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Research Article

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Ableism in the Air: Disability Panic in Stephen King's *The Stand*

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Abstract: This article uses Stephen King's 1990, uncut release of his famous 1978 horror novel *The Stand* to reveal the ways the contemporary horror genre implements the language of pandemics and contagious disease to promote ableist ideas about disability. The horror novel villainizes an antagonist as a central function of its plot. When the antagonist is an airborne disease that inflicts disability and death upon its victims, the novel can be a site of production for what I term "disability panic," a fear and disgust at the possibility of becoming disabled, and a contempt for those who already are. This article argues that *The Stand* calls attention to how stereotypes and misconceptions around illness-induced disability form in times of crisis. This article merges genre studies in horror, disability language, and rhetoric of disease in literature to uncover how King reveals that the language of the horror novel can contribute to a cultural fear and hatred of disability. This novel, though written decades ago, mimics the language of corona virus disease 2019 in current popular media. This article demonstrates how fear of airborne disease in a horror novel can increase fear of real-life pandemics and contribute to ableist views of those suffering from illness-related disability.

Keywords: Stephen King, disability, COVID-19, ableism, pandemic

1 Introduction

Stephen King is no stranger to accusations of ableism in his writing – or racism, sexism, or homophobia, for that matter. Of his 65 novels, this criticism is perhaps most prevalent surrounding the monolithic 1200-page, uncut release of *The Stand* (1990), which follows a group of survivors navigating the post-apocalyptic United States after a super flu wipes out most of the human population. Most of this criticism is not unique to King, but a common response to genre fiction more generally. Other horror, romance, fantasy, and crime authors are often accused of relying on reductive stereotypes as a replacement for character building or critical engagement with identity. *The Stand*, while wildly successful and adapted into both a film and TV show, received mixed reviews from activist groups due to the book's large cast of characters, most of whom are almost exclusively defined by their race, gender, or ability (Paquette, 2012, p. 40). The two central protagonists of the novel, Mother Abagail and Nick Andros, are both visibly disabled; Nick begins the novel as deaf and mute and later becomes blind in one eye, while Mother Abagail is almost entirely immobile at 108 years old. These disabilities are central to both characters' appearance, personality, and motivations, while also generating plot events. The rest of the cast is marked by disability as well: minor characters grapple with depression, cognitive disabilities, and addiction for the entire 1200 pages, often very simply to either produce a shock factor or provide a barrier to be overcome. King's one-dimensional portrayal of disability in this text is so extreme that one critic, Susan Paquette, even remarked, "Stephen King marks the downfall of the generation and the death of the literate reader in America" (Paquette, 2012, p. 5).

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Like King's fictional pandemic, the recent coronavirus disease 2019 (COVID-19) pandemic has also been a generator of ableist language and ideology. King's extended novel, which predates the COVID-19 pandemic by 30 years, follows survivors attempting to rebuild society after a super flu pandemic decimates 99.4% of the world's population in a matter of weeks. Government, infrastructure, and social relations are completely destroyed in the wake of the deadly virus. Coincidentally, the book's film adaptation received a rebooted miniseries in 2020, just before the beginning of the COVID-19 pandemic. The parallels between this fictional horror story and the developing COVID crisis were certainly eerie, but they extended beyond the basic concept of the global pandemic. The ableism that King was bashed for in the 90s reappeared in COVID-19 discourse, through the formation of what I term "disability panic." King uses similar language in *The Stand* to describe the public's response as they grapple with the super flu. He describes people fleeing their cities to avoid the super flu as "stricken with fear, panic-stupid … too crazy to understand" (King, 1990, p. 246). King tracks the progression of a global pandemic from a justified fear of bodily harm to all-out panic, rife with misunderstanding and illogical terror of people with disabilities. Disability panic describes the process through which fear of a direct threat to one's body-mind evolves into a totalizing fear and hatred of anything signifying disability. The characters in King's novel are repeatedly put in potentially disabling or life-threatening situations. Over time, they begin to project these negative feelings and associations onto representations of disability and the disabled characters around them. Through his use of common, ableist horror genre tropes and antagonizing language of illness and disability in a deconstructed, post-apocalyptic setting, Stephen King reveals how quickly fear for one's own safety and well-being can transform into a universal aversion to any body-mind state considered disabled.

King admits that his intense focus on ability and the body in *The Stand* was both his way of reacting to a near-fatal car crash he survived shortly before writing the book and as an interpretation of the modern world's flaws. In an analysis of *The Stand*, critic Sharon Russell identifies several places in the novel where King indirectly comments on topics of the late twentieth-century United States, like secrecy and censorship within the government, naïve belief in mankind's ability to master nature, and a lack of human connection creating a culture of selfishness (King, 1990, pp. 65–66). Importantly, King considers how this selfishness and the instability of the modern world affect human response in times of crisis. These scenarios play out in classically horrific and very bodily ways. King focuses his descriptive powers primarily on scenes of illness, death, and violence. He lingers on flu patients, spending pages describing their swelling, fever sweats, expulsions of pus, vomit, and mucus until they take their wheezing last breaths. During the initial phases of government collapse, King nods at contemporary racial tensions by including a brief televised scene of flu-stricken black soldiers executing their white commanders. The novel also features grotesque, whole-page illustrations of mass human decay. Critic Ben Goldstein explains, "King put the entire horror genre on his back. He refreshed all the classic scary story tropes … and found fertile soil in modern anxieties" (Goldstein, 2015, p. 4). To articulate his own personal and political perspective, King uses typical horror imagery to shock and disgust the reader in a gesture toward broader social commentary.

While he does often rely on racist, sexist, or ableist stereotypes, King sometimes uses them intentionally to draw the reader's attention to their function in the real world. In the case of *The Stand*, I argue that King uses ableism on purpose to show how characters can fall into disability panic as a response to an extreme circumstance. King uses the super flu to predict how humans might react in a global health crisis: fear and concern for their own body-mind will evolve into selfish or irrational stigmatization of disability and contempt for people with disabilities.

2 Disability in Horror

King relies on some of the most recognizable representations of disability in order to signal meaning to his readers. As Cheyne (2019) unpacks in her study on disability in genre fiction, "[i]n horror, disabled characters are frequently monstrous perpetrators of evil acts or vulnerable victims" (pp. 27–28). The disabled characters in *The Stand* fall primarily into the latter category of the pitiful or vulnerable horror victim. While the central

villain, Randall Flagg, is able-bodied and even possesses extreme, supernatural strength and power, the two protagonists are visibly disabled, presumed fragile, and both ultimately die. While she is universally understood as the group's leader, Mother Abagail is 108 years old, requires assistance to move, and does not contribute to the labor of the newly forming society. Likewise, Nick requires writing instruments to communicate with others. King, like other horror authors, relies on "[d]epictions of disabled people as victims" that "resonate with and reinforce conceptualizations of disabled people as helpless or vulnerable, already victims of circumstance or change" (Cheyne, 2019, p. 31). Abagail and Nick are pitied by their peers, who choose them as leaders due to disabilities that represent innocence or moral purity. The others instinctually rally around them protectively and look to them as a sort of divine goodness. Mother Abagail confirms this sentiment when she feels herself becoming power-hungry, and immediately condemns herself to death for her wicked impulses. While they survived the pandemic, they are still disabled, victims of circumstance, and the rest of their posse understands them to be natural emblems of goodness in contrast to Randall Flagg's domineering presence of evil and destruction.

King highlights Abagail's and Nick's disabilities even further through their interactions with his newly inaccessible, post-apocalyptic world. The two both gain superpower-like abilities as a result of engaging with their disabling world. Mother Abagail can suddenly control others' dreams, and Nick radiates a natural leadership ability and can also detect bombs (Lopez, 2020). This heightening of one ability at the expense of another is a common trope in horror called "supercripping," creating the "disabled hero" (Wendell, 1996, p. 251). To use Sami Schalk's definition, supercripping describes moments when a disabled person's newfound abilities or powers "operate in direct relationship with their disability" (Schalk, 2016, p. 81). As the shutting down of infrastructure makes Abagail even less mobile, and Nick loses his eye and injures his leg, they become superhuman in other areas as a sort of compensation. King doubles down on these characters as disabled caricatures by highlighting their struggles in a post-apocalyptic world and setting them apart from others as morally good and slightly superhuman. Readers are primed for disability panic, as the novel's representation of disability marks the protagonists as struggling but important, guiding the characters around them and informing the entire plot of the novel.

In this new, inaccessible world, disability panic begins when the characters start to believe disability is a worse outcome than death. This line of thinking is in large part a response to witnessing 99.4% of the world dying. Death has become a mundane, everyday experience, and most of the characters have lost their entire families or support networks. Dead bodies litter the streets and lose their shock value over time. In addition, the reality of the new world is frightening. The idea of dying could appear peaceful compared to the uncertainty and danger of the new world. The narrator at one point says of a member of the "good guys," Stu Redman, "[h]e was not crazy about the idea of dying, but the thought of having no more pain or worry was a great relief" (King, 1990, p. 370). The ableist conflation, or the idea that disability automatically equals pain and suffering, encourages this preference for death over disability (Reynolds, 2017, p. 150). The ableist conflation assumes that one can never grow accustomed to disability and that disabled lives cannot be valuable, enjoyable, or generative. After Nick is attacked and blinded in one eye, he reproduces this harmful perception to the reader: "Blind and deaf, he waited for what might happen next and reflected that if Ray Booth had gotten his other eye, all of life would be like this. If that had happened, he believed he would have shot himself in the head days ago and had done with it" (King, 1990, p. 414). Even though Nick has lived his entire life as deaf and mute, he is not immune to internalized ableism and feels that he would rather kill himself than learn to adjust to blindness. Disability panic in this novel in part stems from the ableist conflation: because the characters are numbed by overexposure to death and constantly in a state of fear for their safety and health, they equate death with peacefulness and conflate disability with pain and suffering to assume that a disabled life would not be worth living.

In the uncertain, post-virus landscape, the survivors' immediate fear of the flu often slips into disability panic, a fear of any and all conditions that signal disability. One woman, Fran, is pregnant and recognizes her condition as disabling in the new world. She purposely conceals her pregnancy from the others for fear that they will chastise or abandon her for being pregnant, which in this context represents a disabling condition that will inhibit her ability to travel and work. She becomes paranoid about any physical impairments, fearing that any perceived weaknesses in the new world could mean abandonment, suffering, or death. When a man

in her group, Mark, contracts appendicitis, Fran thinks, "[s]ickness was the thing they were all most afraid of," yet she is not talking about the super flu anymore (King, 1990, p. 529). They know Mark does not have the super flu, so "sickness" here stands in for any illness or disabling condition. Her fear of sickness is a direct panic response to an inaccessible world. As the narrator explains, "[i]t made her feel ill to think about it. She could not remember when … she had been so badly frightened. There's no doctor in the house. How true it was. How horribly true … somebody had forgotten the safety net" (King, 1990, p. 530). When she reaches a point of despair at Mark's death after the group attempts an appendectomy, she wails, "[h]aving your appendix out is supposed to be nothing!" to which one of her peers replies, "[w]ell, maybe not in the old days, but it's sure something now" (King, 1990, p. 539). By creating a world where contemporary medicine and accommodations to create disability access are scarce or nonexistent, King positions illness and disability as the ultimate threat, far surpassing the peaceful and now mundane reality of death.

One way that this fear of bodily harm can start to slip into disability panic is due to dramatic language used to describe the vague concepts of illness, suffering, and pain associated with disability. As Elizabeth Outka argues, "Illness and pain are often difficult to characterize – by which I mean both difficult to describe and difficult to turn into tangible characters" (Outka, 2019, p. 26). This very lack of easy characterization presents a creative challenge to authors. With no obvious or predetermined set of associations, writers can use a variety of metaphors to articulate the fear, pain, suffering, illness, degradation, and other negative results associated or sometimes conflated with illnesses or disabilities. Since illness and pain tend to evade easy characterization, their prescribed associations tend to invoke new linkages, many of which add a sense of doom to the already negative concept of disability. The intangibility of illness allows for dramatization once they are linked to negative metaphors with their own implications beyond those of illness.

Negative associations are often exacerbated further when the origin of the disability (in this case, a deadly virus) is unclear or mysterious. Susan Sontag argues, "[a]ny disease that is treated as a mystery and acutely enough feared will be felt to be morally, if not literally, contagious" (Sontag, 1978, p. 6). King's super flu is airborne and 99.4% fatal, making contagion invisible but nearly inevitable. Despite this inevitability, however, the characters of the novel blame others when they fall sick, assigning moral blame to those who pass on the virus. Campion, the low-level security guard working on a secret government project, especially receives blame for the pandemic, as he is the first person to escape the lab where the virus broke loose. Hap, Joe Bob, and Vic sit together at a gas station at the beginning of the novel right after the three are exposed to Campion and his infected family. The three each become paranoid when they start catching "colds," and start to distrust both Campion and each other. Hap sneezes, and Joe Bob says, "[y]ou want to watch that," when Vic interrupts: "[m]aybe it ain't a cold." In response, they all silently "turned to him. Vic looked frightened … Hap looked at him, scared, and tried to remember what all his reasons had been … Before that guy Campion had shown up, he had been fine. Just fine" (King, 1990, p. 26). Starkey, the commander in charge of the secret government project, also becomes enraged at Campion, framing him as the reason for the pandemic, even though Campion was a low-level official, and the virus was a product of a top-secret federal experiment he knew nothing about. Starkey thinks to himself, "[b]y the time someone decided the Shop ought to handle it, this happy asshole – this happy *diseased* asshole – had gotten to Texas, and when they finally caught him he wasn't running anymore" (King, 1990, p. 32, emphasis in original). Starkey ignores the negligence of the federal government (a faceless entity) and pins the blame for the super flu's spread on a terrified man who tried to escape. By calling Campion an asshole when he, too, was simply trying to save himself, Starkey creates an idea that Campion's illness is both morally and physically contagious. A terrified man trying to escape the disease with his family is recharacterized as a "happy diseased asshole" in an attempt to assign responsibility. Since the virus has no clear progenitor, Campion becomes the scapegoat. Campion serves the others' need for a concrete outlet through which to vent fear and frustration towards the more abstract concepts of government and illness.

Characterizing flu patients as victims also plays a role in generating disability panic. To situate those with an illness or disability as natural victims strengthens fear, disability becomes synonymous with an innocent, helpless, and totalizing identity. The idea of a victim also necessarily implies an aggressor, creating an unbalanced power dynamic between the disabled and the disabler. As Sontag (1978) argues, "[v]ictims suggest innocence. And innocence, by the inexorable logic that governs all relational terms, suggests guilt" (p. 99).

Caricatures of disabled victims stand in relation to a guilty party, situating the virus as the assailant. In some cases, the reality of the disabling factor can even be overshadowed by the panic it produces. When talking about her own experience with cancer, Sontag (1978) laments that "the very reputation of this illness added to the suffering of those who have it" (p. 100). She even notes, "etymologically, patient means sufferer. It is not suffering as such that is most deeply feared but suffering that degrades" (Sontag, 1978, p. 125). The victim/assailant complex does the double work of exaggerating the victim's suffering and degradation *and* the assailant's power to victimize. The growing gulf of language that victimizes patients while aggrandizing an illness creates panic through its ability to characterize people by their disease and overstate the illness's power.

3 Illness as Horror Antagonist

Throughout *The Stand*, especially before information about the super flu is widely known, King characterizes the virus as a dangerous entity, almost with its own agency and agenda for terrorizing victims. When Larry reaches New York towards the beginning of the novel, chaos has broken loose, but he does not yet know why. He succinctly states all that he knows: "All the stories were the same. Their friends and relatives were dead or dying" (King, 1990, p. 232). Without a cause for the mass deaths around him, he begins to imagine the ominous looming of illness and death as a monster. After he hears an anonymous voice across Central Park shouting, "Monsters coming now!" Larry begins dreaming about a physical monster chasing after him and causing the death and destruction around him. At one point, he is so distraught and anxious that he wakes up in the middle of the night in his hotel room, "convinced that the suite's door, which he had triple-locked, would burst inward and that the monster-shouter would be there … not a human being at all but a gigantic troll-thing with the head of a dog and saucer-sized fly eyes and champing teeth." The next morning, he encounters the "monster-shouter" face-to-face, realizing "he was only a crazy old man" who "[ran] in terror" at the sight of Larry. Larry then admits that his "opinion of [the monster-shouter] had swung from extreme terror to utter boredom and mild annoyance" (King, 1990, p. 232). Larry's fear of the unknown illness manifests as an imagined physical monster with the agency to chase and attack him, the victim. Larry's experience echoes Sontag's understanding of how perceptions of a disease can cause suffering. While Larry does not contract the super flu, he envisions the virus as a malicious attacker, himself as a helpless victim, and suffers terror and degradation that is completely independent of any symptomatic suffering the virus might cause.

In the context of both COVID-19 and King's super flu, language positing illness as a foreign invasion similarly intensified a sense of disability panic. In the late nineteenth century, germ theory replaced miasma theory as the dominant model of contagion. Miasma theory assumed that air itself could turn noxious and spread diseases. Germ theory, however, discovered the existence of microorganisms that contained the disease and could spread to human bodies in several ways, especially through the air or contact with bodily fluids. Germ theory pinpointed illnesses within an external antagonist invading the home or body. While this understanding helped to externalize the concept of illness, it still did not render illness any more visible or tangible. Outka (2019) argues, "absent a tangible enemy, illness can also inspire a search for a scapegoat" (p. 27). She further explains that pandemic literature, especially about the Spanish Influenza, has historically caused readers to "envision a materialized enemy." The Spanish Flu did not actually originate in Spain, however. As Ida Milne explains in her book on the flu and war in the early 1900s, the Spanish Influenza originated during the First World War, but its source was not initially known. Governments on both sides of the global conflict censored news outlets from reporting on influenza rates and deaths for fear that this would alert enemies to potential weaknesses. Spain, which was not involved in the war, freely reported its growing numbers. The blame for the "mystery disease" was simply attached to the only country that was talking about it (Milne, 2018, p. 1). During the height of the Spanish Flu epidemic, countries quickly adopted the idea that the flu was Spain's fault, expanding the blame to foreign ethnic groups and immigrants more generally: "Crowded immigrant populations, Jews, and Germans were, in some places, blamed for the outbreak. The flu's very nickname, the 'Spanish Flu,' potentially carried, in Britain and the United States, a sense of foreign taint" (Outka, 2019, p. 27).

The most recent example of this is, of course, the Trump-initiated American nicknaming of COVID-19 as the "China Virus." Unlike the reporting issues that gave the Spanish Flu its misnomer, the World Health Organization did formally locate the origin of COVID-19 in Wuhan, China (CDC, 2023). However, characterizing the virus as the weapon of a foreign country reinforces "us vs. them" mindsets and transforms anxiety and hatred of a virus into anxiety and hatred of an entire country, nationality, or ethnicity. In an analysis of 12 different national polls, a group of researchers for *Health Affairs* tracked a stark increase in violent and hateful behavior towards the Asian American community after the emergence of COVID-19 was traced to a Chinese origin. The FBI alone "documented a 77 percent increase from 2019 to 2020 in hate crimes against Asian people living in the US" (Findling et al., 2022, para. 2). Foreign invasion metaphors help to make illness and disability a more concrete character. Instead of being angry towards an invisible, intangible concept, one can project anger onto a group of individuals.

In some cases, the idea of a foreign invader can be escalated until the illness is described with blatantly militaristic language. The mysteriousness of illness that Sontag identifies creates confusion. This confusion was especially pertinent when journalists were trying to write about the influenza outbreak of 1918 as the First World War was happening. Outka (2019) argues that this confusion "can lead to frantic attempts to identify other characters – enemies, scapegoats, and heroes – to combat the confusion … It was hard, first, to characterize a familiar disease like influenza as the enemy it turned out to be. The war provided far more compelling enemies" (p. 27). When the virus first escapes, Starkey personifies the virus as a spying enemy. He still refers to it as "Blue," its military code name. He also expresses anger towards the virus, not just for its deadliness, but for its initial presentation as a mild respiratory illness. He thinks, "Blue spread in such sneaky common-cold disguise" (King, 1990, p. 130). Describing the virus as purposely sneaky and capable of donning a disguise presents it as a covert agent of war rather than a microscopic pathogen. Later, when lonely New York City survivors Rita and Larry first meet, she speaks proudly of her late husband, likening his stroke to a heroic military death. "He died with his tie on. Do you think that could be our generation's equivalent of that old saying about dying with your boots on? Harry Blakemoor died with his tie on. I like it" (King, 1990, p. 239). Rita attempts to create a more solid narrative to understand her husband's death, rather than the "random unfairness" of a stroke or the super flu (Charon, 2008, quoted by Outka, 2019, p. 27). Throughout the novel, the characters continually personify the virus as an agent with its own will, a mighty foe that is more tangible and, therefore, less embarrassing to die from than an invisible, random illness. By assigning agency and intent to the virus, the characters in the novel try to make sense of the seemingly random loss and chaos around them.

4 Disability and Rebuilding

Disability panic is also exacerbated in the novel when the characters begin to consider disability as antithetical to successfully rebuilding society. In the horror genre, many authors rely on "a cultural association between disability and fear: the notion of the disabled person as a frightening or sinister figure, or of disability itself as fearful" (Cheyne, 2019, p. 33). I use the example of Nick's fear of Tom Cullen, a man he finds on the highway who has a cognitive disability. In this case, Nick is not afraid of Tom, but of Tom's disability as a hindrance to Nick's plans. When Nick first meets Tom Cullen on the side of a highway during his cross-country trek, they struggle to understand each other due to Nick's muteness and Tom's illiteracy. This battle for mutual understanding turns into fear and resentment on Nick's part. Nick is afraid that Tom's disability will slow them down or put them in danger on their journey across the country and becomes angry at himself and Tom as a result. Nick thinks, "a deaf-mute and a man who was mentally retarded? Of what possible use could they be to each other? Here you got one guy who can't talk and another guy who can't think" (King, 1990, p. 407). While both men have survived the flu pandemic, King creates a scenario in which their disabilities and the anxieties that surround them heighten the danger. As Siebers (2008) explains in his theory of disability, "the ideology of ability makes us fear disability" (p. 9). Nick perceives Tom as dangerous and unproductive; even though he has found a strong, hardworking companion, the presence of another disabled character increases the situation's

precariousness. This fear response to intellectual disability was present during the COVID-19 pandemic. Due to comorbidities, structural vulnerabilities, and physician biases that understood people with intellectual disabilities (IDs) as having a lower quality of life or even being less deserving of life, those with IDs were at a higher risk of dying from COVID-19 than others (Chicoine et al., 2022, pp. 390–393). Just as those with IDs were sometimes overlooked by physicians during the pandemic to detrimental effect, Tom's disability is unrelated to the pandemic or his physical ability to work or travel with Nick, but the presence of a disability signals a fear response.

Disability panic that comes from understanding disability as both worse than death and hindering the goals of the emerging world reflects a startlingly eugenic line of thinking that is common in the horror genre. The post-Darwinian theory of degeneration cautions against modern advancements in medicine and accommodations that improve accessibility. The theory of degeneration states, "the effects of civilization, industrialization, and modernization might in fact be weakening so-called superior races and classes" (Smith, 2011, p. 7). In this framework, accessibility is discouraged as it allows for the survival and reproduction of those with disability or other "inferiorities." After the super flu, the world of *The Stand* is stripped of all the accessibilities and medicines of the modern world, leaving a primitive environment in which a Darwinian survival of the fittest scenario plays out. Chapter 38, for instance, is entirely dedicated to what King names the "second epidemic" (King, 1990, p. 350). This chapter is written as series of disconnected vignettes that all illustrate the tragic death of a person who is immune to the super flu but dies anyway through suicide or succumbing to an injury, all under the logic that these individuals were unfit for the bleak realities of the new world. The narrator even states, "in a strictly Darwinian sense, it was the final cut – the unkindest cut of all, some might have said" (King, 1990, p. 350). The first wave of the epidemic outright killed anyone who was genetically inferior and could not fight the super flu. The second wave of the epidemic killed other types of inferiors: those with any number of mental or physical disabilities that rendered a person unfit for the rough-and-tumble new world.

The eugenic process in *The Stand* reaches its climax as Tom Cullen, Mother Abagail, and Nick Andros all die during their fight to restore goodness to the world. Tom is slaughtered after he is sent to spy on the "bad guy" society forming in Las Vegas. Mother Abagail wanders off for spiritual healing after she feels that her work is done. Nick dies in a direct confrontation with the novel's antagonist, Randall Flagg, who hopes to remake society into an authoritarian nightmare. Nick's death is symbolic martyrdom, allowing the rest of the "good guys" to succeed and reestablish order at the cost of his personal sacrifice. Mother Abagail and Nick are both vulnerable, disabled, innocent protagonists who invoke sympathy from the reader, yet their status as disabled ultimately marks them as unfit for the new world. As Russell (1996) explains, "Nick Andros is the closest to Mother Abagail on a goodness scale … If Mother Abagail dies after her job is finished, Nick dies as a martyr who inspires the others" (p. 70). The disabled, unfit characters must die so that their stronger, able-bodied counterparts may thrive.

5 Conclusion: King and COVID-19

Eerily, King's theoretical pandemic-induced ableism accurately predicted much of the discourse around ability sparked during the COVID-19 pandemic. *Forbes* writer Purlang (2022) argues that, beyond issues of institutionalization, care standards, poorly implemented COVID protocol, and unequal vaccine access, the very discourse of COVID became eugenic: "whatever current form of COVID is under discussion can be regarded as at least a little less worrying *because it mainly sickens and kills elderly, chronically ill, and disabled people*" (para. 8, emphasis in original). COVID restrictions were lifted based on the needs and risk factors for an ideal, able-bodied citizen that had access to vaccines and adequate healthcare. COVID panic dissipated only when it was no longer a threat to the able-bodied. Those with disabilities that made them more vulnerable to serious illness or death were sacrificed so the able majority could resume a sense of normalcy.

While the COVID-19 pandemic did not wipe out 99.4% of the world's population or completely reset the world order, the "survival of the fittest" language of *The Stand* may sound familiar. I turn to Melinda Hall, who

attempts to recuperate King's work as moving beyond a reduction of disability and identity (Mitchell & Snyder, 2000, p. 35). She argues that King does not perpetuate ableism himself, but uses his novels to point out the ableism already woven into our society and ways of thinking. For King, "the horror genre becomes a vehicle for encountering the normal as horrible in the very act of its exclusions" (Hall, 2016, para. 36). While I do not think Stephen King always approaches disability with understanding and respect in his writing, *The Stand* does mimic the ableism that already exists in American culture: think back to news reports of overflowing hospitals, and debates about who deserved the limited supply of ventilators – those at the highest risk of death, or those with the highest chance of survival? Medical providers were forced to make decisions about whose lives were most worth saving. Many factors that influenced these decisions like old age, ability, and assumed future quality of life were foreshadowed by character decisions and viewpoints expressed in *The Stand* decades ago. Some of the arguments in favor of loosening COVID restrictions revolved around a need to achieve herd immunity. The thought process went something like, *If the elderly or immunocompromised are going to die of COVID anyway, we're delaying the inevitable. I already had COVID – I shouldn't have to stay inside and stop living my life because of other people*. Able-bodied people were quickly pitted against those whose disabilities prevented the reconstruction of the world we missed. Disability came to signal stagnation or weakness in a country that was traumatized by COVID and, quite frankly, desperate to move on.

The dramatized ableism of *The Stand* is perhaps not quite as far from reality as we might believe or hope. As we reach a time when most COVID restrictions are lifted, vaccines are widely distributed, and infection and mortality rates are declining, it is easy to consider things "back to normal." However, I urge you to remember the disability panic that very recently gripped the world and so quickly turned people with different levels of health and ability against each other. Fear of a real, dangerous reality can quickly spiral into eugenic thinking, xenophobia, and resistance towards building a more accessible world. While *The Stand* is not an outright rallying cry for disability justice, King used a fictional scenario to identify what COVID later revealed to us in real life: the "horrible" hidden within the normal, just waiting for the next crisis.

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Research Article

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Airborne Toxicity in Don DeLillo's *White Noise*

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Abstract: In the wake of the COVID-19 pandemic, people across the world came to realize the significant relationship between air and human health. This pandemic, which changed the course of many lives, demonstrated how air serves as a transmitter of viruses. However, this quality of air is not new, with air acting as a significant tool in transmitting diseases, pollution, and even death. It is crucial to understand that airborne diseases include but are not limited to epidemics or pandemics such as the black death, influenza, or COVID-19. Since the Chernobyl disaster, it is perceived that the previously feared disasters were replaced by new and human-made hazards such as toxicity and radioactivity. Environmental disasters such as the Bhopal disaster, Donora Smog, and the Chernobyl disaster emphasize the impact of toxic chemicals on humans and more-than-human lives. These disasters show that toxic substances that threaten the lives of all living things imperceptibly seep into the soil, water, and air, causing harm to ecosystems, and entering into human and more-than-human bodies. Exposure to toxicity and radioactivity can happen in the blink of an eye, transmitted through the air we breathe. Don DeLillo's novel *White Noise* presents a significant example of toxicity through its striking portrayal of an airborne toxic event. This event, the appearance of a cloud of the fictional chemical Nyodene D., presents an environmental crisis through which relationships between air and environments can be explored. Similar to the issues and reflections experienced after the emergence of the COVID-19 pandemic, the characters in *White Noise* experience chaos, uncertainty, and fear following the abrupt occurrence of an airborne toxic event.

Keywords: ecocriticism, toxic discourse, airborne toxic event, risk society, trans-corporeality

1 Introduction

One of Don DeLillo's most famous works, the 1985 novel *White Noise*, focuses on the story of a family who get caught up in an airborne toxic event. Depicting the life of a couple that is afraid of and obsessed with death, the novel captures the feelings of chaos, uncertainty, and fear experienced upon the sudden appearance of a "black billowing cloud" which is formed by a fictional chemical called Nyodene Derivative (DeLillo, 1998, pp. 113, 111). The novel consists of three separate chapters. While the first and the third chapters focus on some of the family issues of Jack Gladney, who is a professor of the fictional discipline "Hitler Studies," the second chapter focuses on the appearance of the billowing cloud of Nyodene D.

The appearance of this toxic cloud is a central plot point within the novel, as it creates great unease among the characters of *White Noise*. The cloud becomes a manifestation of human mortality, thereby revealing the fragility of human existence. The occurrence of a single event triggers widespread panic, prompting individuals to start fleeing frantically. This occurrence effectively shatters the illusion that technologically advanced and prosperous societies are impervious to such calamities. The profound fear of death and the accompanying loss of command over one's own life serve as poignant illustrations of human apprehension and unease in relinquishing control over their existence.

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After hearing the orders to evacuate all places of residence, residents start fleeing from the town of Blacksmith. Jack Gladney joins the people fleeing their homes with his wife Babette and their four children from previous marriages: Heinrich, Denise, Steffie, and Wilder. On the road, they start running out of gas, thus Jack drives into a gas station and gets out of the car for only a few minutes during which he enters into contact with Nyodene D. Following Jack Gladney's accidental exposure to this toxic chemical, the readers are given an insight into Gladney's psychological situation. The novel emphasizes the detrimental impact of the fear of death on both individuals and societies, as symbolized by the black cloud. At the end of the novel, the characters confront their fear of death after facing the decision to either surrender to their anxieties or embrace their own mortality. Thus, the novel suggests that accepting the inevitability of mortality can result in a deeper comprehension of one's own existence. However, the abrupt and unknown nature of the exposure creates a reaction which is one of chaos, uncertainty, and fear at first. Just like the sudden emergence of COVID-19, the abrupt appearance of a "black billowing cloud" in *White Noise* creates great fear among the characters. The uncertainty which is experienced due to the unknown nature of these two incidents led to a period of chaos.

In the wake of the COVID-19 pandemic, people across the world came to realize the significant relationship between air and human health. This pandemic, which changed the course of many lives, demonstrated how air serves as a transmitter of viruses. However, this quality of air is not new, with air acting as a significant tool in transmitting diseases, pollution, and even death. It is crucial to understand that airborne diseases include but are not limited to epidemics or pandemics such as the black death, influenza, or COVID-19.

Since the Chernobyl disaster, it is perceived that "the divine and demonic shadow kingdom 'of antiquity' has been superseded by the modern shadow kingdom of toxic and radiological hazards" (Nixon, 2011, pp. 62–63). Environmental disasters such as the Bhopal disaster, Donora Smog, and the Chernobyl disaster emphasize the impact of toxic chemicals on human and more-than-human lives. These disasters show that toxic substances that threaten the lives of all living things imperceptibly seep into the soil, water, and air, causing harm and toxifying ecosystems, and entering into human and more-than-human bodies. Exposure to toxicity and radioactivity can happen in the blink of an eye, transmitted through the air we breathe.

Don DeLillo's novel *White Noise* presents a significant example of ecocriticism because of its striking portrayal of an airborne toxic event, highlighting that environmental risks can occur instantaneously and that our bodies can easily be affected by environmental risks and hazards. The novel was published in 1985, only a few months after the Bhopal disaster, which resulted in the death of thousands of people who became exposed to the highly toxic methyl isocyanate gas in Bhopal, India. Just like this toxic gas leak in Bhopal, the appearance of a "black billowing cloud" of the fictional chemical Nyodene D. in *White Noise*, presents an environmental crisis through which air's entanglements can be explored. Similar to the issues and reflections experienced after the emergence of the COVID-19 pandemic, the characters in *White Noise* experience chaos, uncertainty, and fear following the abrupt occurrence of an airborne toxic event.

2 Air and Environments

While focusing on toxicity in *White Noise*, it is crucial to understand the relationship between air and environments. Exploring the meaning of the word "air," we find a description from the Cambridge Dictionary, which suggests "[a]ir is the mixture of gases that surrounds the earth and that we breathe" (Cambridge University Press & Assessment, n.d.). All living beings need air for respiration. The process of respiration enables animals and plants to live. Thus, air is one of the most essential things that exists both for the human and for the more-than-human world. In contrast, something that is so vital to our survival can also become extremely dangerous to our well-being. The COVID-19 era has made this very obvious to us, and yet there are other incidents dating back to many years before the COVID-19 pandemic.

The Chernobyl disaster is a great example of the transmitting power of air. We have been well aware that radioactivity did not just affect Chernobyl; the winds carried radioactive particles over long distances, and as a result, a vast area of land became contaminated to various degrees. And how did this radioactivity expand to

such distant places? Well, air was mainly responsible for this expansion. This incident changed our perception of air and radioactivity. Other incidents that occurred before the Chernobyl disaster also enhance this perspective. The Bhopal Disaster and the Donora Smog have been significant disasters that emphasized the power of air in transmitting death and disease.

Today COVID-19 serves as another example that highlights the role of air in everyday lives. When an unknown virus diminishes the world's population, the whole of humanity passes through times of chaos, uncertainty, and fear. Recent research on the psychiatric manifestations of COVID-19 claims:

> COVID-19 can directly or indirectly influence the central nervous system, potentially causing neurological pathologies such as Alzheimer disease and Parkinson disease. Thus, chronic COVID-19-related disease processes have the potential to cause serious mental illnesses, including depression, anxiety, and sleep disorders. (Ptacek et al., 2020, para. 1)

The feelings that are experienced by the occurrence of COVID-19 are also vivid in Don DeLillo's novel *White Noise*. When one of the protagonists, Jack Gladney, a professor of Hitler studies, who has a strange obsession with death and its causes, is exposed to this fictional chemical called Nyodene Derivative, he immediately finds himself in a state of despair about his health and well-being. With this background, Ulrich Beck's term "risk society" can be applied to explain some of those underlying feelings of fear and uncertainty that lead people to act irrationally. In his work *Risikogesellschaft*, translated into English as *Risk Society: Towards a New Modernity*, Beck argues that risks are created by the same society that tries to eliminate them, and this situation is the main paradox behind Beck's concept. He highlights that there is no clear distinction between nature and culture, thus nobody is free from risk. However, in *White Noise*, Jack Gladney mentions a different type of societal dilemma, where certain communities are more vulnerable to risk than others:

> These things happen to poor people who live in exposed areas. Society is set up in such a way that it's the poor and the uneducated who suffer the main impact of natural and man-made disasters. People in low-lying areas get the floods, people in shanties get the hurricanes and tornados. I'm a college professor. Did you ever see a college professor rowing a boat down his own street in one of those TV floods? We live in a neat and pleasant town near a college with a quaint name. These things don't happen in places like Blacksmith. (DeLillo, 1998, p. 119)

The enduring consequences of environmental disasters on both ecosystems and human bodies can materialize in unforeseeable manners, rendering it quite hard to detect as the damage can occur "gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all" (Nixon, 2011, p. 2). Furthermore, just like Gladney pointed out, the weight of environmental deterioration is experienced disparately among various populations, with certain groups enduring the burdens of environmental injustices disproportionately. Unlike Gladney's perception, Beck suggests that the whole society is under the threat of human-made disasters, which can be encountered anywhere and anytime during the course of our daily lives, thus highlighting that nobody is free from risk. Taking a look at the world we live in, we realize that even natural disasters that seem to be beyond the causal capacity of human beings may well be the result of human actions, human negligence, or even technological failures. Reflecting on this paradox suggested by Beck's risk society makes us understand the chaos and fear that cause people to act irrationally. Pointing out the proximity of risk, Buell (2001) focuses on Beck's theory as

> [t]hreats from civilization are bringing about a kind of new "shadow kingdom," comparable to the realm of the gods and demons in antiquity, which is hidden behind the visible world and threatens human life on this Earth. People ... find themselves exposed to "radiation," ingest "toxic levels," and are pursued into their very dreams by the anxiety of a "nuclear holocaust"... Dangerous, hostile substances lie concealed behind the harmless facades. (p. 30)

Taking the theory of risk society into account, the quote shows that the perception of risk has shifted in time, and now hazardous substances have become risks that threaten all life forms on Earth. The fact that exposure to these substances can occur anywhere at any time is what makes them so terrifying. The proximity and the precariousness of risk, and the fear that it engenders, are vividly portrayed in Don DeLillo's *White Noise*.

In the second part of the novel, after receiving the instructions to evacuate all domiciles, Jack Gladney and his family flee their house. Upon hearing on the radio that people on the west end of town should head for the

abandoned Boy Scout camp, they also start heading in that direction. On the way, they realize that they are running out of gas, so they stop at the nearest gas station. When they reach the pump, Jack leaves the car only for a few minutes, and this is when he becomes exposed to the black billowing cloud of Nyodene D. Buell's description above, which mentions that our world must be investigated through a second reality, corresponds with another scene following Jack Gladney's exposure to the toxic cloud. Right after reaching the evacuation camp, a health technician types his data into a computer that predicts how many years he will live after his exposure:

> "Am I going to die?"...
>
> "We'll know more in fifteen years. In the meantime we definitely have a situation."
>
> "What will we know in fifteen years?"
>
> "If you're still alive at the time, we'll know that much more than we do now. Nyodene D. has a life span of thirty years. You'll have made it halfway through."...
>
> "I wouldn't worry about what I can't see or feel," he said. "I'd go ahead and live my life. Get married, settle down, have kids. There's no reason you can't do these things, knowing what we know."
>
> "But you said we have a situation."
>
> "I didn't say it. The computer did. The whole system says it. It's what we call a massive data-base tally. Gladney, J. A. K. I punch in the name, the substance, the exposure time and then I tap into your computer history. Your genetics, your personals, your medicals, your psychologicals, your police-and-hospitals. It comes back pulsing stars. This doesn't mean anything is going to happen to you as such, at least not today or tomorrow. It just means you are the sum total of your data. No man escapes that." (DeLillo, 1998, pp. 140–141)

The above scene from *White Noise* is similar to many people's experiences during COVID-19. Both during COVID-19 and in *White Noise*, people are surrounded by dangerous things. During COVID-19, those people who were closest to us could actually infect us with the deadly virus, which illustrates that understanding such dangers requires considering other realities. People needed medical tests to make sure if they were infected with coronavirus or not. Governments reported daily to the public how many people had died or were suffering from COVID-19. Through these realities, individuals struggled to understand the dangers of everyday life. Considering the whole situation, one may wonder if it is really necessary to focus on these realities to continue living. Are we "the sum total" of our data? Perhaps we should consider Dr. Bernard Rieux's approach in Camus's (1991) famous novel *The Plague*, when he says "I have no idea what's awaiting me, or what will happen when this all ends. For the moment I know this: there are sick people and they need curing" (p. 113). Similar to the idea suggested by Dr. Bernard Rieux in the previous quotation, we should sometimes focus on what we have now and find a way to continue our lives, because focusing on the uncertain only creates more fear and anxiety.

All in all, the agentic power of elements such as chemicals and radioactivity that can be transmitted through the air becomes evident through tragedies such as Chernobyl, the Donora smog, and the Bhopal disaster. While toxic exposure to chemicals or radioactivity was the visible aftermath of these disasters, it would be wrong to overlook the human error and the technological mishaps that took place and consider these disasters as mere consequences of modernity. Looking at these elements, Beck's theory of a risk society becomes even more apparent, because chemicals and radioactivity are products of modern society, used by humans to rule over nature. Furthermore, the notion of unlimited economic expansion, as well as waste and pollution, which are also seen as the byproducts of human progress, make ecological degradation a global issue. The hazardous chemicals that modern society uses in its exploitation of the natural resources of the universe become a threat to the same society because, after all, we are biological bodies as well. Considering these facts, we realize that the agentic force of chemicals and radioactivity is highly significant because, most of the time, the elements that are mentioned are not even visible to the human eye. However, their power cannot be ignored as they cause severe casualties and even cause people to relocate with the aim of escaping

the effects of these disasters. In order to understand this idea better, the agentic force of toxic elements will be discussed in the next part of this article.

3 The Agentic Force of Toxicity

Toxicity permeates different perspectives of modern life. Cambridge Dictionary defines the word toxic as (1) "poisonous" and (2) "very unpleasant or unacceptable" (Cambridge University Press & Assessment, n.d.). Today the word "toxic" is used to describe many things ranging from hazardous chemical substances to harmful relationships and people. However, in this article, the term toxic will be analyzed as an aspect of disaster studies, which places a toxic incident within the borders of an environmental disaster. In his article "Disaster Studies," Lindell (2013) describes a disaster as follows:

> An event concentrated in time and space, in which a society or one of its subdivisions undergoes physical harm and social disruption, such that all or some essential functions of the society or subdivision are impaired. Physical harm and social disruption occur because an event exceeds normal protections. (p. 797)

This definition matches well with the scene that is depicted in *White Noise* after the sudden appearance of a "black billowing cloud of Nyodene D." (DeLillo, 1998, p. 113), which impairs some functions of society and causes "physical harm and social disruption" (Lindell, 2013, p. 797).

Toxicity is a recurring theme in DeLillo's *White Noise*. The chemical cloud that travels from one space to another through the movement of air categorizes itself as a "corporate poison" (Heise, 2008, p. 162), which is a technological development and byproduct of modern society. Another significant element of Lindell's (2013) definition of disaster focuses on three conditions, which are "hazard exposure, physical vulnerability, and social vulnerability" (p. 799). Exposure and vulnerability are intermingled terms. Our physical and social vulnerability can enhance the risk of our exposure; thus, we live in a constant state of fear and shock due to the unpredictability and vulnerability of our existence.

In *White Noise*, while the appearance of a "black billowing cloud" represents uncertainty, how people react signifies the phase of chaos and fear that is experienced by the people upon the appearance of this cloud. Another factor that enhanced fear in *White Noise* and during COVID-19 was the abruptness of both events. The black billowing cloud appeared suddenly and, through the power of wind, it managed to spread its toxicity to a wider area. In the case of the coronavirus, no external forces were needed to spread the virus. As people traveled, the virus traveled along, spreading the illness to almost all the countries in the world within a very short period of time. El's (2019) analysis is significant in understanding this relationship:

> One of the results of the airborne toxic event is the evacuation which forces people to leave their homes ... one single event affects people's lives dramatically and devastates their lives. People have to change their locations, sometimes live in barracks under quarantine ... The fact that the toxic cloud moves regardless of human will befits the material agency principal, which considers toxicity as a mobile and agentic force. (p. 36)

All materialities have their own agency. Even though materials can be human-made, this does not mean that they are subject to the control of human beings. Even materials that seem futile and insignificant to human beings, such as garbage, have an agentic force as the gases that accumulate at garbage dump sites can cause chemical reactions. Thus, nothing can be considered futile, insignificant, or absolutely subject to human control. Contemplating this agentic force, we perceive that the toxic cloud of the fictional chemical Nyodene D. in *White Noise* and the airborne virus in COVID-19 also do not submit to human control. In *White Noise*, people evacuate their houses to prevent coming in contact with the toxic cloud that travels with the wind. In contrast, during the coronavirus pandemic, people had to stay in their homes under quarantine to prevent the spread of the virus. Thus, we comprehend that the ties we have with our homes can easily become affected by the agency of airborne viruses or toxic events.

How people are deprived of their homes can be better understood with the idea Ursula Heise, a German literary scholar, suggests through risk perception. In her book *Sense of Place and Sense of Planet: The Environmental Imagination of the Global*, Heise describes the relationship between risk and an individual's bond to his or her community. According to Heise (2008), risk perceptions are resources for "the cultural study of contemporary societies' relation to the natural environment" (p. 122). In order to understand how our actions are determined by our relation to the natural environment, we can focus on Heise's approach towards risk perception. Through risk perception, Heise (2008) seeks to explain how people are deprived of their homes:

> Most obviously, risk perceptions can either intensify or break individuals' and communities' bonds to a local place. In the first case, the desire to protect an area from danger may deepen residents' affective attachments to it ... Conversely, the perception of danger can break inhabitants' bonds with a place and prompt them to move away, or stigmatize a site to such a degree that its material as well as aesthetic and cultural value decreases. (p. 152)

In her book, Heise (2008) argues that "the novel abounds ... to the multiple technologically generated risks that the average American family encounters in daily life" (p. 164). Thus, we can see that Heise's focus on DeLillo's novel points to a perception of risk based on Ulrich Beck's idea of the proximity and precariousness of risk. In the case of the coronavirus pandemic, it can be said that the whole world was shocked when it realized the magnitude of this catastrophe. Moreover, the underlying causes of the fear and chaos experienced during the COVID-19 pandemic were the confrontation with the agentic power of the coronavirus and the realization of its proximity and power. The agentic power of toxic chemicals or airborne viruses is highly significant, as mentioned in the previous two quotes. They can either increase or decrease the attachment that people have to a particular place. This is what makes this force so powerful. It is helpful to focus on Alaimo's (2010) theory of trans-corporeality to understand the agentic power of a material. According to Alaimo:

> Trans-corporeality reveals the interchanges and interconnections between various bodily natures. But by underscoring that *trans* indicates movement across different sites, trans-corporeality also opens up a mobile space that acknowledges the often unpredictable and unwanted actions of human bodies, nonhuman creatures, ecological systems, chemical agents, and other actors. Emphasizing the material interconnections of human corporeality with the more-than-human world – and, at the same time, acknowledging that material agency necessitates more capacious epistemologies – allows us to forge ethical and political positions that can contend with numerous late twentieth- and early twenty-first-century realities in which "human" and "environment" can by no means be considered as separate. (p. 2)

When comparing the COVID-19 pandemic to DeLillo's *White Noise*, many similarities can be identified. With regards to El's (2019) quotation about evacuation and quarantine, we can suggest that the evacuation that takes place in *White Noise* can also be encountered during the COVID-19 era. While some governments managed to evacuate their citizens from countries that were already infected with the coronavirus, some were not as successful, which aligns with the chaotic evacuation journey of Jack Gladney and his family.

In contrast, during the period of COVID quarantine, people were faced with another problem, which was being "locked down" in their houses. Quarantine is the opposite of evacuation. While the first one locks you up in your house, the second one locks you out of it; however, in reality, their practice can be different. While an emergency evacuation serves as a top-down imperative, quarantine relies on individuals to take responsibility for themselves. Yet, during the COVID-19 pandemic, such differences were blurred. As mentioned in "Governmentality Versus Community: The Impact of the COVID Lockdowns":

> The COVID lockdowns were characterised by new forms of governmentality as lives were disrupted and controlled through the vertical transmission of biopolitics. ... The Coronavirus lockdowns forced people to adapt their community life as travel was restricted and public and leisure services were withdrawn. In Foucault's (2003) framework, this meant new forms of territorial governmentality and the reshaping of the relationship between individuals and the state as the biopolitics of emergency were imposed. (Wallace et al., 2023, para. 1–3)

While some countries imposed a full closure policy during COVID-19, some did not impose such strict measures. The biopolitics blurred the lines of freedom that is cherished among democratic countries around the world. Thus, the similarity between the evacuation scene in *White Noise* and the quarantine during COVID-19

can be seen, as they both lacked individual free will. Just like the evacuation in *White Noise*, the quarantine during the COVID-19 pandemic was imposed upon individuals from above, making the whole process harder to internalize. Why such strict measures were taken is explained as follows:

> COVID-19 was treated like the plague or even leprosy, even this *[sic]* meant keeping in the same territory people who were sick (unhealthy) and those who were not sick (healthy) but were suspected nevertheless of having been in contact with the "virus carrier" and have *[sic]* not yet developed symptoms. Modern medicine from at least the cholera epidemics has been against this view of "contamination". But fear, uncertainty, and division about the nature of the virus created this regression to the habitus of 19th century medicine, giving at least a sort of certainty that imprisoning people in a certain space and limiting social interactions was the less bad solution. (Bigo et al., 2021, p. 6)

Measures like isolation and quarantine showed that COVID-19 was treated like one of the diseases of the nineteenth century. Even though medicine is much more advanced than it was in the nineteenth century, the fear and uncertainty of the virus created a unique form of governmentality for the COVID-19 pandemic.

In 2020, a study that focused on the psychological impact of quarantine showed that "separation from loved ones, the loss of freedom, uncertainty over disease status, and boredom can, on occasion, create dramatic effects" (Brooks et al., 2020, p. 912). In *White Noise*, what created the feelings of chaos and fear was not the quarantine, but these feelings emerged due to the occurrence of the airborne toxic event itself. In contrast, Jack Gladney's exposure to Nyodene D. and the uncertainty regarding how Nyodene D. would affect his body in the future made Jack more and more obsessed with death. As a college professor, he did not believe that these things could happen to people like him, yet he eventually found himself dealing with an increasing fear of death following his exposure to the highly toxic chemical Nyodene D.

During the COVID-19 pandemic, the airborne virus created quite similar feelings. However, according to Brooks and his colleagues' (2020) study on the psychological impact of quarantine, the quarantine has exacerbated the symptoms caused by the pandemic. After conducting research on three electronic databases, the review focused on 24 papers that concentrated on different quarantine examples such as the ones imposed after SARS and Ebola outbreaks. This review highlights the following:

> Most reviewed studies reported negative psychological effects including post-traumatic stress symptoms, confusion, and anger. Stressors included longer quarantine duration, infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss, and stigma. (p. 912)

It is likely that stressors such as confusion and fear emerged due to the abruptness and the unknown nature of the coronavirus; however, as suggested by Brooks et al. (2020), these stressors intensified with the amount of time passed under quarantine during the COVID-19 pandemic.

Furthermore, when comparing the COVID-19 pandemic to the times portrayed following the emergence of the black billowing cloud, parallels to what El (2019) argues in his article "Non-Human Agencies in Don DeLillo's *White Noise*" as the zeitgeist of COVID-19 can be observed. He notes a tendency toward self-soothing behavior as well as a reflection of damaging effects, which include fear and manifestations of mental ill-health depicted by DeLillo in *White Noise*. In order to understand what will happen to him after being exposed to the black billowing cloud, Jack Gladney contacts some officials to get some information about his situation and learns how many years he would live, and this situation corresponds to how people tried to understand the scale of COVID-19 through the news. While the statistical data that appeared on the news were important for all of us, it also reflected the fear that was experienced during the COVID-19 pandemic. In his article, El (2019) points out:

> The quarantine makes the characters in the novel lead a more isolated life dependent on television and other media devices. Therefore, the airborne toxic event not only affects people in physical ways but also affects them psychologically … As the evacuees have been informed about the toxic event primarily via television, they feel the necessity to be informed about the cure of the event via television, too. This example puts forth its helplessness in the posttraumatic world. (p. 43)

As highlighted by El, being informed about the toxic event, primarily via television, and feeling the necessity to be informed about the resolution of the event via television can be applied to COVID-19 as well. In *White Noise*,

and also during the COVID-19 pandemic, people sought solace by searching for information online or through radio and television. Results of an online assessment in India on the role of mass media during the coronavirus pandemic show that "the use of internet/social media was highest during and before lockdown, followed by TV news. The use of TV and internet/social media increased during the lockdown while the use of newspapers, radio, and magazines declined significantly" (Dhanashree et al., 2021, para. 4).

Due to the quarantine, television and the internet were the most common places where people could find information. Furthermore, these technological tools became the only means of entertainment, which provided a way for us to temporarily escape from the reality of the coronavirus and the quarantine. Thus, considering COVID-19 and Don DeLillo's famous novel *White Noise*, we discover that both events mark the agentic force of airborne events. These airborne toxic events are so powerful that they change the course of people's lives. While some people face evacuation, others face quarantine, and due to the intensity of these events, people acquire new and different habits, such as the need to be constantly informed via television and the internet. Moreover, these incidents also have a great influence on behavior patterns as people use social media and television "as a method of coping and escapism" (Fernandes et al., 2020, p. 60).

In a recent study by Fernandes et al. (2020) that focuses on the impact of COVID-19 on internet use among adolescents, the term escapism is explained as follows: "Escapism refers to a form of avoidant coping aimed at dealing with stress by escaping unsatisfying life circumstances" (p. 60). Although the study indicates that high use of social media and the internet was reported among teenagers even before the quarantines were imposed by governments, it can also be noted that lockdowns played a significant role in the increase of such behaviors. Thus, through these research papers, we comprehend that social ties can easily become affected by the agency of things such as airborne viruses or toxic chemicals.

Considering material agency, one realizes that even things that are unimportant to us can play a role in our lives. This role can be as influential as a change in our behavior or the loss of our home. Thus, when considering the coronavirus and the appearance of the toxic chemical of Nyodene D. in DeLillo's *White Noise*, it can be suggested that these events change the course of people's lives, affect their psychology, and even shape the zeitgeist of the times in which they live.

4 Fear, Uncertainty, and Chaos

Comparing COVID-19 and the novel *White Noise*, it becomes apparent that the troubles experienced during COVID-19 have many resemblances and similarities to the tumultuous plot depicted in the novel. The sudden emergence of COVID-19 and the abrupt appearance of a "black billowing cloud" in *White Noise*, both generated great fear. The uncertainty experienced due to the unknown nature of these two incidents led to a period of chaos. While COVID-19 and the black cloud of Nyodene D. were the main reasons behind the feelings of chaos, uncertainty, and fear, the media also played a major role in generating these feelings.

In *White Noise* and amidst the COVID-19 pandemic, people felt the necessity to be informed about the toxic event primarily via the internet and television, and also eagerly waited to be informed about the cure through all sorts of media channels. *White Noise* was first published in 1985; thus, the characters in the novel sought information through radio and television. However, accessing information during the COVID-19 pandemic differed from the means used by the characters in *White Noise*. During the pandemic, as information was sought through TV and the internet, news was encountered that sometimes gave hope, while other times shocked and scared even more. As the airborne toxic event created an era of fear and chaos in *White Noise*, the news about people dying due to the coronavirus also formed similar reactions all around the world. In the novel, the story of a man dying is described as follows:

> It was out in the parking lot that we heard the first of the rumors about a man dying during the inspection of the grade school, one of the masked and Mylex-suited men, heavy-booted and bulky. Collapsed and died, went the story that was going around, in a classroom on the second floor. (DeLillo, 1998, p. 40)

A similar case, which mentions a dead man on the streets of Wuhan, was also made public through the newspapers and the news on January 31, 2020. The image published by *The Guardian* shows a gray-haired man with a face mask lying dead on the street, and there are two people next to him wearing masks and dressed in hazmat suits. As the newspaper suggests "the reaction of the police and medical staff in hazmat suits, as well as some of the bystanders, highlighted the fear pervading the city" (France-Presse, 2020, para. 4). In both cases of death, whether factual or fictional, reactions similar to fear and chaos that occur due to unusual airborne incidents can be experienced.

In *White Noise*, nobody can tell what the outcomes will be after becoming exposed to the "black billowing cloud" of Nyodene D. Furthermore, amid the first appearance of the news of this toxic event, the symptoms reported on the radio differ after a certain amount of time. Jack Gladney's son Heinrich describes the symptoms as follows: "At first they said skin irritation and sweaty palms. But now they say nausea, vomiting, shortness of breath" (DeLillo, 1998, p. 111). COVID-19 also had a similar aspect as the coronavirus had mutations that made it especially hard to follow and detect without a verified test. The symptoms differed for each variant, thus, creating an era dominated by uncertainty.

The methods people use to protect themselves from the effects of these airborne events is another similarity between Don DeLillo's novel and COVID-19. DeLillo describes this method as follows: "There was a family wrapped completely in plastic, a single large sheet of transparent polyethylene" (1998, p. 121). Both in the case of COVID-19 and the cloud of Nyodene D., people tried to protect themselves in a similar manner. The internet presents pictures of people using melon peel, orange peel, or even bras to cover their mouths as methods of protection from the coronavirus. TRT World, which is a Turkish public broadcast service, launched a video on YouTube showing these unusual, DIY protective solutions. In the video, we can see a person shopping in the supermarket dressed up in scuba gear. While some pictures mention the location they were taken, such as the picture of a man in Manila, Philippines, wearing a water bottle on his head, other pictures do not mention the location they were shot. Similar to the previously discussed scene from *White Noise*, during the COVID-19 pandemic, people were seen wrapped in plastic to protect themselves from the coronavirus. The means of protection people sought during the COVID-19 pandemic illustrate the chaos and fear that became an everyday reality. People tried every means possible to prevent coming in contact with the virus because of the unknown nature of its severity and contagion. This uncertainty, fear, and chaos can also be understood through Alaimo's (2010) concept of trans-corporeality:

> [T]rans-corporeality denies the human subject the sovereign, central position. Instead, ethical considerations and practices must emerge from a more uncomfortable and perplexing place where the "human" is always already part of an active, often unpredictable, material world. (pp. 16–17)

Becoming part of an active and unpredictable world that affects our lives and also takes away our sovereign position was highly obvious during COVID-19, and DeLillo managed to vividly portray the position of this human in *White Noise*. Considering the anthropocentric point of view, this philosophical viewpoint asserts that human beings are the center of the universe. Until recently, this has been humanity's pervasive approach towards the environment. Either nature was ignored, abused, or sacrificed for the sake of humans. However, incidents like COVID-19 became influential in demonstrating the real position of human beings within the universe. Although realizing that human beings do not secure a sovereign position and seeing humanity as a part of the whole ecological system through its entanglements in the ecologies is the right perspective, it continues to shock people to be reminded of their helplessness against nature after incidents such as the worldwide spread of an airborne virus.

While Nyodene D. and coronavirus are both airborne and share many similarities, they are in fact quite diverse in their origins. Nyodene D. is a fictional chemical, whereas COVID-19 is a virus. Due to its toxic nature, the chemical Nyodene D. is hazardous to all bodies, whether human or non-human. The person who becomes directly exposed to the chemical can suffer the outcomes of this exposure, yet these people do not further spread the toxic chemical. As the people do not have any role in the spread of Nyodene D., all the characters in the novel go on with their lives after a short period of evacuation. In contrast, COVID-19 is a virus that functions differently than human-made chemicals. As suggested by *Pfizer* "[v]iruses are unable to reproduce

by themselves. In fact, they barely qualify as living things when outside of a host. But these parasites are well designed to infiltrate host cells and replicate copiously" (How Do Viruses Make Us Sick?, n.d., para. 2). This depiction from *Pfizer* clearly shows the difference between Jack Gladney's Nyodene D. and our recent threat: COVID-19. Coronavirus is a living entity, just like the human being it chooses as its host. It requires another body to live and replicate. In order to spread, it seeks another host, which explains why the course of life changed during the coronavirus pandemic, as people had to minimize contact with each other, hence passing many days under quarantine. Thus, even though the coronavirus and the fictional chemical Nyodene D. differ in their origins, they create similar feelings such as fear and chaos, which emerge from the uncertain and undetectable nature of both incidents. Furthermore, a parallel between Nyodene D. and COVID-19 can be drawn, as both events share a common airborne nature. After becoming exposed to Nyodene D. Jack Gladney contemplates his exposure as follows:

> That little breath of Nyodene has planted a death in my body. It is now official, according to the computer. I've got death inside me. It's just a question of whether or not I can outlive it. It has a life span of its own … "This is the nature of modern death," Murray said. "It has a life independent of us. ... The more we learn, the more it grows. Is this some law of physics? Every advance in knowledge and technique is matched by a new kind of death, a new strain. Death adapts, like a viral agent. Is it a law of nature? Or some private superstition of mine? I sense that the dead are closer to us than ever. I sense that we inhabit the same air as the dead." (DeLillo, 1998, p. 150)

This quotation also reminds us of the coronavirus, which adapts, grows rapidly, transmits through the air, has a life span of its own, and is a type of death that is closer to us than ever, making us fear it more than ever as it can penetrate our bodies so easily.

While fear was one of the most pervasive feelings experienced during the COVID-19 pandemic, an article by Willrich et al. (2022) relates the feelings experienced due to the coronavirus to "the fear of contamination by the coronavirus, fear related to the difficulty of accessing health services and fear regarding the work and income situation" (p. 4). Furthermore, the COVID-19 pandemic started a new period in our lives where governments used many regulations to control the spread of the virus. These regulations "led political power to take on the task of managing people's lives through discipline and biopolitics, i.e., biopower is constituted from two poles, which are the body discipline (disciplinary power) and the population regulations (biopolitics)" (Willrich et al., 2022, p. 4). The enforcement of such powers and regulations to control and manage people's lives also created great unease, stress, and fear among many people.

The concept of "governmentality," which Michel Foucault coined in his lectures on security, territory, and population at the College de France, focuses on his extensive work on power and society. Governmentality pertains to the approaches and rationalities that direct and oversee individuals and populations in contemporary societies. It encompasses the interplay of establishments, customs, and discourses that mold the manner in which people are governed. The COVID-19 pandemic has become a time of crisis that revealed how biopolitics and biopower operate over the public. The policies about quarantine and vaccination became signs of such governance, and this situation also added to the fear and stress experienced by people who, on the one hand, tried to focus on their health and well-being, and on the other hand, attempted to control the social and economic burden of the pandemic.

5 Conclusion

At the backdrop of DeLillo's fictional narrative of a cloud sickening and killing humanity, and underlying the panic, distress, and anxiety of the coronavirus epidemic, is the question of why humans fear the unknown. Is it the feeling of helplessness that scared us the most? The course of our lives changed during the COVID-19 pandemic when we were faced with an unknown virus. After all the advances in technology and medicine, it was an utter shock to have a single virus bring life to a halt all around the world. How could all of this happen so swiftly? Why was it so difficult to fight this virus? After all, it was the twenty-first century, was not humanity evolved enough to stop the spread of this airborne disease? Perhaps we can relate to this final quotation from

DeLillo's *White Noise*, which provides some explanation for the fear that surrounded us during the COVID-19 pandemic:

> "It's like we've been flung back in time," he said. "Here we are in the Stone Age, knowing all these great things after centuries of progress but what can we do to make life easier for the Stone Agers? … If you came awake tomorrow in the Middle Ages and there was an epidemic raging, what could you do to stop it, knowing what you know about the progress of medicines and diseases? Here it is practically the twenty-first century and you've read hundreds of books and magazines and seen a hundred TV shows about science and medicine. Could you tell those people one little crucial thing that might save a million and a half lives?" (DeLillo, 1998, pp. 147–148)

The physical repercussions of COVID-19 on the overall well-being of the general population, in conjunction with the socio-economic inequities and worldwide politics further intensified the effects of this crisis. The COVID-19 pandemic showed the disparities on a global scale pertaining to medical services, residential accommodations, and surveillance mechanisms experienced more severely by certain societies. COVID-19 was a deadly threat that, unfortunately, resulted in the deaths of many people. We tried to adapt ourselves to keep up with the new variant and help prevent the spread of the coronavirus. Recognizing our vulnerability was a true shock.

Humanity cannot be prepared for all sorts of disasters awaiting it. Just like the appearance of a black billowing cloud of Nyodene D., the spread of coronavirus created an exceptional panic all around the world. The COVID-19 pandemic affected the whole of humanity and caused great fear among people young and old. Of course, experiencing such fears and stress was reasonable, as the realities of COVID-19 were solid and factual. We feared for our lives and our loved ones because coronavirus threatened all of us, and we were not sure about what was going to happen next, which was truly alarming. Even though Don DeLillo wrote *White Noise* many years before COVID-19, and the novel delves into the perilous ramifications of corporate greed and technological advancements, the appearance of the toxic cloud of Nyodene D. and how late the people were warned to evacuate serves as a physical manifestation that encapsulates the notion of entropy by elucidating the disintegration of societal organization. The risks posed by the accumulation of industrial waste and the occurrence of environmental catastrophes urge society to be vigilant to airborne dangers. The depiction of these everyday risks in the novel bears many resemblances to the incidents that took place during the coronavirus pandemic. These similarities highlight why a movie adaptation of the novel debuted on Netflix shortly after the coronavirus pandemic. Furthermore, the feelings that were experienced both in *White Noise* and the COVID-19 pandemic show great similarities, making us think that, although times change and technology improves, the fear that we face remains in its most primitive and crude form. Yet, can we conclude that the experience of fear, in its most primitive form, is a bad thing?

When Charles Darwin presented the idea of natural selection in his famous book *On the Origin of Species*, he drew attention to living organisms' ability to adapt and change (Natural Selection, n.d., para. 1–2). This idea corresponds with humanity's endeavors to adapt. Fear is one of those vital things that kept us alive for centuries. Amidst the fear and chaos, we also bring out the best of ourselves. We constantly adapt and progress in times of havoc (Mobbs et al., 2015, p. 6). In *White Noise*, we can see examples of this adaptation. The airborne toxic event takes place in the second part of the novel; however, in the third and final part of the novel, entitled Dylarama, the plot shifts to another story. Moreover, the novel surprisingly ends in a supermarket, which manifests the necessity we all feel to continue with our daily lives, even though we have just faced one of the biggest threats of our lives. If we can find so many similarities with COVID-19 in a fictional novel written in 1985, we can assume that similar feelings occur under different times and situations. Maybe we should not just focus on the fear but look past it to recognize our true potential in facing the unknown.

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Research Article

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Eco-Thrax: Anthrax Narratives and Unstable Ground

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Abstract: Numerous articles predicting pandemic futures identify threats tied directly to a warming planet. One notable example is the threat of once-stable pathogens held in ice shelves being released into the world. *Bacillus anthracis*, or anthrax, presents as the key bacterial threat emerging from melting permafrost. Such a threat reads like a fictitious horror brought into direct proximity with the real. Exploring perceptions of microbes across time and the resonance of specific tropes in television and eco-horror in the context of anthrax reveals an unstable theoretical and ecological landscape characterized by shifting human/biological relationships. Untangling this relationship more than 20 years after the last great anthrax-related challenge – the "Amerithrax" incident – and in recognition of the impact of COVID-19 on contemporary environmental humanities, it becomes possible to think of contagion as more than an epidemiological threat. Instead, contagion, as related to anthrax, can be identified as a window across time and place, one which assists in rethinking relationships to ecologies and environments. Two theoretical frameworks, the "outbreak narrative" as proposed by Priscilla Wald and the "hijacker model" introduced by Hannah Landecker, are deployed as lenses to introduce and think differently anthrax's contemporary condition.

Keywords: anthrax, pandemics, Anthropocene, eco-horror, outbreak narratives

1 Introduction

In her 2008 text *Contagious: Cultures, Carriers, and the Outbreak Narrative*, literary scholar Priscilla Wald recognizes that "Contagion is more than an epidemiological fact. It is also a foundational concept in the study of religion and of society, with a long history of explaining how beliefs circulate in social interactions" (p. 2). She draws attention to a key quality of contagion: transmissibility as evidence not only of biological/microbial encounter but also as social, cultural, and ideological connectivity. As seen through the COVID-19 pandemic, transmission, though once local, has become truly global – identified in the rapid shuttering of borders, grounding of flights, social distancing guidelines and stay home directives, and the spread of the virus regardless. Through the lens of the contemporary crisis, relationships between society, culture, ecology, and the microbial world are thrown into sharp relief. Turning this lens toward *Bacillus anthracis*, epidemiological threats of the past and the future reveal a complex network of connectivity across culture, ecology, biology, politics, place, and time. This network can be traced across film, television, and contemporary theory, in which fears for environmental futures find themselves in a complicated tangle with specifically US-centric histories of terror and destabilizations of ecological landscapes seeded through news reports and journalistic reportage.

Lowe (2022), in the context of COVID-19 and conspiracy, writes:

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> Viral worlds are a key site from which to explore questions of the real. The "real" is often understood to be epistemologically associated with the visible. Yet, viruses are "unseens," meaning they are not accessible to unaided visual perception, proprioception, or interoception.

The real and the metaphorical, epidemiological fact and belief; these entangled contexts are the spheres in which specific biological actants can be located, spheres in which the real, as located amidst a rapidly warming globe, can be understood. Lowe's observation, when brought into contact with Wald's understanding of contagion, illuminates the significance of human/microbial interactions in contemporary thought and media. In her text, which takes *Bacillus anthracis*, or anthrax, as its focus, medical historian Jones (2010) positions historical and contemporary encounters and ideas around anthrax as "windows into the constantly changing ecological and cultural relationships between animals, the environment, and human society and culture" (para. xvii). These windows provide an illumination of specific human/bacterial contact, which resounds amidst a contemporary era wherein microbes emerge as one among many global threats. One such window is contemporary media; this article will attend to anthrax as it appears in serialized television, alongside broader renderings of eco-horror tropes in cinema. Read through and alongside contemporary scholarship, these windows sharpen the view of a complex and entangled landscape in which the "unseen" can be brought into view.

2 Hijacking the Anthrax Narrative

Before apprehending anthrax through the window of contemporary media, or in the context of encounter and contagion, the nature of the bacterium needs clarification. First, "anthrax" is the name given to the bacteria itself, the biological weapon, as well the disease that emerges from exposure. This disease has multiple forms, which depend on the mode of exposure. Cutaneous anthrax is the most common and least deadly disease, arising from skin contact with anthrax spores. Inhalational anthrax is less common, but far more fatal, caused by inhaling the bacterial spores. This form of anthrax has been known as "Woolsorter's disease," a historically industrial disease affecting those working directly with animal hides in slaughterhouses or the production of leather garments, for example. Susan D. Jones and historian Philip M. Teigen (2008) illuminate the contemporary history of anthrax as an industrial disease, while highlighting the centrality of anthrax to broad research undertaken by noted microbiologists Robert Koch and Louis Pasteur in the late 1800s (Jones and Teigen, 2008, pp. 456–457). The apprehension of anthrax in the contemporary period is transformed against this historical background, through its entanglement with militarization and terrorism, alongside subsequent mobilization as a cultural motif in television and cinema.

Considering the contemporary condition of anthrax, there are two significant theoretical frameworks that provide a boundedness through which anthrax can be perceived. One is the established notion of the "outbreak narrative," as presented by Wald (2008, p. 2). An outbreak narrative is the "paradigmatic narrative" of the spread of a disease, one that "follows a formulaic plot that begins with the identification of emerging infection, includes a discussion of the global networks throughout which it travels, and chronicles the epidemiological work that ends with its containment" (Wald, 2008, p. 2). The outbreak narrative presents a useful framework for the consideration of the stories that are told about emergent diseases and infections, but as it is explored, this narrative can be necessarily complicated by the shifting and changing natures of human/disease relationships. As Wald herself acknowledges, the outbreak narrative presents "a battle between the enemy microbe and the heroic researchers and epidemiologists over the fate of humanity," with epidemiologists often emerging as triumphant saviors. This latter point is underscored specifically through perceived veracity of the containment, which, as this article will address, is a more complicated idea than a neat outbreak narrative might indicate.

As science, society, and academia reckon with the impact of COVID-19, extensive discourse interrogating human/microbial relationships has emerged. Much of this discourse focuses on the viral qualities of COVID-19; however, this does not completely exclude its correlation to bacteria and other microorganisms. In a 2022 article titled "Viruses Are More Like Cone Snails Than Hijackers," theorist Hannah Landecker writes, "In the twentieth century, the word "hijacking" came to typify the explanation of what viruses do to the cells they

infect" (para. 1). While a virus needs a host to survive, a bacterium is a single-celled organism and does not need to "hijack" a living host to reproduce. However, Landecker (2022) quite aptly utilizes the notion of hijacking to reveal the entanglement of a virus with other bodies, human and nonhuman alike. Landecker (2022) writes of hijacking:

> It transposes the idea of an individual or a group of individuals storming a vehicle and overwhelming its drivers and passengers by force; of a temporary and illegal deviation of a normal journey; of violence and coercion in the name of another cause. The hijacker is a terrorist, a thief, a stranger looking to take the wheel. (para. 3)

Implicit in this framing is the transposition of ill-will as a motivator for the virus. This hijacker model, whilst a viral model, is an example of the applications of viral theories emerging from COVID-19 in the context of other microorganisms. As it relates to anthrax, the hijacker model is particularly resonant due to the weaponization and deployment of anthrax as a bioweapon in the early 2000s.

The October 2001 anthrax attacks in the United States – the "Amerithrax" incident – saw weaponized, refined, lab grown anthrax enter into public circulation through the US postal system in an act of terror. Postal workers and political targets were exposed to powdered and granulated anthrax, which caused both cutaneous and the far-deadlier inhalational anthrax. Killing five people and infecting at least 18 across a month-long period, these attacks led to what was then seen to be the largest FBI investigation in the history of the organization, while fear and panic spread across the nation, and the globe. This period of time in the US history was marked by widespread anxiety in the wake of the September 11 terror attacks, when four coordinated suicide attacks coordinated by Al-Qaeda resulted in substantial loss of life on the US soil. These aerial attacks were undertaken by hijacking passenger planes, resulting in the collapse of the World Trade Center twin towers in New York City in 2001. In working within what was a climate of heightened anxiety, fear and terror literary theorist Redfield (2009) remarks on the centrality of the "political history of the phantom" drawing upon a Derridean foundation of contemporary critique, which recognizes the "spirit of haunting" as the representation of terrorism, a recurring political wound across time (p. 7).

Within this shadowed and shadowy space of terror and haunting, "anthrax" was hijacked through the weaponization of the bacterium's spores, spreading and circulating unseen within the traditionally safe hands of the postal service. Immediately, media and society developed an emergent literacy in relation to anthrax, with articles outlining the impacts of granulation and spore dispersal in terms of infection rates as the antibiotic ciprofloxacin ("cipro"), used to treat anthrax exposure, underwent a US-wide shortage. Swiss historian Philipp Sarasin gave great attention to anthrax, and the anthrax attacks in his 2004 text, translated in English in 2006 as *Anthrax: bioterror as phantasm*, (or *fact and fantasy*). Within this text, Sarasin (2006) wrote that anthrax spread in September 2001 not only through four letters circulating through the US Postal system, but in the thousands of potentially contaminated letters (p. 5). These thousands were contaminated, hijacked, by an imaginary anthrax – and with this came the subsequent spread of fear and panic. Anthrax, the microbe, became anthrax the metaphor.

Metaphors, Sarasin (2006) acknowledges, are a form of contamination – transferring meaning from one realm to another (p. 5). Anthrax became a metaphor for bioterrorism, a specific type of warfare, for the spread of sickness does not simply harm the individual but constitutes an attack on society. While Sarasin (2006) dismisses fears of anthrax contamination as a passing hysteria (even a mere three years following the attacks), anthrax is a bacterium that has entered into cultural shorthand (p. 10). Early representations of anthrax on television see the bacterium obscured by a murder investigation. A 1963 episode of *The Alfred Hitchcock Hour* titled "Diagnosis: Danger" is centered around an apparent hit and run (Pollack and Kibbee, 1963). The subsequent investigation reveals not a murderous rampage, but death caused by anthrax spores in the hide of a drum that spreads fear and sickness across Los Angeles.[1] Post–2001 television grasps upon the shorthand of anthrax, particularly in police procedurals, serving to further plots about fear of contamination spreading through populations at the hands of some malevolent human or political force.

1 Coincidentally, this narrative correlates with the 2006 death of a drummer in the United Kingdom from inhalational anthrax. The Scottish artist died after becoming infected through contact with untreated animal hides used to make instruments (Carvel, 2006).

Employing tropes of the outbreak narrative, the eighth season of the US television procedural *Criminal Minds* sees FBI agents investigate a domestic terror attack. The episode "Amplification" directly invokes the 2001 Amerithrax incident, but focuses upon a fictionalized attack motivated by a perceived lack of governmental preparedness for large-scale bioterrorism on the US soil (Gallagher, 2009). Particular tropes of containment and accident are invoked through the sealing-off of a homemade laboratory and through scientists clad in PPE. This episode ends with the suspect apprehended and the lab grown, virulent strain of the bioweapon locked away in an anonymous government vault – filled with thousands of other deadly viral and bacterial agents. Here, the notion of containment is represented with an undercurrent of anxiety and conspiracy. This scene, captured by a wide and retreating lens, appears to point back to pre–2001 television, namely, recurring tropes from *The X-Files* of hidden government secrets connected to weaponized microbial infections (Carter et al., 1993–2018). *The X-Files* itself contains its own gestures toward anthrax-related fears in later seasons. The threat of anthrax emerges as a result of its recent history, but also in the extent to which its use as a weapon violates the rules of engagement – specifically the global Biological Weapons Convention (1972).[2]

The fear associated with anthrax is specific, historically generated, and culturally performed, but not solely unique to anthrax. Indeed, following Landecker's hijacker model alongside many anthropomorphic, value-laden readings of viral and bacterial agents, we can begin to understand perceptions of microbes in the present. Some of the earliest representations of germs – those unseen agents of disease – position them as grotesque and malicious forms. An 1828 etching of the waters of the Thames under a microscope depicts bacteria as monstrous forms, gawping, fanged, freakish, and eerie (Heath, 1828). The woman witnessing this magnified drop of water is turned toward the viewer with a look of horror. These chimeric, threatening forms bring with them a wave of revulsion and fear. At the time of this etching, microorganisms had been known and observable for almost 200 years, yet despite the rapid advances of technology in the near-200 years since the etching, the rendering of viruses and bacteria as monstrous forms persists. Indeed, amidst the post–2001 security context and the presence of weaponized bacteria, microbes are apprehended as "'public enemies far more dangerous' than the criminals on the FBI's Most Wanted lists," as recognized by Wald (2008, p. 25, referencing Ratcliff, 1959, p. 21). With the spread of COVID-19 came new iterations of these same value judgments. A 2021 article published in the *European Archives of Oto-Rhino-Laryngology* branded COVID-19 as an evil serial killer (Guha et al., 2021). The opening paragraphs of this article describe a serial killer as "a murderer who repeatedly commits the same offense," ascribing to COVID the characteristics of willfulness and intentionality of murder (Guha et al., 2021, p. 2101). With anthrax, the threat of harm against the human body emerges through encounter with the bacterium, amplified by the threat of the terrorist.

Perceptions of the microbial agent as a willingly hostile entity, as a hijacker and a threat, create conflict for the boundedness of the outbreak narrative. Albertini (2008) recognizes a tension within the outbreak narrative, which arises through containment and accidental exposure. He writes that the "epidemiological effort is an urge toward ... 'closure,' but the spectacular accident [of initial exposure and spread] resists closure, instead lingering in its own rupture within the narratable" (p. 472). This rupture reveals the "fragility of the body's barriers," reinforcing the divide between the individual body and the invading threat (Albertini, 2008, p. 444). In the aforementioned example from procedural television, the accidental encounter between a heroic investigator and an anthrax vial creates narrative tension. A clumsy gesture and an accidental scrape lead the FBI investigator in "Amplification" into a moment of contact with the microbe, a moment that underscores the fragility of the body amidst the potential for infection. What makes anthrax a key bacterium for contemporary attention is not simply its legacy as weaponized agent of terror and "character" within the outbreak narrative but, more so, as the future landscape of anthrax-related encounters.

2 Opened for signature in 1972, the Biological Weapons Convention, is signed by over 170 international parties, recognizing global efforts to halt the use of biological weapons, specifically as weapons of mass destruction.

3 Microbial Perceptions and a Warming Planet

In the 2022 article "Welcome to the 'pandemicene': Is Australia ready for the next pandemic?," Professor Catherine Bennett, Deakin University's Chair of Epidemiology, speaks about current and future epidemiological threats (Nogrady, 2022, para. 3–8). In these considerations, she encourages the discipline of epidemiology to embrace thinking like a microbe. This way of thinking is presented in the context of "how we work, how we live, how we build those structures – physical, social and economic" that allow pathogens to spread, take hold, and rise to the level of a pandemic (Nogrady, 2022, para. 3). Implicit in these words is a multispecies approach, but one that is relational, not predicated on the willful devastation of human populations, but rather, as a consequence of human behaviors. This way of thinking complicates the pattern of the outbreak narrative, which posits threat from an Other (usually outside of traditional Western centers of power), and in terms of the killer, the "Most Wanted," and the threat to the porous body. Looking to anthrax outbreaks, which scientists predict will increase in occurrence relative to global heating, a cultural framework which simultaneously shapes and represents these fears emerges. This framework can be understood in explicitly human terms, revealing the narratives told across fiction, in response to contemporary environmental challenges.

Introducing the "Anthropocene" in 2002 as a geological epoch encompassing the environmental changes, disturbances, and harms undertaken by a specific subset of humanity, Crutzen (2002) writes, "Unless there is a global catastrophe – a meteorite impact, a world war or a pandemic – mankind *[sic]* will remain a major environmental force for many millennia" (p. 23). This "environmental force" is the result of increasing resource consumption, species extinction, temperature, and pollution – the innumerable human-caused events and processes now shaping the Earth and its dynamics. Fixing the Anthropocene in time, place, or origin, however, is a complex task – with multiple "-cenes" emerging from each attempt to deviate from the homogenous attribution of blame to the human (Davis et al., 2019). These multiple "-cenes," which consider relationships across widespread climate catastrophes and increasing catastrophic environmental events, reflect upon the "interrelated historical processes set in motion by a small minority": a white colonial minority (Davis et al., 2019, p. 4). Merchant (2020), writing in *The Anthropocene and the Humanities* endorses the need for a "global ecological revolution" to transform human–human and human–environmental relationships in recognition of the severity of the current climate crisis (p. 155).

With this brief acknowledgement of climate crisis and catastrophe, the key anthrax-related challenge for the present shifts. The fear is no longer the threat of anthrax related to a human agent attempting to spread fear and panic through a population, but instead the fear is of exposure arising from anthropogenic environmental conditions. In the context of the outbreak narrative, which is seen to "consistently register anxieties about the global village that reflexively imagine the containment of disease in national terms against its actual and threatened border crossings," anthrax is complicated. According to a source of national anxiety and fear in the context of the Amerithrax incident, anthrax is rather understood as border crossing in the same way that climate crisis and the Anthropocene are simultaneously global and local (Wald, 2008, p. 63). This emergent anxiety is that of the unfolding climate crisis, the contested but very real effects of the "Anthropocene" impact all environmental cycles of the globe, and are currently leading to widespread global permafrost melts. Permafrost, a layer of rock and soil frozen for greater than 2 years and less susceptible to the impacts of seasonal change, covers approximately 19 million km^2 of land across Alaska, Canada, Greenland, and Siberia (Tarnocai et al., 2009). Permafrost stability is shifting as a result of the current climate crisis, registering average temperature increases of one degree annually. With melting permafrost comes the release of that which it contains, which studies identify as between 1 and 1,000 million bacteria per gram of permafrost soil (Hansen et al., 2007, p. 2870). With this destabilization comes the threat of dormant anthrax spores – frozen, contained and preserved in this permafrost – rising to the surface and infecting new populations, a narrative that reads less like a traditional outbreak narrative and more like a particular form of real-life ecohorror.

A study by French and Russian researchers published in the *Proceedings of the National Academy of Sciences (PNAS)* in 2014 revealed the presence of a 30,000-year-old virus within layers of Siberian permafrost, which scientists were able to resurrect (Legendre et al., 2014, pp. 5327–5335). An outbreak of anthrax in Russia in 2016 that led to over 100 hospitalizations and the death of a child was directly related to permafrost melts connected to rising temperatures (Liskova et al., 2021, para. 5), exposing humans to long-dormant spores held

in animal bodies preserved in frozen earth layers. In another example, increased permafrost melts as a result of unseasonably warm temperatures exposed 70-year-old frozen deer carcasses to the air, and subsequently revived dormant anthrax spores. In 2019, the US National Academies of Sciences, Medicine, and Engineering organized a workshop titled "Understanding and Responding to Global Health Security Risks from Microbial Threats in the Arctic," which specifically recognized the very real and present threat of anthrax exposure due to melting ice. Studies of and research into these events have led to a myriad of news articles with titles warning that "As Permafrost Melts It Is Unleashing Ancient Viruses" (Chognot, 2020), "As Earth Warms, the Diseases That May Lie within Permafrost Become a Bigger Worry" (Goudarzi, 2016), and "The Next Pandemic Could Be Hiding in the Arctic Permafrost" (Schreiber, 2020).

The most analogous connection between these contemporary realities is John Carpenter's 1982 film *The Thing*, in which an alien craft buried deep under layers of snow in the Antarctic releases a monstrous and mutating virus upon a team of researchers. Similar narratives appear in perhaps less critically acclaimed science fiction and horror films, including *The Thaw* (Lewis, 2009), in which an ancient virus is unleashed from melting ice caps; *Blood Glacier* (Kren, 2013), a similar narrative set in the melting Austrian Alps; *The Last Winter* (Fessenden, 2007), in which a fictional US oil company drilling in the Arctic releases a malevolent petrochemical creature; or, (potentially the origin for this specific genre) 1953's atomic-monster-era film *The Beast from 20000 Fathoms* (Lourié, 1953), in which an atomic bomb releases a dinosaur from the clutches of Arctic ice to wreak havoc upon "America." What draws these films together is the fictionalized representation of a very real threat, the release of an environmental harm as a consequence of human intrusion or ecological devastation. Within these stories is a narrative warning, one which contrasts with the outbreak narrative, but still preserves some identifiable correlations. Within the traditional frame of the outbreak narrative, warnings emerge through a Western, colonial, and deeply racialized fear of the "other" embedded in transformative globalization (Wald, 2008, p. 81). Embedded within the fear of contagion in this sampling of eco-horror films, is a fear of the consequences of misled, but widespread, everyday behavior. Like the atomic monster genre, which explores fears and anxieties in response to the terror of scientific developments and their potential for destruction, seeded into narratives around environmental horrors lying frozen within the Earth is a communicable fear for the future. This fear for the future is analogous to "eco-anxiety," defined as "distress caused by climate change where people are becoming anxious about their future" (Coffey et al., 2021, p. 1). As Colebrooke (2014) acknowledges in her essays on extinction that address the global backdrop of the last decades, amidst terrorism, large-scale environmental disasters, wars, pandemics, and increasing societal polarization, "These terrors – viral, political, economic, climactic and affective – have not failed to dent the cultural imaginary" (p. 68). These terrors can be read in the transforming popular culture film and literature that address questions of infection through the lens of ecology.

As Wald (2008) establishes and Albertini (2008) recognizes, containment is a significant element in the progression of the outbreak narrative – a denouement in which the infection is bounded, and the success of epidemiological methods prevails. In the specific subset of eco-horror films that address hidden threats in once-stable ice, the final scenes often do not display successful containment, but rather explicitly present scenes of infectious agents or animals continuing to spread, or hint at the horror persisting. This grouping of films can be read as a form of contemporary eco-horror, a new iteration of the genre that dominated film screens of the 1970s.[3] Understanding the connection between traditional eco-horror and contemporary eco-horror illuminates how structures of thought, fear, and anxiety condition contemporary apprehensions of microbial matter. As a historian of horror, film and literature Murphy (2013) writes:

3 The archetypal eco-horror film of this period, emblematic of the genre, is the cult Australian classic *Long Weekend* from 1978. This film sees an environmentally destructive couple in the Australian outback attacked by birds, spiders, and possums, in a narrative which feeds into broader cultural anxieties of white panic and the "other," which was emblematic of the time (Morris, 2005, p. 225). Significantly, this film is couched in colonial anxieties and legacies of invasion, traced back to the genocidal occupation by the British Empire of a continent perceived as hostile in the 1700s.

> [W]hilst the 'nature strikes back' horror films of the 1970s are obviously linked to the sense of ecological crisis that become a part of American life following the publication of [Rachel Carson's] *The Silent Spring*, they also belong to the much longer tradition of American narratives in which the natural world and the landscape itself are seen as actively hostile. (p. 181)

This aligns with what Estok (2009) recognizes in the present, namely that "[h]uman history is a history of controlling the natural environment," and identifies ecophobia – a fear of the environment rooted in ideas around sanitation and order – as "one of the hallmarks of human progress" (p. 210). In recognition of these psychological frameworks, and their influence on literature, contemporary eco-horror is understood to be predicated on an unstable, shifting ecological present, with environments harmed, altered, or degraded by human activity, "striking back" at their occupiers.[4]

Contemporary scholarship addressing this genre in film and literature recognizes connections between the emerging narratives and related shifts in the broader environmental imaginary. Concretely, Tidwell and Soles (2021) establish that contemporary eco-horror can be "read as a response to real world environmental fears" at the intersection of fear and global, planetary scales (p. 2). Particularly, as Keetley and Sivils (2018) identify, "humanity's continued abuses against the land and its denizens, human and nonhuman alike, have spawned a culture obsessed with and fearful of a natural world both monstrous and monstrously wronged" (p. 11). The fear is not simply of what the natural world will do to human but also of what has been done to the natural world. This affective register is particularly evident in films that address the horror of melting icescapes, and of that which is no longer trapped within them breaking out of containment and infecting or attacking those who are proximal. Importantly, despite these recognitions of human harms upon the natural world, eco-horror has the capacity to reinforce an antagonistic relationship between humans and nonhumans. Viewing this from a posthuman framework, Tidwell (2018) writes that eco-horror

> risks reinforcing those fears and the categories they are built upon, but ecohorror also asks us to reconsider some of those fears and to imagine what might happen if we were not to insist so vehemently upon such divisions. (p. 117)

The often-cited Gaia hypothesis by Lovelock (1972) is predicated upon the Earth as a self-regulating entity, one in which infection enacts a form of revenge against those causing destruction to ecological systems (pp. 579–580). These narratives align with those very same perceptions of microbial matter as a willful agent of harm, playing into anxieties of the present and deeply tied to the climate crisis. Here, the flaws of the human-centric outbreak narrative, and the ecologically motivated narrative of contemporary eco-horror align. Both narratives are predicated in some way on the struggle of human agency over natural threats, a form of battle or warfare that challenges notions of trans-corporeality and multispecies frameworks.

4 Anthrax and the Third Position

It may be pure coincidence that there is increased speculation that anthrax is emerging as a speculated environmental challenge for the future, while having a weaponized background in the context of US centric histories of terror. However, the anxieties that underpin both such historical and present realities of the anthrax bacterium reinforce narratives of fear and antagonism. Fourteen years following the finale of *The X-Files*, a 2016 event series saw the longstanding US television return to screens across the globe (Carter et al., 1993–2018). Important shifts occurred in this season, against the backdrop of a long-standing fictionalization of government conspiracy, monsters, and aliens. In Season 10, the myth-arc of the series (which was predicated on alien invasion) was abandoned – the warming globe no longer a suitable habitat for alien colonization. A central plotline in this season instead saw the two heroes, FBI agents Scully and Mulder, facing an earthly

4 Readings of the "first wave" of eco-horror, namely, the "nature-strikes-back" films of the 1970s, which include *Long Weekend,* identify their particular cultural emergence in the United States and Australia – two countries with difficult and ongoing structures of invasion, colonization, and Indigenous genocide.

threat: infection. Uncovering the "truth," the agents reveal a plot that had seen US citizens infected with an alien virus, one which was set to bring down immune systems to wipe out humanity – a clean slate. As Scully explains, "Anthrax is the canary in the coal mine. It's a harbinger of infections to come …. You are witnessing what might be the advent of a global contagion!" (Carter, 2016). Anthrax here is a useful shorthand for infection amidst frames of terror and human-engineered microbial agents – a key player in a narrative of conflict around power and shifting ecologies.

As mentioned earlier, the use of anthrax as a weapon violates the Biological Weapons Convention, a treaty many consider as having established strong global norms against the use of bacteria and viruses in conflict. The deployment of anthrax as a weapon in 2001 was an abhorrent attack, not solely because they targeted political figures, but through their threats to the US postal system and its workers. This event in 2001 was seen as a breach of morality, or the rules of engagement for conflict. What then, for anthrax that emerges as a result of a warming climate? Foundational French philosopher Michel Serres argued in 1990s that a warming, changing climate necessitates a reconsideration of human/ecological relationships. Essentially, Serres (1995) argues that the same social contract that governs human relationships (which he at times terms a pact) requires an extension to, or the inclusion of, the natural world as a necessity amidst changing human/ecological relationships and climate crisis. The earth, the world, the environment, should not be read as a backdrop for the social contract to play out, and he argues, rather, this contract should be inclusive of the natural world as a partner. Returning to the idea of rules of engagement, particularly as they relate to the use of biological weapons, the natural world is not currently a party to this agreement. Including the natural world in this moratorium on the use of biological agents such as anthrax would require willing engagements by human actants in a mutual respect of life that extends beyond the human.

While this sphere is rather speculative, Serres presents a thought experiment to explicate the necessity of a natural contract, one which has direct correlations with the emergence of anthrax from melting layers of permafrost. He takes the 1820 oil painting *Fight with Cudgels* by Francisco Goya as its focus. This painting, with muted layers of brown, depicts two men in conflict, upon a muddy surface, knee deep in the earth. Serres (1995) writes:

> With every move they make, a slimy hole swallows them up, so that they are gradually burying themselves together. How quickly depends on how aggressive they are: the more heated the struggle, the more violent their movements become and the faster they sink in. The belligerents don't notice the abyss they're rushing into … Who will die? we ask. Who will win? ... Let's make a wager. You put your stakes on the right; we've bet on the left. The fight's outcome is in doubt simply because there are two combatants, and once one of them wins there will be no more uncertainty. But we can identify a third position, outside their squabble: the marsh into which the struggle is sinking. (p. 1)

There is a direct and pointed correlation here between Goya's mud in Serres' hands, and the melting permafrost, the instability of the once-solid surface giving way to reveal the human bodies preserved within, and giving way to further violence. The third position – not the human struggle taking place across the surface, a battle of two nation states for the right to occupy land – but the land itself. If the land is treated as mere backdrop, the battle taking place is no longer consequential. What plays out in the war of the two brandishing their cudgels upon an unstable and melting surface is a strange suicide pact. As human conflict (read as human to human conflict, but also inclusive of ecological harms such as extraction or overconsumption) plays out, the earth subsumes those who act without recognition of its agency.

Philosopher of technology Bratton (2022), working toward his concept of the "revenge of the real," holds as a matter of principle that "to advance a scientific biological conception of life is not to reduce the world to mere facts, but to recognize its complexity and fragility, and therefore that it also can't be reduced to the constructed meanings we might project upon it" (p. 3). Writing amidst the COVID-19 pandemic, Bratton (2022) positions the pandemic itself as "a non-negotiable reality that upends comfortable illusions, no matter how hard some may try to push back with their chosen form of magic" (p. 3). One of these forms of the real is in terms of our relationship to microbial matter, revealed in relation to anthrax. As explored, anthrax is a bacterium laden with history, metaphor, and cultural baggage. However, notions of revenge, conflict, terror, or hijacking as read into human/microbial relations throws up a myriad of concerns. Perhaps it is the case that, in the words of philosopher Stengers (2000), the Earth "doesn't care about the questions we ask about it. What

we call a catastrophe will be, for it, a contingency. Microbes will survive, as well as insects, whatever we let loose" (p. 144). The future for human/anthrax relationships, however, entangled with or divorced from these perspectives, appears no clearer or less dangerous than those of the past.

Anthrax is rendered often as a fiction, as are many elements of the environment, with particular forms of agency or willfulness in the narratives that are told about relationships between humans and the world. Rejecting the clean, hermetic ideal of containment as understood in relationship to the outbreak narrative, other possible avenues appear. As feminist and New Materialist scholar Alaimo (2010) writes, trans-corporeality presents as the "the literal contact zone between human corporeality and more-than-human nature ... in which the human is always intermeshed with the more-than-human world" (p. 2). This intermeshing is one that might be rendered with fear and anxiety, particularly in a contemporary world defined by contagion. Indeed, Alaimo (2010) acknowledges that the "the sense of being permeable to harmful substances" that arises with the identification of trans-corporeality "may provoke denial, delusions of transcendence, or the desire for a magical fix" (p. 146). However, as the permafrost melts, as fears and anxieties seep into the narratives we tell ourselves, as we become subsumed into the muddy ground below, rejecting the containment of the outbreak narrative exposes the potential for thinking microbial relationships in far expanded manners. Against a more traditional background, which sees the microbe as hijacker, willful agent of destruction, challenge to safety or boundedness, the trans-corporeal approach might illuminate alternative paths for future microbial encounters.

5 Conclusion

Recent histories of anthrax, deployed as a bioweapon and an agent of terror in 2001, have seen anthrax present specifically in serialized television as a marker of harm. Two decades later, the threat of anthrax has shifted in light of the environmental realities of a warming planet. The threat of anthrax has instead transformed into an activated harm emerging from once-stable layers of permafrost. The narratives told around microbial harm necessitate new ways of thinking about human–ecological and human–microbial relationships. Across eco-horror, and through theoretical frameworks, anxieties about unseen agents and culpability in relation to climate crisis, containment, and the traditional outbreak narrative is rethought. In this manner, conflict once read as purely political infuses a third position, one in which the natural world forms part of complex relationships, changed and altered by a heating globe. If contagion as it relates to anthrax is viewed as a window, what is seen are traces read into narratives of eco-horror in cinema, reflected in the very real reports of reawakened threats to human bodies across news media. In reflecting upon Wald's framework of the outbreak narrative and the more experimental and diffuse hijacker model outlined by Landecker, the contemporary condition of anthrax is illuminated as shifting and complex, embedded both in landscapes transformed in real time, and the stories told about human–ecological interactions. Doing so opens up space for thinking beyond the possibility, or realities, of containment, and underscoring the criticality of ecological thinking across media, theory, and destabilized contemporary conditions.

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Research Article

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Vaccine/Vaccination Hesitancy: Challenging Science and Society

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Abstract: How disasters (e.g., disease, war, and natural disasters) affect people is reflected in their behavior; in the face of a disaster, people are likely to act out of fear, anxiety, uncertainty, and panic in terms of self-preservation. Following more than 2 years of living amidst a global pandemic, issues of human behavior, and especially individual and societal resilience in response to disasters, are increasingly gaining focus. The theories of planned behavior and cognitive dissonance can help explain behavioral changes and underlying intrinsic conflicts. Especially in relation to global health, such phenomena as discrimination and exclusion are identified as having a negative impact on efforts to contain infectious diseases. In this context, the question arises of how to encourage members of a global society to behave cohesively in terms of quarantine, social distancing, and vaccination. This article demonstrates the existence of disbelief and misrepresentations in the context of vaccine fatigue and skepticism. While vaccinations have helped improve public health, skepticism, and resistance toward their efficacy are increasing. Looking specifically at the relatively new vaccines inoculating against the coronavirus, this article explores factors contributing to vaccine skepticism, especially with regard to Western Europe and the United States.

Keywords: vaccine, human behavior, cognitive dissonance, COVID-19

1 Introduction

How disasters such as disease outbreaks, wars, and natural catastrophes affect people is evidenced in their behavior. In the face of a disaster, people are likely to act out of fear, anxiety, uncertainty, and panic in search of self-preservation, as seen in the context of the COVID-19 pandemic through rampant, global panic buying (Karni & Schmeidler, 1986, pp. 71–81; Yuen et al., 2020, pp. 1–14). In historical research on previous pandemics, social division appears as a recurring issue. Especially in relation to global health, such phenomena as prejudice, discrimination, exclusion, interpersonal hatred, and hostility are identified as having a negative impact on attempts to contain infectious diseases (Brandt, 2021, pp. 409–410; Peters, 2021, pp. 755–759). In this context, medical historian Riva and colleagues (2014) mention the Greek historian Thucydides, who used the example of the plague to explore the ethical values of human behavior and described the increase of discord, jealousy, and greed in times of public uncertainty (p. 1753). The discussion of pandemics and human behavior seems to be of interest when considering literary texts. In their article, Riva and colleagues (2014) examined the novel *The Scarlet Plague*, written by Jack London in 1912, which portrays a post-apocalyptic scenario (p. 1755). This novel serves as an example of how pandemics and the appearance of new diseases can evoke profound fears and significantly transform human behavior (p. 1753). As Illing (2020) writes, citing Albert Camus' novel *The Plague,* one of the biggest problems in difficult times is the rise of individualism and personal freedom (para. 15). Arguably, the fear of possible contagion is precisely responsible for bringing misguided

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and self-serving behaviors to light. In her book on the history of disease, Wald (2008) argues that the concept of contagion has influenced societies throughout history, often with detrimental effects (pp. 1–28). In times of uncertainty, particularly in the midst of disease outbreaks, Wald (2008) asserts that outbreak narratives often distort or exaggerate the truth, perpetuate stigma, and can reinforce ableist and racist narratives (pp. 1–28).

Against the backdrop of these debates surrounding the topic of epidemics and pandemics, this article examines factors contributing to vaccine skepticism and vaccination fatigue regarding the relatively new coronavirus vaccines (SARS-CoV-2). Thus, the goal of this article is to take an interdisciplinary look through the lens of culture and behavior to develop an understanding of the underlying behavioral patterns toward vaccines and vaccine fatigue, particularly with regard to social media and specific behavioral aspects. This review subsequently provides an assessment of vaccine and vaccination fatigue and human behavioral theories, setting an agenda for future research.

2 Emerging Viruses and Vaccines

Accelerated by wars, the global economy, international air travel, and other forms of global exchange, microbes can spread across geographic boundaries (Baker et al., 2022, pp. 193–205; Morse, 1995, p. 9). In this context, an epidemic is defined as a temporally and spatially limited increased incidence of disease with a single cause in human populations. In contrast to an epidemic, a pandemic is not spatially limited. In this case, it usually involves viruses that suddenly appear in another species due to close contact (Morse, 1993, p. IX). Precisely due to the proximity of humans to livestock or wild animals that can serve as virus reservoirs, pathogens continue to find new ways to enter the human body (Morse, 1993, p. 31). Thus, the worldwide dissemination of microorganisms has been hastened by climate change, globalization, and extensive urbanization.

Over time, as the global spread of microbes intensified, vaccine research underwent significant advancements to combat the growing threats posed by the microorganism. British physician Edward Jenner paved the way in 1796 by demonstrating that the *Vacciniavirus* could protect against smallpox (Plotkin, 2003, p. 1349; 2014, pp. 12283–12287). Mainly, the outstanding achievement of the twentieth-century immunology, led by the concepts and discoveries of Louis Pasteur to produce vaccines that helped eradicate various infectious diseases, maximized the potential of the human immune system (Berche, 2012, pp. 1–6; Cavaillon & Legout, 2022, p. 2; Plotkin, 2003, pp. 1349–1359). This achievement pertains to the efficacy of vaccination in treating viral infections by leveraging the human immune system's ability to identify the vaccine as foreign and retain a memory of it (Nicholson, 2016, pp. 275–301). As a result, when a virulent form of a pathogen appears, the body recognizes the protein coat that triggers an immune response, thereby priming itself to react (Nicholson, 2016, pp. 275–301). First, the immune system recognizes the target pathogen once again before it can invade cells, and second, the immune system identifies and eliminates infected cells before the pathogen can replicate in large numbers (Nicholson, 2016, pp. 275–301). Emerging from this scientific background, presently there is a broad scientific consensus that vaccines are safe and effective means of controlling and eradicating infectious diseases. Although vaccines have contributed and continue to contribute to improving public health and have led to declines in mortality and morbidity rates for several infectious diseases (e.g., eradication of smallpox, declines in measles, mumps, rubella (MMR), diphtheria, and polio), skepticism and resistance to their effectiveness are increasing (Bauer et al., 2021, pp. 703–713; Dubé et al., 2013, pp. 1763–1773). To successfully reduce the prevalence and incidence of vaccine-preventable diseases, vaccination programs rely on high vaccination coverage rates.[1] However, as history shows, there has always been resistance and skepticism about vaccination (Wolfe & Sharp, 2002, pp. 430–432).

1 For insight into global vaccination coverage, data from the WHO Global Health Observatory (https://immunizationdata.who.int/listing.html?topic=coverage&location=) are highly useful. Vaccination coverage varies by vaccination, geographic location, and access to vaccination services. To provide an example, the measles vaccination data (first and second doses) will be used. Based on the WHO data, globally, the vaccination rate for the first vaccine dose was above 50% vaccination coverage in 2021. However, a significant percentage decrease can be observed for the second dose in 2021; in the African Region, the Eastern Mediterranean Region, the European Region, the Region of America, the South-East Asia Region, and the Western Pacific Region, the vaccination rate remains the same for the first and second dose.

The publication of an article in *The Lancet* by Andrew Wakefield and his colleagues in 1998 voiced presumptions that the MMR vaccine may cause behavioral regression and developmental problems in children (Rao & Andrade, 2011, pp. 95–96). The authors claimed that "possible environmental triggers" (i.e., the vaccine) were associated with the onset of both the gastrointestinal disease and developmental regression (Rao & Andrade, 2011, pp. 95–96). Despite the fact *The Lancet* retracted the published article and Wakefield was held accountable for his misrepresentations and misstatements, the article continues to be cited and referenced when questioning vaccines. Both *The Lancet* article and many other misrepresented facts in certain media outlets can greatly influence vaccination decisions. The choice to receive a vaccination or not extends beyond personal impact and carries societal implications, influencing both individual and collective well-being (Giubilini, 2021, p. 5; Korn et al., 2020, pp. 14890–14899). Consequently, understanding the societal implications of individual vaccination decisions requires an exploration of ethics, which involves the consideration of values and principles that are intended to govern behaviors that are not only or not exclusively in one's own interest and societal expectations (Korn et al., 2020, pp. 14890–14899). Vaccination is considered a social act precisely because it provides indirect protection by reducing the transmission of infectious diseases (Böhm et al., 2016, pp. 183–195; 2019, pp. 381–391; Korn et al., 2020, pp. 14890–14899). Due to this rationale, choices regarding vaccination are often referred to as an illustration of the social contract, given that the potential risks linked to vaccination are generally outweighed by the risks posed by the disease in question (Korn et al., 2020, pp. 14890–14899; Weinstein, 2000, pp. 65–74). Nevertheless, the social contract presents a conundrum, as it requires trust in the relevant agencies and the government (Korn et al., 2020, pp. 14890–14899). However, due to the occasional lack of trust, the social contract frequently comes under scrutiny and serves as a platform for various groups and individuals to advance their own opinions and fuel fears (Kates et al., 2022, pp. 1445–1447; Korn et al., 2020, pp. 14890–14899). Therefore, aversion to vaccination may be seen as the result of biased information processing or inadequately informed decision-making, e.g., due to distorted and exaggerated portrayals of risks associated with vaccination or due to conspiracy theories (Betsch et al., 2011, 742–753; Brewer et al., 2007, pp. 136–145; Hollmeyer et al., 2009, pp. 3935–3944).

3 A Concept of Vaccine/Vaccination Hesitancy

As vaccination hesitancy becomes more of a global issue in the fight against various infectious diseases, the Special Advisory Group of Experts and Canadian physician Noni MacDonald (2015), who study global health and vaccination hesitancy, defined vaccine and vaccination hesitancy (p. 4161). Anthropologist Heidi Larson and colleagues (2022) position hesitancy toward vaccines as "a state or attitude of indecision and uncertainty about vaccination before a decision is made to act (or not act)" (p. 58). However, there appears to be a slight distinction between vaccine and vaccination hesitancy (MacDonald, 2015). According to MacDonald (2015), vaccine hesitancy refers to the reluctance or refusal to be vaccinated, not the vaccine itself (p. 4161). On the other hand, vaccination hesitancy is a multifactorial issue that is highly influenced by "[specific contexts], varying across time, place and vaccines" (MacDonald, 2015, p. 4161). It encompasses a wide array of "factors, [including access to] immunization services, … fear of needles, [and] a lack of concern [regarding] vaccine preventable diseases" (MacDonald, 2015, p. 4161). According to the article published by Larson and colleagues (2022), vaccination is facing increased "levels of volatility," which has been notably amplified by social media platforms and networks during the COVID-19 pandemic (pp. 58–65).

However, Peretti-Watel and colleagues (2015) argue that the concepts of vaccine and vaccination hesitancy are inherently "ambiguous," as they encompass varying levels of uncertainty and indecisiveness regarding specific vaccines or vaccination in general (para. 2). While the majority of the world's population accepts vaccination and acknowledges scientific progress; nevertheless, there are increasing voices of smaller groups who are hesitant about certain vaccines and raise skeptical opinions, especially due to the coronavirus pandemic (Dubé et al., 2013, pp. 1763–1773; MacDonald, 2015, p. 4161). This can range from complete acceptance to complete rejection (Larson et al., 2014, p. 2151; MacDonald, 2015, p. 4161). Changes in vaccination hesitancy frequently align with the emergence of "new information, [revised] guidelines, or [the disclosure of] newly

reported vaccine risks" (Larson et al., 2022, p. 58). These fluctuations, according to Larson and colleagues can stem from various factors, including diminished public trust in experts, political views, and extreme religious beliefs, which collectively contribute to evolving attitudes toward vaccines and vaccination (Larson et al., 2022, pp. 58–65).

In this context, social psychologist Milošević Đorđević and colleagues (2021) defined four possible behaviors based on previously published studies by health scientists Kumar and colleagues (2016) and MacDonald (2015) (p. 2). These can be defined using the proposed hesitancy continuum and range from "cautious immunization," "hesitating to vaccinate, being late with some vaccines," "selective vaccination," and "complete rejection of all vaccines" (Kumar et al., 2016, p. 2; MacDonald, 2015, p. 4161; Milošević Đorđević et al., 2021, p. 2). Given those identified behaviors toward vaccines and vaccination, the high variability and nuances between absolute acceptance to complete rejection is recognized (Milošević Đorđević et al., 2021, p. 2). For this reason, behavioral research, considering interdisciplinary approaches, may lend help to understand the underlying factors such as aversion and uncertainty. With increased understandings, especially on the part of academia and policy actors, new context-, community-, and vaccine-specific strategies can be developed to address hesitancy. This will require broad collaboration among different scientific fields and extensive discourse among many experts, as well as a better understanding of science denialism and why individuals display certain attitudes and intentions.

4 Theory of Cognitive Dissonance

Cognitive dissonance theory, developed by social psychologist Festinger (1957, pp. 1–32), explains conflicting information and its impact on attitudes and behaviors. Festinger posits that when an individual holds two or more contradictory cognitions, which encompass acquired knowledge, attitudes, norms, or beliefs from experiences, education, or other (media) outlets, cognitive dissonance can arise (Festinger, 1957, pp. 1–32; Harmon-Jones & Mills, 2019, p. 3). Cognitive dissonance can stem from logical inconsistencies, cultural values, specific opinions, or shifts resulting from experiences, necessitating the establishment of some form of balance (Festinger, 1957, pp. 1–32). Achieving this balance can be attained by either modifying behaviors or acquiring additional knowledge (Festinger, 1957, pp. 1–32). Overcoming cognitive dissonance can, therefore, be challenging as established beliefs are often resistant to reflection and change (Festinger, 1957, p. 6). The experience of cognitive dissonance varies in its impact and can influence decision-making and other behaviors.

Festinger's work on cognitive dissonance, particularly through his study of doomsday cults, demonstrates how individuals navigate conflicting beliefs and behaviors (Festinger, 1957, pp. 1–32). This study, in which Festinger and his colleagues insinuated themselves as believers, aligns seamlessly with his theory of cognitive dissonance and reveals intriguing reactions when prophecies fail (Festinger et al., 2008).[2] Cognitive dissonance theory, based on the premise that people seek consistency between thoughts, feelings, and actions, therefore, provides profound insights into the intricacies of belief systems and the challenges of cognitive dissonance in the face of contradictory beliefs. Festinger's research addresses the pressures for consistency in human cognition and behavior and lays the groundwork for future investigations that can further explore the complexities of cognitive dissonance in various contexts. By making connections to diverse fields such as apocalyptic thinking, environmental discourse, consumer behavior, and vaccination behavior, among others, future studies can illuminate the processes of human decision-making and cognition.

2 This method is considered ethically problematic by some researchers. Ethical concerns about covert research often stem from the deception involved, as researchers sometimes conceal their activities from participants. Covert research is conducted without disclosing to subjects that research is being conducted. Examples include researchers attending public events and writing about them, or observing people in public spaces, such as noting how many individuals are jaywalking. Deception occurs when researchers mislead subjects about the nature of their activities, as in the Milgram experiments or the Stanford prison experiment. Although covert research may be necessary to avoid influencing participants' behavior, it is crucial to engage in discussions about ethical research practices and to find a balance between overt and covert methods (for more, see Alves da Costa, 2020; Lugosi, 2006; Spicker, 2011; Van Deventer, 2009).

5 Theory of Planned Behavior

The theory of planned behavior (TPB), proposed by Icek Ajzen and extended by Martin Fishbein, builds upon the theory of reasoned action and incorporates elements of Festinger's dissonance theory. TPB offers a framework for predicting and understanding attitudes and intentions related to specific activities in a given context (Ajzen, 1991, p. 181). According to Ajzen, behavior is "a function of salient information, or beliefs" (p. 189). TPB asserts that human behavior is guided by an individual's beliefs, which in turn determine their intentions and actions (Ajzen, 1991, pp. 181–191; Fishbein & Ajzen, 2010, p. 223). These beliefs encompass information acquired through experience, observation, or external sources such as media and friends (Ajzen, 1991, pp. 181–191; Fishbein & Ajzen, 2010, p. 223; Madden et al., 1992, pp. 3–9). The authors identify three distinct categories of belief: behavioral beliefs, normative beliefs, and control beliefs (Fishbein & Ajzen, 2010, p. 223; Madden et al., 1992, pp. 3–4). Behavioral beliefs influence one's attitude toward a specific behavior and lead to favorable or unfavorable attitudes toward a particular behavior. Normative beliefs shape an individual's subjective norm regarding a behavior and lead to a "perceived social pressure to perform or not perform a behavior," and control beliefs contribute to perceived behavioral control and "provide the basis for perceptions of behavioral control" (Fishbein & Ajzen, p. 321; Ajzen, pp. 189). It is important to note that these beliefs may not always be accurate or truthful as they can be influenced by external factors or biases (Ajzen, 1991, p. 191). Despite their potential inaccuracies, these beliefs are considered valid by the individuals acting upon them. The combination of behavioral, normative, and control beliefs exerts pressure on an individual's intention to engage in a behavior (Ajzen, 1991, p. 181). Higher intention levels correspond to a greater likelihood of performing a behavior (Ajzen, 1991, p. 181). However, the execution of the behavior may also depend on external factors unrelated to motivation, such as time or financial constraints. Attitudes, subjective norms, and perceived behavioral control all play a role in influencing the intention to engage in a specific behavior.

These studies demonstrate that intentions can be predicted by factors such as attitudes, subjective norms, and perceived behavioral control. In a recent study conducted by Seddig and colleagues (2022), data were collected in April 2021 through an online questionnaire involving adults aged 18–74 in Germany (n = 5044), with the aim of predicting attitudes toward vaccination intentions (pp. 1–10). The findings revealed that personal beliefs, whether positive or negative, significantly influenced the intention to engage in a specific behavior (Seddig et al., 2022, p. 7). Moreover, the data collected supported the notion that trust in science plays a role in vaccine uptake (Seddig et al., 2022, p. 7). These findings suggest that an individual's attitude toward a behavior is shaped by their behavioral beliefs, which encompass the perceived likelihood of certain outcomes and experiences resulting from performing a behavior (Seddig et al., 2022, p. 7). The study concludes by suggesting the need for further research to gain a deeper understanding of individuals' decision-making regarding vaccination, particularly in relation to the application of theoretical frameworks such as the one discussed.

In light of the research presented, the TPB emerges as a relevant framework for understanding the complexities of human decision-making. The TPB's focus on an individual's beliefs, including behavioral, normative, and control beliefs, provides a foundation for analyzing how attitudes and intentions influence behavior. The study conducted by Seddig and colleagues (2022) serves as an example, identifying trust in science as a significant factor in influencing vaccine uptake and highlighting the central role of behavioral beliefs in shaping attitudes (pp. 1–10). Moving forward, research efforts can explore the dynamic interplay between attitudes, beliefs, and behavioral intentions. Examining the multiple factors that influence these aspects will not only enhance our understanding of human decision-making but also pave the way for the development of more effective strategies to promote informed behavior. Future research could explore the effectiveness of interventions tailored to address individuals' behavioral beliefs and their influence on attitudes, providing valuable insights for promoting positive behaviors and informed decisions in different contexts.

6 Conclusion

The COVID-19 pandemic has led to increased polarization, particularly in relation to vaccines, vaccination, and science, resulting in the spread of fears and uncertainties (Rosenbaum, 2021, pp. 1367–1371). Existing skepticism

toward vaccines has been amplified, and extreme views and opposition have become more prevalent. The abundance of information from various (digital) media platforms, particularly social media such as Twitter™ and TikTok™, has made it difficult to distinguish between accurate and false information. The media coverage has included misinformation, including conspiracy theories, fake experts, selective reporting, misrepresentations, rumors, and false prevention methods, among others (Dentith, 2014, p. 125; Liu & Li, 2021, pp. 1–17; Diethelm & McKee, 2009, pp. 2–4; Douglas et al., 2019, p. 4; Liu, 2012, pp. 129–134). This highlights how (new) information, when taken out of context, can shape narratives that align with individual worldviews (Jamison et al., 2020, pp. 1–10). It is therefore critical to address these challenges with transparency and public engagement. It is important to bridge the gap between experts from different scholarly fields and the public to build trust and understanding.

Engaging citizen science holds promise for advancing research in this field, contributing to democratizing policymaking, and investigating the reasons behind vaccine and vaccination hesitancy in societies. Beyond simply disseminating research findings to the public, citizen science fosters direct collaboration between scientists and nonexperts, providing a platform for meaningful interaction throughout the research process (Silvertown, 2009, pp. 467–471). This inclusive approach goes beyond communication, offering nonexperts the opportunity to actively participate in scientific endeavors, enhancing their understanding (Silvertown, 2009, pp. 467–471). Recognizing the diverse perspectives shaped by individual experiences, citizen science becomes a valuable way for scientists to understand the world through the eyes of citizens, acknowledging and respecting differing opinions (Del Savio et al., 2016, pp. 1–3, 12–13). Far from challenging the authority of science, citizen science opens new avenues for participation and is closely linked to learning itself (Bonney et al., 2014, pp. 1436–1437).

The development of a COVID-19 vaccine triggered global anxiety, with social media platforms playing a significant role in polarizing and homogenizing groups around health issues (Del Vicario et al., 2016a, pp. 554–559; 2016b, pp. 1–12; Milošević Đorđević et al., 2021, p. 2; Puri et al., 2020, pp. 2586–2593). Individuals often gravitate toward information that aligns with their preexisting beliefs, exhibiting a cognitive phenomenon known as confirmation bias. Assistant Professor of Medicine Lisa Rosenbaum contends that this growing polarization of science has led to an increase in antiscientific sentiments and heightened disdain for science denial (Rosenbaum, 2021, pp. 1367–1371). These sentiments are often misconstrued as manifestations of fear of the unknown (Rosenbaum, 2021, pp. 1367–1371). Right-wing political parties and figures in Europe and the United States have promoted conspiracy theories and opposition to the COVID-19 vaccine, influencing their followers (Dolman et al., 2022, pp. 1–4; Puri et al., 2020, pp. 2586–2593). In doing so, alternative media outlets and right-wing populism often offer simplistic solutions that challenge the authority of the state, science, and scientific consensus (Cascini et al., 2022, p. 44; Swami et al., 2011, pp. 443–463). This may be accompanied by a general tendency to oppose state efforts to contain the pandemic (including the vaccination campaign). The term “science denial” refers to the use of pseudoscience and rhetorical arguments to create the illusion of legitimate debate, despite scientific consensus on certain issues such as the effectiveness of vaccines (Diethelm & McKee, 2009, pp. 2–4). The goal is to refute a claim for which there is scientific consensus, such as that vaccinations help eradicate infectious diseases. Underlying science denial are economic, political, or psychological interests that lead to biased beliefs (Diethelm & McKee, 2009, pp. 2–4; Hornsey & Fielding, 2017, pp. 459–473). Science deniers are driven by their skepticism of a particular scientific account or theory, for example, by a lack of trust in political actors, experts, or the media (Diethelm & McKee, 2009, pp. 2–4; Hornsey & Fielding, 2017, pp. 459–473). It is important to distinguish here, however, between denial and skepticism, as skepticism can contribute positively to scientific progress by encouraging further research and debate (Ecker et al., 2022, pp. 13–29). Skepticism is one of the foundations for advancing science by examining, questioning, and scrutinizing the facts (Schmid & Betsch, 2019, pp. 931–939).

The theories of cognitive dissonance and planned behavior can explain how individuals’ attitudes, values, norms, beliefs, and emotions based on their experiences influence their decisions to get vaccinated or not. The COVID-19 pandemic has demonstrated yet again the impact of emotions, beliefs, and worldviews on people’s behavior. The uncertainty surrounding the disease has created risk awareness and can lead to the devaluation of scientific knowledge, reducing cognitive tension (Sachdeva, 2022, pp. 1–20). People may create new realities and truths to resolve cognitive contradictions, even if those beliefs are not based on evidence. This provides an

opportunity for opponents and political parties to spread false information and influence individuals' beliefs in times of (extreme) uncertainty. Therefore, cognitive dissonance theory and the theory of planned behavior highlight how belief systems can influence human behavior, which is complex and dependent on various factors. Beliefs are often based on information from others and faulty reasoning, leading to inaccurate behavioral, normative, and control beliefs. These theories provide valuable insights for understanding dissonance behaviors and their influences in social, political, economic, and ecological discourses, particularly in the context of decisions that impact societies, such as vaccinations. Opinions and views can evolve or change over time based on experience, increased knowledge, and cultural factors, but this requires self-reflection and the willingness to live with cognitive dissonance instead of immediately justifying it.

Poor communication between science and society is also a contributing factor to vaccine hesitancy, which needs to be improved. It is crucial to communicate knowledge in a credible, accurate, and easily understandable manner, particularly in public debates where scientists and scholars should be involved to support knowledge transfer. The public health benefits of high vaccination rates should be emphasized, and it should be understood why people reject certain vaccines or immunizations. Heidi Larson argues that the pandemic highlights the need for science to understand the public, going beyond simply promoting scientific excitement (Rosenbaum, 2021, pp. 1367–1371). This view is consistent with the inclusion of theories regarding human behavior to reduce the discrepancy between science deniers and science proponents. The COVID-19 pandemic has underscored that the well-being of societies hinges not only on scientific knowledge but also on the comprehension of why people exhibit skepticism and lack trust, particularly in the context of vaccines and immunization. Researchers and scholars should actively participate in public debates, providing credible and accurate information in an easily understandable manner. It is time for interdisciplinary and transdisciplinary research across academic and nonacademic fields to bridge the gap between science deniers and proponents. Transparency and open discussions are key in this endeavor. While discussions may become heated, it is essential that they remain respectful and nondiscriminatory, avoiding whataboutisms and talking down to people. By promoting transparency, open discussions, and understanding, vaccine hesitancy can be reduced.

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Research Article

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Considerations of Post-Pandemic Life

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Abstract: Although the duration of a pandemic has a limit, it is also a time wherein we comport ourselves toward a world where there is a pandemic. Pandemic time can be a time of panic, during which we may attempt to find solace in the comforting objectivity of the sciences. However much science is necessary, we should remember that science is not the only relevant discourse. Further, adjacent to the particulate matter that spreads airborne contagions, pandemic time can be a time of minuscule identity, the forgetting of our collective being when we are overwhelmed by a concern for personal survival. During a pandemic time, without a collaborative approach to scholarship in general, we can become stuck in pandemic time and isolated as precisely calculating beings that survive only to reproduce iterative knowledge and maintain existing routines.

Keywords: pandemic, particulate matter, air pollution, environmental pollution

1 Introduction

This article turns toward the historical present of post-pandemic life, attempting to imagine how life proceeds from here.

We are grateful to be able to situate this article within a series of broader examinations of air and environmental health in a (post-)COVID-19 world. Those examinations include this special issue, which is based on an international conference on airborne diseases in history, literature, and culture where an earlier version of this article was presented.

In considering air and environmental health in a (post-)COVID-19 world here, we would note that post-pandemic life is “post” not necessarily in the sense that the threat of pandemics is now forever over. Rather, because the event of a global pandemic has occurred, and the lessons learned should not be forgotten for the sake of the health of living beings, the world is now situated in a time that is always already after this event and ever shaped by it. As authors, we here refer to living after such a pandemic event as *pandemic time*.

Prior to the COVID-19 pandemic, it might have been difficult for some to imagine a pandemic on a planetary scale. Nevertheless, there were serious outbreaks of severe acute respiratory syndrome-related coronavirus (SARS-CoV-1) in 2002–2004 and again in the 2010s, primarily in China and surrounding areas in Asia. There were also outbreaks of Middle East respiratory syndrome-related coronavirus (MERS-CoV) from 2012 onward. What people would come to know as SARS and MERS, however, were outbreaks that were, for the most part, regionally contained. This allowed people living, working, and traveling outside the affected areas to minimize what was happening and compartmentalize SARS and MERS as events that were happening somewhere else, in sufficiently distanced, separated, and remote *over theres*. Still, SARS and MERS were indicators of what could happen *elsewhere*, wherever that may happen to be. Put differently, SARS and

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MERS were a caution that pandemics could happen *anywhere* and *everywhere*, and as public health experts had already warned, one did.

As we find ourselves during the pandemic time at the time of this writing, we pause to consider the possibilities and perils of post-pandemic life. As such, the first section of this article offers scientific perspectives on environmental pollution and airborne disease, especially as they relate to various forms of particulate matter. From there, the second section of this article offers philosophical perspectives on the fantasy of absolute fluidity, delving into time, identities, memories, routines, and imprecisions along the way. By juxtaposing discussions of scientific perspectives with philosophical and sociocultural perspectives, we illustrate how we might move from pandemic-related obsessions with death toward affirmations of life by avoiding the traps of nostalgia and reexamining our daily lives. In so doing, we put scientific discourse into dialogue with some of Luce Irigaray's thinking as an initial springboard in *The Forgetting of Air*.

2 Scientific Perspectives on Environmental Pollution and Airborne Disease

According to the World Health Organization (2022a, 2023), nearly every human on Earth is now potentially breathing unsafe air. Only 1% of people breathe air believed to be uncontaminated by high levels of pollutants. The remaining 99% of people live in a world in which it has been known that "outdoor and indoor air pollution cause respiratory and other diseases and are important sources of morbidity and mortality" (WHO, 2023, p. 2). Although air quality is often framed as a shared problem, the WHO acknowledges that air quality is a shared problem that is not shared equally.

Air quality is closely linked with health outcomes, as evidenced by growing bodies of literature on the many forms of air pollution and the myriad threats each presents to public health. Notably, some forms of air pollution come with recommended quantitative guidelines from nongovernmental health organizations and environmental groups; currently, there are other forms of air pollution that are not attached to similar regulatory suggestions. For instance, the WHO (2023) offers recommended guidelines for air pollutants such as carbon monoxide, nitrogen dioxide, sulfur dioxide, formaldehyde, polycyclic aromatic hydrocarbons, radon, and lead. Still, without establishing similar recommended guidelines for black carbon, ultrafine particles, and mold, the WHO more simply draws attention to each of these, instead. Black carbon, ultrafine particles, and mold are significant, however, in that they are each type of particulate matter. According to the U.S. Environmental Protection Agency (2022), particulate matter, also known as particle pollution, is "the term for a mixture of solid particles and liquid droplets found in the air" (par. 1).

Air pollution includes different types of ambient particulate matter. Particulate matter is measured in microns (or micrometers) and is often abbreviated as $PM_{2.5}$ or PM_{10}, in reference to the particulate's diameter. Whereas PM_{10} includes larger, coarse particles from sources such as roads, construction sites, mining operations, farms, sawdust, pollen, and sea spray, $PM_{2.5}$ includes fine particles emitted from the combustion of diesel fuel, gasoline, wood, oil, coal, and natural gas in home heating, transportation, and industrial manufacturing. $PM_{2.5}$ is also produced indoors by burning candles, using common cleaning supplies, taking showers, and cooking food (such as when frying, sautéing, broiling, and more). This is beyond the carbon monoxide, nitrogen dioxide, and formaldehyde that can be released into the air when cooking with natural gas. The lists of $PM_{2.5}$ and PM_{10} continue much farther than most would care to know. Dust, bacteria, and mold, which vary in size, are considered to be examples of both $PM_{2.5}$ and PM_{10}.

It is $PM_{2.5}$ that has been of elevated concern from the standpoint of public health, as researchers continue to find that exposures to higher levels of indoor and outdoor $PM_{2.5}$ increase the risk of serious health effects. Because $PM_{2.5}$ can travel far into the lungs and even into the bloodstream, fine particles can contribute to acute and chronic respiratory diseases, heart diseases, lung cancers, strokes, and other health risks. Yet, these risks are not distributed evenly around the world, especially when it comes to the Global South. In one recent study, for example, Yang et al. (2023) modeled multiple potential future scenarios from 2015 to 2100 involving global patterns of warming and $PM_{2.5}$-related deaths. In suggesting that existing inequalities in air quality and health

are likely to persist, Yang et al. (2023) predict that "64–69% of the global cumulative deaths [will be likely to] occur in only three regions: China, India, and Africa" (p. 60). However, as much as air pollution and ambient particulate matter represent planetary challenges, not everyone will experience these challenges to the same degree. Not unrelatedly, the same unequal distribution of effects has also been the case for COVID-19.

The relationships among air pollution, environmental health, and well-being have received increased attention amidst the COVID-19 pandemic, and the disproportionate effects of SARS-CoV-2 (or severe acute respiratory syndrome coronavirus 2) have been attributed in many areas, at least in part, to differences in the quality of air. As Wang et al. (2020) write:

> Air pollution exposure can dysregulate the human immune response and make people more susceptible to infections, and affect infectivity. For example, in response to exposure to air pollution, angiotensin-converting enzyme 2 will increase, which is the receptor for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This may increase the efficiency of viral infection. It is also possible that air pollution can facilitate SARS-CoV-2 spread by increasing the transmission, and potentially, SARS-CoV-2 can also survive longer when attached to a pollutant. (p. L416)

By way of example, Wang et al. turn to influential work early in the pandemic, in which Setti et al. (2020) found that "[t]he high concentration of dust and airflow conditions in northern Italy could promote SARS-CoV-2 viral transmission by forming clusters with PMs" (p. L419).

In other words, unsafe air has the potential to exacerbate the effects of COVID-19 and other future pandemics. Particulate matter offers infectious agents vehicles of sorts, which can enable them to survive longer, travel further, and cluster together. The forgetting of air, along with varying levels of awareness around the everyday and pandemic-related dangers of ambient particulate matter, raise urgent and collective questions about what to do and how humanity can better respond.

3 Philosophical Perspectives on the Fantasy of Absolute Fluidity

In cautioning against the forgetting of air, Irigaray (1999) writes: "Air does not show itself. As such, it escapes appearing as (a) being. It allows itself to be forgotten even by the perceptual ability of the nose. Except in cases where human activity has fabricated the air to begin with" (p. 14). Here, though not writing about pandemics explicitly, Irigaray's thought helps to remind us that in moments that are not of pandemic time, the air is a shared connection, the air is life, and the air is breath; the air is something that we as humans can all too easily forget. Amidst the business of our daily travels and routines, we can forget that air is what surrounds us, fluidly crossing geopolitical borders through wind currents, jet streams, weather patterns, and atmospheric circulations. We can forget that air is something we inhale approximately 12–20 times a minute, 22,000 times a day. And in this forgetting of air, we can remain largely unaware of what it is we breathe.

While the forgetting of air can be a failure of individuals, this forgetting can also be a collective action in matters of the politics. For instance, a utopian imagining of a peaceful world without national territories or the tensions pertaining to cultural borders, let us say, would nonetheless contain ontological beings who would be free only inasmuch as they are still constrained by air. Such beings would still be inescapably bound, not by the borders of nations or cultures, but by the boundaries of air. Just as the physicality of fluid ontic beings is nonetheless bounded, ontological fluidity in the absence of restrictive governance is similarly bound by physical constraints, including by the bounds of the ontological being itself.

And what are these bounds of ontological being, but the bounds of time when ontological beings are but beings-for-death? This boundedness to time does not make itself especially apparent when imagining utopic futures, but it does become salient when one imagines better times in the past, falling into the iterative traps of nostalgia. Nostalgia offers us a way to distinguish the time we typically experience from pandemic time and its infectious fluidity, much like the fluid air-bearing pandemic causing pathogens. However, pandemic time and pandemic air are fluid in the sense that there is a necessary forgetting. What is forgotten is that absolute fluidity is but a fantasy, for even the fluid itself, constitutes a boundary, and the temporal stretching of ontological beings between birth and death, while fluid, is indeed terminal. To be sure, ontological being in

any form is terminal for all mortal beings. It is only that pandemic time makes death more salient, whereas otherwise, death remains hidden.

3.1 Fluid Time

For Irigaray in *The Forgetting of Air*, philosophy is preoccupied with a revealing: the revealing of death. Death, as Irigaray notes, is "what remains, and what must remain, hidden: philosophy's fundamental method for causing death. But isn't it as a kind of lack of air, in all its various forms, that this method operates?" (Irigaray, 1999, p. 7). And why is this sort of death a lack of air, a suffocation? Again, Irigaray (1999) asks this:

> Is not air the whole of our habitation as mortals? Is there a dwelling more vast, more spacious, or even more generally peaceful than that of air? Can man live elsewhere than in air? Neither in earth, nor in fire, nor in water is any habitation possible for him. No other element can for him take the place of place. No other element carries with it – or lets itself be passed through by – light and shadow, voice or silence. No other element is to this extent opening itself – to one who would not have forgotten its nature there is no need for it to open or re-open. No other element is as light, as free, and as much in the 'fundamental' mode of a permanent, available, 'there is.' (p. 8)

Air is indeed fluid, but our conception of fluidity is imprecise. By this, we do not mean that our definition of fluidity is vague, but that the way in which we often think of fluid is that it has the quality of being imprecise. Imprecision is not, of course, always a negative thing.

In a pandemic time, death is more salient because the air can also be literally filled with it. Death is in the air, so to speak, but death can also be literally in the air in the form of particulate matter. Whereas air, the medium of life for most non-marine creatures, is mostly forgotten, during the pandemic time, air is no longer forgettable as the medium through which death travels and comes to fall upon living beings.

Furthermore, pandemic time is a time of miniscule identity, the forgetting of our collective being- when we are overwhelmed by a concern for personal survival. In pandemic time, there is a nostalgia for what was pre-pandemic, as though in pre-pandemic times, ontological beings did not die. Obviously, this is not the case. It is only the case that pre-pandemic times allow us to disavow that life only moves toward death. Thus, the nostalgia for pre-pandemic times is but a type of anxiety where there is something lost – one knows not what – in the past. It may seem that what is lost is an immortality of sorts, but what is actually lost, when the panic of pandemics thrusts us into an "everyone for themselves" mentality, is that we forget that when we work together to govern ourselves for collective and shared benefit, it is possible, not to disavow death, but to collectively avow life.

As such, so long as it is not too late, we can collectively avow life. We can govern together so that we might survive mass extinction. We can remember that together, we are not miniscule beings as tied to death as deadly particulate matter. We can remember that pandemic time is not a durational time marked out by dates, but a world time wherein we orient our being, as being-for-death. We can change this, so long as we do not forget air.

3.2 Fluid Identities

Depending on the context, there are several ways in which the fluidity of identity is positive. Many discourses on identity, for instance, use the notion of fluidity as something that is empowering or liberating, ontologically speaking. Here, one is not necessarily locked into ideologies of imposed definitions that lock into particular subjectivities. However, one can imagine another side of this fluidity regarding identity goes too far in asserting that everything about all possible identities is absolutely fluid. Such a conception of absolute fluidity can instead make subjectivity aimless, or in other words, imprecise to the degree that no truth-telling about subjectivity can ever be spoken. For instance, a politician cannot identify as a champion of environmental causes and at the same time bend policy and law to favor polluting corporations. Herein one can see how imprecision might not always necessarily be positively valenced, which is of course not to say that it never can be.

Imprecision, for instance, can lead to errors when it comes to things we value, and it can further be the basis of legal loopholes or policies that can be exploited by those who are clever enough to do so for personal gain. In other words, the value of imprecision depends upon how we apply the imprecise to what we value. Imprecision, then, is instrumental, and instruments can be used for different purposes depending upon one's intention or inattention, either deliberate or indeliberate. However, imprecision is not a material instrument, such as the many instruments that make up our technologies.

Let us consider a pair of examples: First, perhaps motivated by an unconscious, nostalgic desire to escape one's own death by being remembered, many of us may document our otherwise aimless days through digital photographs and archive them on the internet. However, creating our own personal archives is neither necessarily historical documentation in the proper sense, nor is it methodologically scientific in terms of social science research. Still, what we do could be of value to social science or historical study. In this example, what is shown is that imprecision as a theoretical instrument has a value that has much to do with how precise our measurements need to be. Thus, whether or not the imprecision of fluidity is positively valued or negatively valued depends upon the context.

Second, moving from the example of the self-obsessive activities of Facebook to a more Levinasian philosophy, is it the case that one needs to know someone's name to be concerned about them, or does one only need to see their face, albeit an anonymous one? In the context of science, for example, do we need to make precise, laser-like calculations, such as in manufacturing, launching, and operating the James Webb Telescope? Or perhaps, like the science of topology that can account for the imprecise, fluid qualities of deformable objects, are our measures deliberately designed to allow room for the uncertainty of the random or stochastic, as we often do? Here, fluidity can be of much use when accounting for the will of ontological beings, a will that we presume to be free from the strictures of determinism, but not necessarily resistant to things beyond our control.

What is more paradigmatic of things being out of control than a pandemic where the air that we breathe, the air that constitutes our only habitat, is filled with a death that cannot be hidden? Just as the particulate matter causing the disease is too small to see, so too are our memories unresolvable, only perhaps rather than being too small, they are too large. While nostalgia might refer to a bounded duration of time, the iterative possibilities of memory make them infinite. Just as we become trapped in our routines, we can become trapped in our own archives. We can become trapped in the archives of scholarship, social media, and things we cannot forget. When we are trapped in our own archives, we are also trapped in an incongruity of measure, when the scale we are using to measure what needs to be known does not match how we need to know it. This can be especially dangerous when there is a forgetting of the plural object of "population" because there is an overactive remembering of "individuals," who only remember themselves in times of crisis. In truth, like the air which is atomic, molecular, and fluidly unified, populations are individually singular, collectively plural, and collectively one all at once. Thus, the remembering of sets of ontological beings must match the fluidity of that set. This fluidity cannot be forgotten, especially when there are threats to survival.

3.3 Fluid Memories

When we become trapped in our own archives, we turn our being into a miniscule, solitary being. When this happens, people become as microscopic as the particulate matter causing a pandemic. They are unseen and trigger death. If particulate matter can cause biological death, the anxious nostalgia of pre-pandemic routine, on an infinite loop, is but a re-living of a sort of second death, the death of an ontological being as a symbolic subject. When we become trapped in our archives as miniscule, solitary beings precisely cut off from being with, we are subjects no longer, but beings who mindlessly and lifelessly repeat like siloed robots, not ontological beings who live within the community of others.

Herein we might draw a distinction between imprecision and the precise. Imprecision, as we have noted, can be positively or negatively valenced when it comes to what we value. Precision, however, is typically valued when we work within the realm of the sciences that purport to be objective. The sciences, through their

precision, wish to cut off the subjective as a matter of practice. While we would not support an idea of subjective science in a way that would lapse into a dangerous relativism, we might point out that when the sciences become not just the dominant discourse during pandemics, but the only discourse, this precision – which literally means a cutting off – can also be inadvertently dehumanizing.

3.4 Fluid Routines

Fluid routines are articulated when humans become precise machines of routine that reproduce only their habits. The pandemic destroys the community. When we are cut off from the plurality of subjects that constitute a community, when we are miniscule, solitary beings, just as we cannot escape the air in the pandemic – for ceasing to breathe is death itself – we cannot hope to escape pandemic time, this iterative time wherein we are doomed to what Nietzsche (2001) called an eternal return. We might try to move places, to escape by moving beyond what we might think are spatial borders, but just as all habitable space is permeated with air infected with particulate matter, all space is permeated with pandemic time. Both air and time are inescapable in general, and when both air and time are filled with death as in the pandemic time, our mortality becomes all too salient, and this revealing is one that cannot go into hiding. Death cannot be disavowed, but then it becomes all too pervasive. And just as air knows no national borders, neither does the time of a pandemic.

The particulate matter is in the air, carried not only by traffic but also by wind patterns. Here is where the fantasy of absolute fluidity might be found, when it might be forgotten that the fluidity of air itself is not something that can never be solidified, like for instance dry ice. Air contains particulate solids, though it is not a magical vacuum that is at the same time something while containing nothing of itself. In the absence of the air-tight, air always leaks in, and is not itself insusceptible to leakage. This cannot be forgotten in an environmental context, though this forgetting is perhaps abetted by our literary philosophies of air. Something is in the air, always *in* the air as though the air is not itself an object, but a fluid container uncontained.

While people may be quarantined, the air itself cannot be governed into immobility, nor can time. Both air and time always flow. So, when Nietzsche (2001) speaks of "bad air," when he speaks of what he feels to be the life-negating aspects of European culture, what is bad about the air itself, other than the things that fill it?

Are pandemic air and pandemic time naught but an iteration of the air and time of the Anthropocene itself? Is this not only a crisis of climate, but a crisis of governance, at our inability to govern globally to save ourselves?

If there is indeed a forgetting of air, then there, too, perpetually lies a danger in the remembering of air while still forgetting that the air is not just an imprecise medium for whatever we need it to be, but a thing itself. Air is the only habitat of terrestrial animals, among them humans, who, through extractive practice, take not only from the land, but perhaps if things go as planned, also from the ocean – the other fluid being on our planet – through technological proposals such as marine cloud brightening. It is as though the air is matter that we are able to pass through, yet it never passes through us; as though the air is an unyielding resource that we can fill without overfilling; as though the air is the blank space where we can technologically project our will; as though it is an always welcoming container that can never exert pressure on us, though we know full well that this is far from true as we watch climate change create more and more severe hurricanes and extreme weather phenomena. The air carries the airborne particles of disease, and the science of 5 microns has been shown to have very little basis in fact other than something that was iterated as though it were a well-established measure (for example, Molteni, 2021).

3.5 Fluid Imprecisions

At the end of the day, though the air is indeed fluid, the fluid has only become the way through which we conceive of the imprecise, a metaphor that itself is easy to forget about as merely a metaphor. The fluid may be unpredictable, but there is microscopic precision regarding the air, one made especially salient during the

pandemic time. It is just not a precision we are able to keep at the forefront of our minds because we lack the resolution – both the will and sensory capacity – to do so. Metaphorically speaking, this microscopic precision can be a discursive trap when it is the precision that cuts off humanity from humans. We can and should value precision, but not at the expense of valuing it absolutely. Again, absolute fluidity is a fiction. No matter in extended space is absolutely fluid inasmuch as it is composed of matter, however small. Absolute fluidity would require a fictional substance made up of geometric points with no extension, things which are only a mathematical possibility. The mathematical can forget boundaries owing to its constitutive logic that allows for an infinitely precise symbolic proliferation, but this is but a Hegelian "bad infinity" (Hegel, 1969). This misunderstanding of the mathematical would have us also mistake air for absolutely fluid. The absolutely precise is but a human construct, but it is not the reality that is the human's medium.

Pandemic or not, fluid, yet always already bound, the fantasized forgetting of the boundaries of air presents a crisis for the dwelling of ontological beings, who may be unbounded by the structures of governance, but still ineluctably constrained by the concern of death. And what is worse? Pandemic air and pandemic time are now suffused with the specter of the Anthropocene. We seem to be unable to help but be caught in our temporal loop of filling the air and the time of our historical present with the microscopic pathogen of carbon, for the Anthropocene is a pandemic that infects our air. As the days continue to pass, what is ever more revealed is that this death will not only be unhidable, but also have the finality of mass extinction.

4 Carbon Pandemics and Pandemics Yet to Come

Even as we are still in the immediate aftermath of *this* pandemic, the COVID-19 pandemic, public health experts and nongovernmental organizations are increasingly warning of additional future pandemics to come. The range of pandemic types is expected to become more varied and more interrelated from this point onward. Climate change is expected to be a significant driver of future pandemics, and as pollutants and PMs continue to be emitted into the air, planetary boundaries and thresholds continue to be exceeded. Not only are black carbon and carbon dioxide contributing to rising temperatures, but also increasing temperatures are expected to contribute to a release of new disease vectors, such as ancient viruses that have been frozen in the now melting ice, an increase in zoonotic diseases, and the proliferation of mold and fungus.

In terms of the potential for additional pandemics, airborne pathogens are of particular concern to the WHO. In observing that fungal pathogens and infections should be recognized as an increasing global health concern, for example, the WHO notes that there has already been an increase in fungal infections associated with the COVID-19 pandemic (WHO, 2022b, p. 1). The people who have been most at risk for invasive fungal disease, or IFD, are people whose immune systems are already weakened. This includes people with viral respiratory tract infections, chronic lung disease, lung cancer, and chronic obstructive pulmonary disease. In short, some of the people who are most at risk of IFD include people whose immune systems have already been weakened by exposure to particulate matter. It is possible, then, that just as COVID-19 may increase vulnerabilities to IFD, IFD, in a mutually reinforcing cycle, may increase vulnerabilities to COVID-19. It is no wonder, then, that the WHO recognizes climate change as the greatest current threat to human health (WHO, 2021, p. 1), especially given that climate change is expected to create an increase in future pandemics.

Disruptions to the jet stream are contributing to extreme weather events, including record wildfires in Canada that are burning at the time of this writing. As the wildfires are adding more carbon emissions and pollutants into the air, scientists are attempting to calculate and keep track of the environmental toll. Although the peak of wildfire season has yet to be reached, scientists from the Copernicus Atmosphere Monitoring Service (CAMS) have indicated that in the first half of 2023 alone, "accumulated carbon emissions from wildfires across Canada total 290 megatonnes. This is already more than double the previous record for the year as a whole and represents over 25% of the global total for 2023 to date" (CAMS, 2023, p. 1). To say that the potential consequences are serious is an understatement. Increased carbon emissions will accelerate rising temperatures, shortening the timeline to effect change. Further, the resulting smoke (and pollutants that smoke

contains) has led to air quality alerts in Canada and beyond. As this has occurred, a weakened jet stream continues to threaten the health of biological life on this planet, carrying the smoke in unusual directions along the way. Whether from Canadian wildfires or from other sources, carbon emissions and airborne pollutants are creating and exacerbating public health hazards on a planetary scale. Separately and together, the ongoing challenges of carbon emissions and airborne pollutants raise pressing questions about what might possibly be done. These are questions that are intertwined not only with airborne disease, but with anticipated pandemics yet to come. For inasmuch as pandemics bring death, any situation of unsafe air is, in this sense, the time of a pandemic: if not viral, bacterial, or fungal, then of polluting particulate matter.

Without actively considering post-pandemic life amidst these challenges, we may be stuck in discourses that lose sight of the humanness of the human community. Without a collaborative approach to humanity, we can become stuck in a pandemic time and become isolated as precisely calculating beings that survive to reproduce iterative knowledge and maintain existing routines. As human ontological beings, we value producing the type of knowledge that allows us to avow our lives positively, to live not in the fantastical absolute fluidity as though we, too, were but miniscule pieces of particulate matter floating aimlessly in the air, but as humans with the purpose of communing and being together. We need to retain our humanity and clean our air so we might live together in this inescapably shared way. If not, we will cease to be human, because humanity itself will cease.

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