increasing age, body mass index, and female gender (Sudre et al. 2021). Regarding treatment, CBT for chronic fatigue could be considered, although its efficacy for chronic fatigue has been questioned (Vink & Vink-Niese 2020).

## 15. LIFE IN THE PANDEMIC AFTERMATH

### 15.1. Psychosocial Remnants of Past Pandemics

Pandemics can leave imprints on society, culture, and art, but the impacts can be evanescent or difficult to discern. Consider the Spanish flu, which arguably served as a catalyst for the development of centralized, publicly funded health care (Spinney 2017). There is scant evidence that the Spanish flu had other long-term impacts. The practice of wearing face masks was commonplace and even mandatory throughout Western countries during the Spanish flu, but the practice rapidly disappeared once the pandemic had passed. At the level of organizations and institutions the pandemic had little impact, although written accounts (e.g., letters, memoirs) show that many people were frightened during the Spanish flu and that it was one of the most important experiences of their lives. The Spanish flu “did not spur great changes in the structure and procedures of governments, armies, corporations, or universities. . . . Spanish influenza had a permanent influence not on the collectivities but on the *atoms* of human society—individuals” (Crosby 2003, p. 309; emphasis in original).

During the swine flu pandemic, mask wearing and hand hygiene increased during the outbreak and declined afterward in both Western and Asian countries (Garcia-Contiente et al. 2013, Manning et al. 2010, Shu-Ru & Jiun-Hau 2012). At a societal level, there was no evidence of long-term effects. The situation might be somewhat different for the COVID-19 pandemic,

which has served to accelerate societal changes that were already in progress before the outbreak, such as the rise of e-health for addressing mental health needs and the tendency to increasingly work from home.

## 15.2. Lingering Effects on Mental Health

A common response to major stressors is resilience, which is the ability to endure and overcome various kinds of adversities, including the ability to bounce back to previous levels of psychological functioning once the adversity has passed (Bonanno & Diminich 2013). Debates about the prevalence of resilience after highly stressful events have focused mostly on measurement and methodological issues (Infurna & Jayawickreme 2019). Nevertheless, the research literature consistently shows that many and probably most people are resilient to stressful events; even if they become distressed during a stressor, most people return to their prestressor levels of functioning (Galatzer-Levy et al. 2018). That said, a substantial minority of people experience worsened or new-onset mental health problems during pandemics. Research from natural disasters suggests that approximately 15% of people develop long-term psychological problems (Galatzer-Levy et al. 2018). As mentioned above, it has been predicted that approximately 20% of people will need mental health services due to COVID-19 (O'Shea 2020). The proportion of people developing psychological problems depends, in part, on the lethality of the pandemic and the person's exposure to traumatic stressors, such as the loss of loved ones (Snowden 2019, Taylor 2019).

Chronic diseases of all kinds, particularly those associated with persistently uncomfortable, painful, or debilitating somatic symptoms such as those of long COVID, are often associated with psychological problems such as depression and anxiety, insomnia, and cognitive problems such as concentration difficulties (Conversano 2019). These problems may persist into the postpandemic period, thereby warranting clinical attention.

## 15.3. Posttraumatic Growth

Posttraumatic growth (PTG), also known as benefit finding or stress-related growth, refers to positive psychological changes that occur as a result of undergoing some major stressful event. Changes include a deeper appreciation for friends and family, improved resilience, enhanced spirituality, a greater appreciation for life, and recognition of new possibilities or paths in one's life (Tedeschi & Calhoun 2004). PTG differs from resilience. The latter refers to a return to one's baseline level of functioning after enduring a stressful experience. In comparison, PTG refers to psychological growth beyond baseline levels of functioning. Meta-analytic research prior to COVID-19 suggests that approximately 50% of people report moderate or greater levels of PTG after going through a stressful life event (Wu et al. 2019). Studies conducted during COVID-19 found that most people reported some form of PTG, including a greater appreciation for life, improved social relationships, and greater personal resilience (Asmundson et al. 2021, Pietrzak et al. 2021). Factors associated with PTG include active coping, higher education level, openness to experience, hope, social support, and deliberate rumination (i.e., making sense of the trauma) (Huecker et al. 2021).

Questions arise as to whether PTG is enduring or transient, how it varies across pandemics, and whether the growth is real or illusory. It could be illusory if people claim to have experienced some beneficial change (e.g., increased resilience) but other data contradict that change (e.g., progressively worsening distress during the time in which growth supposedly occurred). Evidence suggests that some people report PTG as part of a self-deceptive strategy to try to assure themselves that they are coping better than is actually the case (e.g., becoming progressively anxious but telling themselves that they are growing more resilient to stress) (Asmundson et al.

2021). Various psychological interventions, such as CBT, can improve psychological functioning and can facilitate PTG (Liu et al. 2020). Protocols for facilitating PTG are described in detail elsewhere (Tedeschi et al. 2018).

## 16. MANAGING AND TREATING PANDEMIC-RELATED PSYCHOPATHOLOGY

### 16.1. Enhancing the Resilience of Health Care Workers

Military and government organizations such as the US Department of Defense have developed training programs for enhancing the resiliency of infantry and medical staff working in theaters of war. Recently, there have been efforts to adapt these procedures for improving the resiliency of civilian HCWs during COVID-19 (Albott et al. 2020), which involves a combination of educational webinars, skills training, and structural changes to workplace operations. HCWs received education about the signs and risk factors for workplace-related burnout and PTSD. Skills training focused on practical, readily implemented coping strategies (e.g., reaching out to colleagues, positive self-talk, limiting exposure to disturbing news media, maintaining a healthy lifestyle, and other stress-reducing activities such as yoga or meditation) (Albott et al. 2020). Stress reactions were framed as normal reactions that one should expect and plan to address.

Structural changes to the workplace environment involve the inclusion of management personnel who support the use of stress management methods by staff, such as the use of peer support groups and other forms of social support including the availability of a dedicated, on-site mental health consultant who can facilitate training in stress inoculation methods, provide additional support, or coordinate referrals for external professional consultation (Albott et al. 2020). The use of self-assessment tools can also be used to improve awareness among HCWs of whether they are developing important problems such as burnout.

A component of this program known as *Battle Buddies* (Albott et al. 2020) is particularly promising because it is simple to implement and likely to be very useful in dealing with workplace stress. *Battle Buddies* involves HCWs pairing up, with individuals in each pair being matched, as far as possible, on demographics, occupational roles, and seniority. Buddies within each pair are matched on these variables because the nature of occupational stressors can differ considerably across demographics, roles, and seniority (e.g., people in managerial positions face different stressors than people in junior positions). Members of each pair debrief one another each day, brainstorm potential solutions to problems, and provide mutual support. During daily check-ins buddies share their reactions to stressors (e.g., “I’m afraid I’m going to bring the virus home”), validate each other’s experiences (rather than debating or arguing), offer their perspectives and discuss possible solutions, and encourage the seeking of additional help if stressors or anxieties escalate (Albott et al. 2020). Buddies are selected specifically not to be close friends or confidantes (or spouses) because sometimes difficult conversations or observations must be made without the fear of jeopardizing close friendships. Further investigation is needed to evaluate the efficacy of the *Battle Buddies* program in reducing burnout and associated psychological problems.

### 16.2. Community-Wide Interventions: The Rise of e-Health

During pandemics, face-to-face psychological consultations may not be possible in many circumstances, and the sheer number of people requiring such services makes one-to-one consultations untenable. Experience from past pandemics and disasters suggests that a stepped care approach would be useful, incorporating a screen-and-treat approach in which cases are screened for psychological problems and the level or intensity of intervention is determined by the screening

results, ranging from educational online materials to virtual or face-to-face sessions with a mental health professional (Taylor 2019).

Various online interventions are useful in reducing pandemic-related distress, including lockdown-related distress (Amanvermez et al. 2020, Jasti et al. 2020). Videoconferencing methods can also be used to deliver, for suitable patients, cognitive restructuring and exposure therapies for PTSD (Fina et al. 2021). A brief, online, self-guided cognitive behavioral intervention was found to be useful in reducing excessive worry about COVID-19 (Wahlund et al. 2020). Mindfulness training, which can be delivered online, also shows promise in improving resilience to COVID-19-related stress (Yuan 2021). Empathy-focused telephone calls, delivered by lay counselors, reduced loneliness, depression, and anxiety in housebound adults during COVID-19 (Kahlon et al. 2021).

### 16.3. Comprehensive Mental Health Management

The most comprehensive, integrated multicomponent program for COVID-19-related mental health problems was developed in Chengdu, China, and was rapidly deployed in the early months of the pandemic (He et al. 2020). Administered by a multidisciplinary team of mental health professionals, the program was designed to reach members of the community as well as at-risk groups. The program had four main components:

- TV and radio programs, broadcast nightly, discussing COVID-19-related psychological problems and offering information and advice. These were supplemented and promoted through Chinese social media platforms (WeChat, Weibo, and TikTok), drawing the attention of millions of people.
- Free 24-hour hotline consultations through six dedicated hotlines. Complex or urgent cases were referred on for consultation sessions.
- Online video consultation sessions that used psychological interventions or pharmacotherapy. Cases were referred from the hotline and from other agencies, such as COVID-19 hospitals.
- On-site (i.e., hospital or clinic) crisis intervention for two groups of people: (a) confirmed, suspected, or quarantined cases of COVID-19 who showed signs of psychological distress and (b) frontline HCWs, who were provided with training in stress management.

Preliminary data showed that this rapidly implemented, comprehensive program was feasible, was well received by the community, and attracted numerous calls and consultations, sometimes hundreds of calls per day to the telephone hotline (He et al. 2020). Although this program requires further evaluation in terms of its efficacy, it currently stands as a model for mental health management during pandemics, especially pandemics requiring lockdown, which is a necessary but stressful intervention.

## 17. CONCLUSIONS

Pandemics are dynamic events involving a range of stressors that can seriously affect mental health. Pandemics are particularly stressful when governments impose social restrictions such as stay-at-home orders and closures of places of public congregation. These restrictions are vital for stemming infection but negatively affect the mental health of communities, especially when restrictions are drawn out over long periods of time (e.g., several months). Research is needed to investigate alternatives to drawn-out social distancing restrictions.

Although most people are resilient to stress, during pandemics a substantial minority experience new or worsened mental health problems such as mood and anxiety disorders, substance use



disorders, PTSD, prolonged grief disorder, and OCD. Frontline HCWs working under stressful conditions that put them at risk for infection are especially vulnerable to developing symptoms of these disorders. Additionally, people recovering from an outbreak such as COVID-19 are at risk for PTSD and possible persistent neuropsychiatric symptoms (e.g., chronic fatigue).

Until COVID-19, there had been little attention to treating psychological problems arising from pandemics. Psychological treatment approaches during COVID-19 involve an increasing use of e-health applications (e.g., cognitive behavioral programs via phone or internet) as well as interventions to boost the resilience of frontline workers. Further research is needed to refine and evaluate mental health services and to examine their applicability to specific vulnerable populations, such as the elderly, children, and the indigent, as well as incarcerated individuals and ethnic minorities.

Advances in managing pandemics require that governments and health authorities learn the lessons of the past. The lessons of pandemics are too often forgotten at a societal level. Problems such as vaccination hesitancy, mask nonadherence, violations of social distancing mandates, racism, panic buying, and the rise of mental health problems were all predictable pandemic-related phenomena before the onset of COVID-19. In future pandemics, such problems should be anticipated and proactively addressed so as to limit the spread of disease, distress, and social disruption.

## SUMMARY POINTS

1. The psychological footprint of pandemics exceeds the medical footprint; more people are affected emotionally and behaviorally in comparison to the number of people actually infected.
2. Psychological factors are central to the management of pandemics in that people are required to do things to contain the spread of infection, such as wear face masks, get vaccinated, and adhere to social distancing guidelines.
3. Pandemics are associated with three broad classes of important, problematic types of psychological phenomena: (a) nonadherence to health guidelines (e.g., disregard for social distancing), (b) societally disruptive phenomena (e.g., panic buying, protest rallies against lockdown), and (c) psychopathology (e.g., a worsening of preexisting psychopathology or new-onset problems).
4. Pandemics are dynamic events in which the nature of challenges in managing pandemics and associated distress and societal disruption change over time and circumstances.
5. Risk communication, which is pandemic-related messaging to the public from health authorities, needs to be carefully crafted and pilot tested in order to be optimally effective and to avoid unintended consequences such as triggering outbreaks of panic buying.
6. Pandemics require large-scale, remotely accessible mental health resources such as online or phone-based treatment resources.
7. Most people are resilient to stress and bounce back from pandemics, although a minority develop new or worsened psychological problems that may merit clinical attention.
8. Societies tend to rapidly forget the lessons of past pandemics. Steps need to be taken to remember the lessons of COVID-19 in order to prepare for the next pandemic. Plans concerning pandemic mitigation measures and resources for addressing mental health



problems need to be proactive (i.e., planned to address foreseeable problems) rather than reactive (i.e., waiting for problems to emerge).

## DISCLOSURE STATEMENT

The author is not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

## LITERATURE CITED

- Ahmed H, Patel K, Greenwood DC, Halpin S, Lewthwaite P, et al. 2020. Long-term clinical outcomes in survivors of severe acute respiratory syndrome and Middle East respiratory syndrome coronavirus outbreaks after hospitalisation or ICU admission: a systematic review and meta-analysis. *J. Rehabil. Med.* 52:jrm00063
- Albott CS, Wozniak JR, McGlinch BP, Wall MH, Gold BS, Vinogradov S. 2020. **Battle Buddies: rapid deployment of a psychological resilience intervention for health care workers during the COVID-19 pandemic.** *Anesth. Analg.* 131:43–54
- Amanvermez Y, Rahmadiana M, Karyotaki E, de Wit L, Ebert DD, et al. 2020. Stress management interventions for college students: a systematic review and meta-analysis. *Clin. Psychol. Sci. Pract.* e12342. In press
- Arora T, Grey I, Östlundh L, Lam KBH, Omar OM, Arnone D. 2020. The prevalence of psychological consequences of COVID-19: a systematic review and meta-analysis of observational studies. *J. Health Psychol.* <https://doi.org/10.1177/1359105320966639>
- Asmundson GJG, Paluszek MM, Landry CA, Rachor GS, McKay D, Taylor S. 2020. Do pre-existing anxiety-related and mood disorders differentially impact COVID-19 stress responses and coping? *J. Anxiety Disord.* 74:102271
- Asmundson GJG, Paluszek MM, Taylor S. 2021. Real versus illusory personal growth in response to stressors of the COVID-19 pandemic. *J. Anxiety Disord.* 81:102418
- Asmundson GJG, Taylor S. 2020. Coronaphobia revisited: a state-of-the-art on pandemic-related fear, anxiety, and stress. *J. Anxiety Disord.* 76:102326
- Bachem R, Casey P. 2018. Adjustment disorder: a diagnosis whose time has come. *J. Affect. Disord.* 227:243–53
- Baldwin PC. 2003. How night air became good air, 1776–1930. *Environ. Hist.* 8:412–29
- Ball P, Maxmen A. 2020. The epic battle against coronavirus misinformation and conspiracy theories. *Nature* 581:371–74
- Becker KM. 2020. More than 200 COVID-19 cases linked to Fitchburg church. *NBC News*, Novemb. 7. <https://www.nbcboston.com/news/local/more-than-200-covid-19-cases-linked-to-fitchburg-church/2225433/?amp>
- Bench SW, Lench HC. 2019. Boredom as a seeking state: Boredom prompts the pursuit of novel (even negative) experiences. *Emotion* 19:242–54
- Berger K. 2020. Seattle struggled with suicide in late stages of the 1918 flu. *Crosscut Blog*, May 7. <https://crosscut.com/2020/05/seattle-struggled-suicide-late-stages-1918-flu>
- Birrell J, Meares K, Wilkinson A, Freeston M. 2011. Toward a definition of intolerance of uncertainty: a review of factor analytical studies of the Intolerance of Uncertainty Scale. *Clin. Psychol. Rev.* 31:1198–208
- Boguszewski R, Makowska M, Bożewicz M, Podkowińska M. 2020. The COVID-19 pandemic's impact on religiosity in Poland. *Religions* 11:646
- Bonanno GA, Diminich ED. 2013. Positive adjustment to adversity—trajectories of minimal-impact resilience and emergent resilience. *J. Child Psychol. Psychiatry* 54:378–401
- Boylan J, Seli P, Scholer AA, Danckert J. 2021. Boredom in the COVID-19 pandemic: trait boredom proneness, the desire to act, and rule-breaking. *Personal. Individ. Differ.* 171:110387
- Brandes CM, Herzhoff K, Smack AJ, Tackett JL. 2019. The *p* factor and the *n* factor: associations between the general factors of psychopathology and neuroticism in children. *Clin. Psychol. Sci.* 7:1266–84

Describes military applications for improving the resilience of health care workers.

Documents the progressive deterioration in adherence in social distancing, indicative of pandemic fatigue.

- Brehm JW. 1966. *A Theory of Psychological Reactance*. New York: Academic
- Bristow NK. 2012. *American Pandemic: The Lost World of the 1918 Influenza Epidemic*. New York: Oxford Univ. Press
- CDC (Cent. Dis. Control Prev.). 2020. *Overdose deaths accelerating during COVID-19*. News Release, Dec. 17, CDC, Washington, DC. <https://www.cdc.gov/media/releases/2020/p1218-overdose-deaths-covid-19.html>
- Chan SM, Chiu FK, Lam CW, Leung PY, Conwell Y. 2006. Elderly suicide and the 2003 SARS epidemic in Hong Kong. *Int. J. Geriatr. Psychiatry* 21:113–18
- Cheng C. 2004. To be paranoid is the standard? Panic responses to SARS out-break in the Hong Kong Special Administrative Region. *Asian Perspect.* 28:67–98
- Chicago Tribune. 1918. All who peril health of city to be arrested. *Chicago Tribune*, Oct. 19, p. 13. <http://hdl.handle.net/2027/spo.2920flu.0012.292>
- Chor WPD, Ng WM, Cheng L, Situ W, Chong JW, et al. 2021. Burnout amongst emergency healthcare workers during the COVID-19 pandemic: a multi-center study. *Am. J. Emerg. Med.* 46:700–2
- Coelho GLH, Vilar R, Hanel PHP, Monteiro RP, Ribeiro MGC, Gouveia VV. 2018. Optimism scale: evidence of psychometric validity in two countries and correlations with personality. *Personal. Individ. Differ.* 134:245–51
- Cohn SK. 2017. Cholera revolts: a class struggle we may not like. *Soc. Hist.* 42:162–80
- Connor KM, Davidson JRT. 2003. Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). *Depress. Anxiety* 18:76–82
- Conversano C. 2019. Common psychological factors in chronic diseases. *Front. Psychol.* 10:2727
- Crane MA, Shermock KM, Omer SB, Romley JA. 2021. Change in reported adherence to nonpharmaceutical interventions during the COVID-19 pandemic, April–November 2020. *JAMA* 325:883–85
- Crosby AW. 2003. *America's Forgotten Pandemic: The Influenza of 1918*. Cambridge, UK: Cambridge Univ. Press. 2nd ed.
- Czeisler ME, Lane RI, Petrosky E, Wiley JF, Christensen A, et al. 2020. Mental health, substance use, and suicidal ideation during the COVID-19 pandemic—United States, June 24–30, 2020. *Morb. Mortal. Wkly. Rep.* 69:1049–57
- Davide P, Andrea P, Martina O, Andrea E, Davide D, Mario A. 2020. The impact of the COVID-19 pandemic on patients with OCD: effects of contamination symptoms and remission state before the quarantine in a preliminary naturalistic study. *Psychiatry Res.* 291:113213
- Dolan B. 2020. Unmasking history: Who was behind the Anti-Mask League protests during the 1918 influenza epidemic in San Francisco? *Perspect. Med. Humanit.* 5(19). <https://doi.org/10.34947/M7QP4M>
- Douglas KM, Uscinski JE, Sutton RM, Cichocka A, Nefes T, et al. 2019. Understanding conspiracy theories. *Political Psychol.* 40:3–35
- Duarte D, El-Hagrassy MM, Couto TCE, Gurgel W, Fregni F, Correa H. 2020. Male and female physician suicidality: a systematic review and meta-analysis. *JAMA Psychiatry* 77:587–97
- Duncan LA, Schaller M, Park JH. 2009. Perceived vulnerability to disease: development and validation of a 15-item self-report instrument. *Personal. Individ. Differ.* 47:541–46
- Dutheil F, Aubert C, Pereira B, Dambrun M, Moustafa F, et al. 2019. Suicide among physicians and health-care workers: a systematic review and meta-analysis. *PLOS ONE* 14:e0226361
- Farmer R, Sundberg ND. 1986. Boredom proneness—the development and correlates of a new scale. *J. Personal. Assess.* 50:4–17
- Fergus TA. 2015. Anxiety sensitivity and intolerance of uncertainty as potential risk factors for cyberchondria: a replication and extension examining dimensions of each construct. *J. Affect. Disord.* 184:305–9
- Fina BA, Wright EC, Rauch SAM, Norman SB, Acierno R, et al. 2021. Conducting prolonged exposure for PTSD during the COVID-19 pandemic: considerations for treatment. *Cogn. Behav. Pract.* 28(4):532–42
- Fineberg NA, Van Ameringen M, Drummond L, Hollander E, Stein DJ, et al. 2020. How to manage obsessive-compulsive disorder (OCD) under COVID-19: a clinician's guide from the International College of Obsessive Compulsive Spectrum Disorders (ICOCS) and the Obsessive-Compulsive and Related Disorders Research Network (OCRN) of the European College of Neuropsychopharmacology. *Compr. Psychiatry* 100:152174

- Fung TKF, Namkoong K, Brossard D. 2011. Media, social proximity, and risk: a comparative analysis of newspaper coverage of avian flu in Hong Kong and in the United States. *J. Health Commun.* 16:889–907
- Galatzer-Levy IR, Huang SH, Bonanno GA. 2018. Trajectories of resilience and dysfunction following potential trauma: a review and statistical evaluation. *Clin. Psychol. Rev.* 63:41–55**
- Garcia-Contiente X, Serral G, López MJ, Pérez A, Nebot M. 2013. Long-term effect of the influenza A/H1N1 pandemic: attitudes and preventive behaviours one year after the pandemic. *Eur. J. Public Health* 23:679–81
- Gilles I, Bangerter A, Clémence A, Green EGT, Krings F, et al. 2013. Collective symbolic coping with disease threat and othering: a case study of avian influenza. *Br. J. Soc. Psychol.* 52:83–102
- Goldberg YK, Eastwood JD, Laguardia J, Danckert J. 2011. Boredom: an emotional experience distinct from apathy, anhedonia, or depression. *J. Soc. Clin. Psychol.* 30:647–66
- Goldman E. 2020. Exaggerated risk of transmission of COVID-19 by fomites. *Lancet Infect. Dis.* 20:892–93
- Grasso A, Resnati C, Lanza A, Berrino L, Villani R. 2021. Toxicovigilance during COVID-19: attention to poisoning related to disinfection. *Minerva Anestesiol.* 87:251–52
- He Z, Chen J, Pan K, Yue Y, Cheung T, et al. 2020. The development of the “COVID-19 Psychological Resilience Model” and its efficacy during the COVID-19 pandemic in China. *Int. J. Biol. Sci.* 16:2828–34**
- Herrera-Valdez MA, Cruz-Aponte M, Castillo-Chavez C. 2011. Multiple outbreaks for the same pandemic: Local transportation and social distancing explain the different “waves” of A-H1N1pdm cases observed in México during 2009. *Math. Biosci. Eng.* 8:21–48
- Honigsbaum M. 2010. The great dread: cultural and psychological impacts and responses to the “Russian” influenza in the United Kingdom, 1889–1893. *Soc. Hist. Med.* 23:299–319
- Honigsbaum M. 2013. “An inexpressible dread”: psychoses of influenza at fin-de-siècle. *Lancet* 381:988–89
- Honigsbaum M. 2020. Revisiting the 1957 and 1968 influenza pandemics. *Lancet* 395:1824–26
- Hornsey MJ, Harris EA, Fielding KS. 2018. The psychological roots of anti-vaccination attitudes: a 24-nation investigation. *Health Psychol.* 37:307–15**
- Huecker M, Shreffler J, Danzl D. 2021. COVID-19: optimizing healthcare provider wellness and posttraumatic growth. *Am. J. Emerg. Med.* 46:693–94
- Iglewicz A, Shear MK, Reynolds CF 3rd, Simon N, Lebowitz B, Zisook S. 2020. Complicated grief therapy for clinicians: an evidence-based protocol for mental health practice. *Depress. Anxiety* 37:90–98
- Infurna FJ, Jayawickreme E. 2019. Fixing the growth illusion: new directions for research in resilience and posttraumatic growth. *Curr. Dir. Psychol. Sci.* 28:152–58
- Irmak C, Murdock MR, Kanuri VK. 2020. When consumption regulations backfire: the role of political ideology. *J. Mark. Res.* 57:966–84
- Janiri D, Carfi A, Kotzalidis GD, Bernabei R, Landi F, Sani G. 2021. Posttraumatic stress disorder in patients after severe COVID-19 infection. *JAMA Psychiatry* 78:567–69**
- Jasti N, Bhargav H, George S, Varambally S, Gangadhar BN. 2020. Tele-yoga for stress management: need of the hour during the COVID-19 pandemic and beyond? *Asian J. Psychiatry* 54:102334
- Jung SJ, Lim S-S, Yoon J-H. 2021. Fluctuations in influenza-like illness epidemics and suicide mortality: a time-series regression of 13-year mortality data in South Korea. *PLOS ONE* 16:e0244596
- Kacem I, Gharbi A, Harizi C, Souissi E, Safer M, et al. 2021. Characteristics, onset, and evolution of neurological symptoms in patients with COVID-19. *Neurol. Sci.* 42:39–46
- Kahlon MK, Aksan N, Aubrey R, Clark N, Cowley-Morillo M, et al. 2021. Effect of layperson-delivered, empathy-focused program of telephone calls on loneliness, depression, and anxiety among adults during the COVID-19 pandemic: a randomized clinical trial. *JAMA Psychiatry* 78(6):616–22
- Keane M, Neal T. 2021. Consumer panic in the COVID-19 pandemic. *J. Econom.* 220(1):86–105
- Kempińska-Mirosławska B, Woźniak-Kosek A. 2013. The influenza epidemic of 1889–90 in selected European cities—a picture based on the reports of two Poznań daily newspapers from the second half of the nineteenth century. *Med. Sci. Monit.* 19:1131–41
- Kilgo DK, Yoo J, Johnson TJ. 2019. Spreading Ebola panic: newspaper and social media coverage of the 2014 Ebola health crisis. *Health Commun.* 34(8):811–17
- Klemm C, Das E, Hartmann T. 2016. Swine flu and hype: a systematic review of media dramatization of the H1N1 influenza pandemic. *J. Risk Res.* 19:1–20

---

Presents a comprehensive analysis of the major patterns of resilience and dysfunction after trauma exposure.

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Describes a state-of-the-art program for providing mental health services during lockdown.

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Presents a detailed analysis of the motives for vaccination hesitancy.

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Discusses the prevalence of PTSD after recovering from COVID-19, SARS, MERS, or other traumatic events.

---

Presents a detailed  
protocol for managing  
burnout among  
health care workers.

- Labine J. 2021. GraceLife church holds secret service after AHS fenced facility for violating public health orders. *Edmonton Journal*, April 12. <https://edmontonjournal.com/news/local-news/gracelife-church-holds-secret-service-after-ahs-fenced-facility-for-violating-public-health-orders>
- Lewing CA, Caraway SJ. 2019. Psychological reactance as a motivation in psychopathy. *Personal. Individ. Differ.* 139:355–59
- Lewis D. 2021a. COVID-19 rarely spreads through surfaces. *Nature News Feature*, Jan. 29. <https://www.nature.com/articles/d41586-021-00251-4>
- Lewis D. 2021b. Superspreading drives the COVID pandemic—and could help to tame it. *Nature News Feature*, Febr. 23. <https://www.nature.com/articles/d41586-021-00460-x>
- Litz BT, Stein N, Delaney E, Lebowitz L, Nash WP, et al. 2009. Moral injury and moral repair in war veterans: a preliminary model and intervention strategy. *Clin. Psychol. Rev.* 29:695–706
- Liu JJW, Ein N, Gervasio J, Battaion M, Reed M, Vickers K. 2020. Comprehensive meta-analysis of resilience interventions. *Clin. Psychol. Rev.* 82:101919
- Lundorff M, Holmgren H, Zachariae R, Farver-Vestergaard I, O'Connor M. 2017. Prevalence of prolonged grief disorder in adult bereavement: a systematic review and meta-analysis. *J. Affect. Disord.* 212:138–49
- MacMillan T, Corrigan MJ, Coffey K, Tronnier CD, Wang D, Krase K. 2021. Exploring factors associated with alcohol and/or substance use during the COVID-19 pandemic. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00482-y>
- Mamelund S-E. 2010. *The impact of influenza on mental health in Norway, 1972–1929*. Paper Presented at “Historical Influenza Pandemics: Lessons Learned” Meeting and Workshop, Copenhagen, May 3–7
- Man S. 2020. Anti-Asian violence and US imperialism. *Race Class* 62:24–33
- Manning S, Barry T, Wilson N, Baker M. 2010. Follow-up study showing post-pandemic decline in hand sanitiser use, New Zealand, December 2009. *Eurosurveillance* 15:19466
- Martarelli CS, Pacozzi SG, Bieleke M, Wolff W. 2021. High trait self-control and low boredom proneness help COVID-19 homeschoolers. *Front. Psychol.* 12:594256
- Maslach C, Leiter MP. 2016. Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry* 15:103–11
- McMeekin J, Shah A. 2020. FDA protects patients and consumers from fraud during COVID-19. *FDA Voices on Consumer Safety and Enforcement*, July 20. <https://www.fda.gov/news-events/fda-voices/fda-protects-patients-and-consumers-fraud-during-covid-19>
- Mollica RF, Augusterfer EF, Fricchione GL, Graziano S. 2020. *New self-care protocol*. Pract. Guide, Harvard/MGH Trauma Prog., Boston, MA. <https://hprtsselfcare.org>
- Morgantini LA, Naha U, Wang H, Francavilla S, Acar Ö, et al. 2020. Factors contributing to healthcare professional burnout during the COVID-19 pandemic: a rapid turnaround global survey. *PLOS ONE* 15:e0238217
- Mortier P, Vilagut G, Ferrer M, Serra C, Dios Molina J, et al. 2021. Thirty-day suicidal thoughts and behaviors among hospital workers during the first wave of the Spain Covid-19 outbreak. *Depress. Anxiety* 38:528–44
- Moutier CY, Myers MF, Feist JB, Feist JC, Zisook S. 2021. Preventing clinician suicide: a call to action during the COVID-19 pandemic and beyond. *Acad. Med.* 96:624–28
- Murray DR, Schaller M. 2012. Threat(s) and conformity deconstructed: perceived threat of infectious disease and its implications for conformist attitudes and behavior. *Eur. J. Soc. Psychol.* 42:180–88
- O'Shea N. 2020. *Covid-19 and the nation's mental health*. Brief., Cent. Ment. Health, London, UK. [https://www.centreformentalhealth.org.uk/sites/default/files/publication/download/CentreforMentalHealth\\_COVID\\_MH\\_Forecasting3\\_Oct20\\_0.pdf](https://www.centreformentalhealth.org.uk/sites/default/files/publication/download/CentreforMentalHealth_COVID_MH_Forecasting3_Oct20_0.pdf)
- Phoenix Australia. 2020. *Moral stress amongst healthcare workers during COVID-19: a guide to moral injury*. Guide, Phoenix Australia/Can. Cent. Excell, Melbourne, Aust. <https://www.phoenixaustralia.org/wp-content/uploads/2020/07/Moral-Stress-Healthcare-Workers-COVID-19-Guide-to-Moral-Injury.pdf>
- Pietrzak RH, Tsai J, Southwick SM. 2021. Association of symptoms of posttraumatic stress disorder with posttraumatic psychological growth among US veterans during the COVID-19 pandemic. *JAMA Netw. Open* 4:e214972
- Prati G, Mancini AD. 2021. The psychological impact of COVID-19 pandemic lockdowns: a review and meta-analysis of longitudinal studies and natural experiments. *Psychol. Med.* 51:201–11

- Radeloff D, Papsdorf R, Uhlig K, Vasilache A, Putnam K, von Klitzing K. 2021. Trends in suicide rates during the COVID-19 pandemic restrictions in a major German city. *Epidemiol. Psychiatr. Sci.* 30:e16
- Regan T, Harris B, Van Loon M, Nanavaty N, Schueler J, et al. 2020. Does mindfulness reduce the effects of risk factors for problematic smartphone use? Comparing frequency of use versus self-reported addiction. *Addict. Behav.* 108:106435
- Rettie H, Daniels J. 2021. Coping and tolerance of uncertainty: predictors and mediators of mental health during the COVID-19 pandemic. *Am. Psychol.* 76(3):427–37
- Richter D, Riedel-Heller S, Zuercher S. 2021. Mental health problems in the general population during and after the first lockdown phase due to the SARS-Cov-2 pandemic: rapid review of multi-wave studies. *Epidemiol. Psychiatr. Sci.* 30:e27
- Robillard R, Daros AR, Phillips JL, Porteous M, Saad M, et al. 2021. Emerging new psychiatric symptoms and the worsening of pre-existing mental disorders during the COVID-19 pandemic: a Canadian multisite study. *Can. J. Psychiatry* 66(9):815–26
- Rogers JP, Chesney E, Oliver D, Pollak TA, McGuire P, et al. 2020. Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: a systematic review and meta-analysis with comparison to the COVID-19 pandemic. *Lancet Psychiatry* 7:611–27
- Rosser BA. 2018. Intolerance of uncertainty as a transdiagnostic mechanism of psychological difficulties: a systematic review of evidence pertaining to causality and temporal precedence. *Cogn. Ther. Res.* 43:438–63
- Rozen TD. 2020. Daily persistent headache after a viral illness during a worldwide pandemic may not be a new occurrence: lessons from the 1890 Russian/Asiatic flu. *Cephalalgia* 40:1406–9
- Rubin GJ, Amlôt R, Page L, Wessely S. 2009. Public perceptions, anxiety, and behaviour change in relation to the Swine flu outbreak: cross sectional telephone survey. *Br. Med. J.* 339:2651
- Schaller M, Park JH. 2011. The behavioral immune system (and why it matters). *Curr. Dir. Psychol. Sci.* 20:99–103
- Sharma LP, Balachander S, Thamby A, Bhattacharya M, Kishore C, et al. 2021. Impact of the COVID-19 pandemic on the short-term course of obsessive-compulsive disorder. *J. Nerv. Ment. Dis.* 209:256–64
- Shear MK, Gribbin CE. 2016. Persistent complex bereavement disorder and its treatment. In *Trauma- and Stressor-Related Disorders: A Handbook for Clinicians*, ed. PR Casey, JJ Strain, pp. 133–54. Arlington, VA: Am. Psychiatr. Publ.
- Shihata S, McEvoy PM, Mullan BA, Carleton RN. 2016. Intolerance of uncertainty in emotional disorders: What uncertainties remain? *J. Anxiety Disord.* 41:115–24
- Shu-Ru J, Jiun-Hau H. 2012. The prevalence of and factors associated with intention to wear a face mask during an influenza-like illness: a comparison between the influenza A/H1N1 pandemic and the post-pandemic phase. *Taiwan J. Public Health* 31:570–80
- Skues J, Williams B, Oldmeadow J, Wise L. 2016. The effects of boredom, loneliness, and distress tolerance on problem internet use among university students. *Int. J. Ment. Health Addict.* 14:167–80
- Smith FB. 1995. The Russian influenza in the United Kingdom, 1889–1894. *Soc. Hist. Med.* 8:55–73
- Snowden FM. 2019. *Epidemics and Society: From the Black Death to the Present*. New Haven, CT: Yale Univ. Press
- Sommerlad A, Marston L, Huntley J, Livingston G, Lewis G, et al. 2021. Social relationships and depression during the COVID-19 lockdown: longitudinal analysis of the COVID-19 social study. *Psychol. Med.* In press
- Sommers J, Vodanovich SJ. 2000. Boredom proneness: its relationship to psychological and physical-health symptoms. *J. Clin. Psychol.* 56:149–55
- Spinney L. 2017. *Pale Rider: The Spanish Flu of 1918 and How It Changed the World*. London: Vintage
- Stack S, Rockett IRH. 2021. Social distancing predicts suicide rates: analysis of the 1918 flu pandemic in 43 large cities. *Suicide Life Threat. Behav.* 51:833–35
- Storch EA, Sheu JC, Guzik AG, Schneider SC, Cepeda SL, et al. 2021. Impact of the COVID-19 pandemic on exposure and response prevention outcomes in adults and youth with obsessive-compulsive disorder. *Psychiatry Res.* 295:113597
- Sudre CH, Murray B, Varsavsky T, Graham MS, Penfold RS, et al. 2021. Attributes and predictors of long COVID. *Nat. Med.* 27:626–31

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Discusses the conceptual and empirical basis of the behavioral immune system.

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Offers a comprehensive analysis of the psychology of pandemics, published just before the outbreak of COVID-19.

Describes the rationale, development, and evaluation of the COVID Stress Scales.

- Taha S, Matheson K, Anisman H. 2013. The 2009 H1N1 influenza pandemic: the role of threat, coping, and media trust on vaccination intentions in Canada. *J. Health Commun.* 18:278–90
- Talkovsky AM, Norton PJ. 2016. Intolerance of uncertainty and transdiagnostic group cognitive behavioral therapy for anxiety. *J. Anxiety Disord.* 41:108–14
- Taylor S. 2011. Etiology of obsessions and compulsions: a meta-analysis and narrative review of twin studies. *Clin. Psychol. Rev.* 31:1361–72
- Taylor S. 2017. *Clinician's Guide to PTSD*. New York: Guilford. 2nd ed.
- Taylor S. 2019. *The Psychology of Pandemics: Preparing for the Next Global Outbreak of Infectious Disease*. Newcastle upon Tyne, UK: Cambridge Sch.**
- Taylor S. 2021. Understanding and managing pandemic-related panic buying. *J. Anxiety Disord.* 78:102364
- Taylor S, Asmundson GJG. 2021. Negative attitudes about facemasks during the COVID-19 pandemic: the dual importance of perceived ineffectiveness and psychological reactance. *PLOS ONE* 16:e0246317
- Taylor S, Fong A, Asmundson GJG. 2021a. Predicting the severity of symptoms of the COVID stress syndrome from personality traits: a prospective network analysis. *Front. Psychol.* 12:632227
- Taylor S, Landry CA, Paluszek MM, Fergus TA, McKay D, Asmundson GJG. 2020a. COVID stress syndrome: concept, structure, and correlates. *Depress. Anxiety* 37:706–14
- Taylor S, Landry CA, Paluszek MM, Fergus TA, McKay D, Asmundson GJG. 2020b. Development and initial validation of the COVID Stress Scales. *J. Anxiety Disord.* 72:102232**
- Taylor S, Landry CA, Paluszek MM, Groenewoud R, Rachor GS, Asmundson GJG. 2020c. A proactive approach for managing COVID-19: the importance of understanding the motivational roots of vaccination hesitancy for SARS-CoV2. *Front. Psychol.* 11:2890J
- Taylor S, Paluszek M, Landry C, Rachor GS, Asmundson GJG. 2020d. Worry, avoidance, and coping during the COVID-19 pandemic: a comprehensive network analysis. *J. Anxiety Disord.* 76:102327
- Taylor S, Paluszek M, Landry C, Rachor GS, Asmundson GJG. 2021b. Predictors of distress and coping during pandemic-related self isolation: the relative importance of personality traits and beliefs about personal threat. *Personal. Individ. Differ.* 176:110779
- Taylor S, Paluszek M, Rachor GS, McKay D, Asmundson GJG. 2020e. Substance use and abuse, COVID-19-related distress, and disregard for social distancing: a network analysis. *Addict. Behav.* 114:106754
- Tedeschi RG, Calhoun LG. 2004. Posttraumatic growth: conceptual foundations and empirical evidence. *Psychol. Inq.* 15:1–18
- Tedeschi RG, Shakespeare-Finch J, Taku K, Calhoun LG. 2018. *Posttraumatic Growth: Theory, Research, and Applications*. New York: Routledge
- Temime L, Opatowski L, Pannet Y, Brun-Buisson C, Boëlle PY, Guillemot D. 2009. Peripatetic health-care workers as potential superspreaders. *PNAS* 106:18420–25
- Teng Z, Pontes HM, Nie Q, Griffiths MD, Guo C. 2021. Depression and anxiety symptoms associated with internet gaming disorder before and during the COVID-19 pandemic: a longitudinal study. *J. Behav. Addict.* 10:169–80
- Thompson D. 2020. Hygiene theater is a huge waste of time. *The Atlantic*, July 27. <https://www.theatlantic.com/ideas/archive/2020/07/scourge-hygiene-theater/614599>
- Tomes N. 2010. “Destroyer and teacher”: managing the masses during the 1918–1919 influenza pandemic. *Public Health Rep.* 125(Suppl. 3):48–62
- Turner EB. 1919. Discussion on Influenza. *Proc. R. Soc. Med.* 12:76–90
- Tzeng N-S, Chung C-H, Chang C-C, Chang H-A, Kao Y-C, et al. 2020. What could we learn from SARS when facing the mental health issues related to the COVID-19 outbreak? A nationwide cohort study in Taiwan. *Transl. Psychiatry* 10:339
- Verdery AM, Smith-Greenaway E, Margolis R, Daw J. 2020. Tracking the reach of COVID-19 kin loss with a bereavement multiplier applied to the United States. *PNAS* 117:17695–701
- Vink M, Vink-Niese A. 2020. Could cognitive behavioural therapy be an effective treatment for long COVID and post COVID-19 fatigue syndrome? Lessons from the Qure study for Q-fever fatigue syndrome. *Healthcare* 8:552
- Wahlund T, Mataix-Cols D, Olofsdotter Lauri K, de Schipper E, Ljótsson B, et al. 2020. Brief online cognitive behavioural intervention for dysfunctional worry related to the COVID-19 pandemic: a randomised controlled trial. *Psychother. Psychosom.* 90:191–99

- Wasserman IM. 1992. The impact of epidemic, war, prohibition and media on suicide: United States, 1910–1920. *Suicide Life Threat. Behav.* 22:240–54
- WHO (World Health Organ.). 2019a. Burnout. In *ICD-11 for Morbidity and Mortality Statistics*, Version 05/2021. Geneva: WHO. <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/129180281>
- WHO (World Health Organ.). 2019b. *Ten threats to global health in 2019*. Spotlight, WHO, Geneva. <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>
- WHO (World Health Organ.). 2020. *Pandemic fatigue: reinvigorating the public to prevent COVID-19*. Policy Framew., WHO Reg. Off. Eur., Copenhagen. <https://apps.who.int/iris/bitstream/handle/10665/335820/WHO-EURO-2020-1160-40906-55390-eng.pdf>
- WHO (World Health Organ.). 2021. *Coronavirus disease (COVID-19)*. Advice for Public, Oct. 1, WHO, Geneva. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
- Wu X, Kaminga AC, Dai W, Deng J, Wang Z, et al. 2019. The prevalence of moderate-to-high posttraumatic growth: a systematic review and meta-analysis. *J. Affect. Disord.* 243:408–15
- Xuereb S, Kim HS, Clark L, Wohl MJA. 2021. Substitution behaviors among people who gamble during Covid-19 precipitated casino closures. *Int. Gambl. Stud.* 21:411–25
- Yang X-J, Liu Q-Q, Lian S-L, Zhou Z-K. 2020. Are bored minds more likely to be addicted? The relationship between boredom proneness and problematic mobile phone use. *Addict. Behav.* 108:106426
- Yarrington JS, Lasser J, Garcia D, Vargas JH, Couto DD, et al. 2021. Impact of the COVID-19 pandemic on mental health among 157,213 Americans. *J. Affect. Disord.* 286:64–70
- Yuan K, Gong Y-M, Liu L, Sun Y-K, Tian S-S, et al. 2021. Prevalence of posttraumatic stress disorder after infectious disease pandemics in the twenty-first century, including COVID-19: a meta-analysis and systematic review. *Mol. Psychiatry* 26:4982–98
- Yuan Y. 2021. Mindfulness training on the resilience of adolescents under the COVID-19 epidemic: a latent growth curve analysis. *Personal. Individ. Differ.* 172:110560





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## Errata

An online log of corrections to *Annual Review of Clinical Psychology* articles may be found at <http://www.annualreviews.org/errata/clinpsy>