



## RESEARCH ARTICLE

# Nuclear war as a predictable surprise

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## Abstract

Like asteroids, hundred-year floods and pandemic disease, thermonuclear war is a low-frequency, high-impact threat. In the long run, catastrophe is inevitable if nothing is done – yet each successive government and generation may fail to address it. Drawing on risk perception research, this paper argues that psychological biases cause the threat of nuclear war to receive less attention than it deserves. Nuclear deterrence is, moreover, a ‘front-loaded good’: its benefits accrue disproportionately to proximate generations, whereas much of the expected cost will be borne in the distant future. Recent surveys indicate that the US and Russian publics assign a surprisingly high likelihood to nuclear war. Nevertheless, earlier research suggests that it is probably not believed to be just around the corner. This, along with the absence of easy solutions, encourages governments and publics to give priority to more pressing concerns. The danger is that the pattern will continue clear up to the point that nuclear war arrives.

## 1 | INTRODUCTION

Some risks, if we wait long enough, are bound to materialise. ‘In the case of asteroids’, observe Chichilnisky & Eisenberger (2010, p. 5), ‘we know with certainty that at some point in time one will hit the earth and destroy most life on the planet unless we take action’. Fortunately, we almost surely have thousands of years to address that threat (Chapman & Morrison, 1994). The same was not true of COVID-19. A pandemic sometime in the next few decades was widely foreseen (Botzen et al., 2021; Osterholm & Olshaker, 2020). Nor is it true of nuclear weapons. While the annual probability of nuclear war may be lower than that of another pandemic, it is surely much higher than that of our obliteration by a big rock (Ord, 2020). It would be unwise to assume that we have many decades, let alone millennia, to find a solution.

Pandemics and nuclear war have something else in common: despite strong reasons to think that they are just a matter of time, governments have taken insufficient

action. For years before COVID-19, experts warned that more must be done to prepare. Nevertheless, when it arrived, governments were caught flatfooted, notably in the United States (Osterholm & Olshaker, 2020; Phan & Wood, 2020). The pandemic was a classic example of what Bazerman and Watkins (2004) call a ‘predictable surprise’: an unforeseen disaster which decision makers had all the information they needed to foresee. A defining feature is that ‘while uncertainty surrounds the details of the impending disaster, there is little uncertainty that a large disaster awaits’ (Bazerman, 2006, p. 181).

Barring major change, nuclear war is on the way, yet decade after decade, states fail to prioritise the problem. An expert on environmental politics remarks that the obstacle to addressing global heating is not that people do not care, but rather that ‘it just never rises anywhere near the top of the list of most pressing issues. Those at the top often seem more immediate and integral to everyday life’ (Meyer, 2006, p.

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96). The same is true of nuclear war. Research in the 1980s showed that though many Americans believed it likely, few gave it much thought or – except for a few years in the middle of the decade – considered it one of the country's most important problems (Schatz & Fiske, 1992; Schuman et al., 1986). Two online surveys in 2018 found Americans estimating the probability of being affected by nuclear attack in the course of their lifetimes as close to fifty percent (Lytle & Karl, 2020).<sup>1</sup> Vladimir Putin's invasion of Ukraine later prompted discussion of nuclear conflict (Fisher, 2022). Yet by mid-2022, Americans were citing inflation as the most serious problem facing the country by a sizable margin (Doherty & Gómez, 2022). Social media analysis found Russians likewise most concerned about inflation and empty shelves despite fears that the conflict would escalate (Prakh, 2022).

In Russia for two decades, polling has shown nuclear war to be one of the public's chief international concerns (Fond 'Obshchestvennoe mnenie', 2015, 2018, 2019). Already in 1996, over a third of respondents reported being seriously frightened, with 28.7 per cent saying in 1999 that a third world war was inevitable (Pautova, 2016; PIR-tsentr, 2000; see also Petrova et al., 1999). Anxiety has since grown, with over half the population reporting some level of concern in 2019 (VTsIOM Novosti, 2019).<sup>2</sup> Yet this has not prompted serious efforts in either Russia or the United States to seek a solution. Though leaders express pious hopes for nuclear disarmament, few have faced up to the transformation of international politics that would likely be required to achieve it (Glaser, 2019; Pelopidas, 2021).

The major exception was Mikhail Gorbachev, whose dramatic overtures to the West sprang partly from economic problems but also from deep concern about nuclear war (Polynov, 2012). At the end of the Cold War, this opened a window for radical change. 'Of course, no one knows whether or not it will be possible to achieve a war-free world', wrote Booth and Wheeler (1992, p. 39), 'but considering Western Europe's evolution during the past 50 years (1940–90), from a Hobbesian state of war to a peaceful republican community, it does not seem impossible'. But while the West had made great efforts to win the Cold War, it did not give the same priority to winning the peace. Rather than reciprocating Moscow's overtures, NATO pushed toward Russia's borders. The nascent norm of working through the UN Security Council was broken in Kosovo and Iraq, leading to deep Russian disillusionment (Sarotte, 2021; Sauer, 2017; Sigal, 2000). By annexing the Crimea and now with his invasion of Ukraine, Vladimir Putin has taken a blowtorch to arms control (Schepers, 2022). Working towards a solution for the problem of nuclear weapons is clearly not among his priorities.

Why do states and publics tolerate a status quo that must end in disaster? The answer, this paper argues, is that nuclear war, like asteroids and pandemics

### Policy Implications

- Nuclear deterrence cannot be sustained indefinitely. Rather than focusing on its low probability of nuclear war in the short run, analysts, policy-makers and activists should emphasise its long-term inevitability.
- Much of the expected cost of nuclear weapons is externalised to future generations, while present-day possessors capture the lion's share of their benefits. Disarmament proponents must reckon with this fact.
- Since as things stand we are on track for nuclear war, governments should explore forms of deterrence that would limit the risk and extent of nuclear winter.
- Proposals for international reform should emphasise strategies for achieving peace enduring enough for political or technological change to occur that mitigates the threat of nuclear weapons. International relations research should prioritise the study of stable peace, and governments should prioritise its funding.
- Scholars and activists should recognise that nuclear weapons and climate change involve many of the same problems. They have much to learn from one another.

(Chichilnisky & Eisenberger, 2010; Phan & Wood, 2020) is a low-frequency, high impact threat. Great power war of any kind is rare, averaging about two per century in the modern era. Its absence since 1945 could be just random chance (Braumoeller, 2019).<sup>3</sup> Nuclear weapons, however, are widely thought to have reduced its frequency. Low-frequency, high-impact threats receive less attention than they deserve (Wiener, 2016). One reason is that they have not materialised recently, and are less evocative or at the forefront of people's minds. Another is that the costs of addressing them would fall on the present generation, but those of failing to do so will likely fall on future ones. This, along with the natural temptation to procrastinate on difficult problems not perceived as urgent, encourages each generation to kick the can down the road till disaster arrives.

## 2 | NOT WHETHER, BUT WHEN

Any event with non-zero probability over a finite period is all but inevitable, given long enough. This is true of asteroid strikes, hundred-year floods, pandemics, and nuclear war (Avenhaus et al., 1989; Boulding, 1984). To avoid the breakdown of nuclear deterrence, not

only would each component have to operate without a single slip-up everywhere for the rest of history, but we would have to foresee every contingency (Downer, 2011; Pelopidas, 2015). While we cannot rely on historical frequencies to estimate the probability of nuclear war, theory and history permit ballpark estimates (Hägström, 2016). It seems likely, for example, that the annual risk is closer to one in a hundred than one in a million (Barrett et al., 2013). That this risk is anthropogenic makes no difference to the statistical fact. Murder is an anthropogenic risk; nevertheless, if a city has a murder rate of 10 deaths per year, we can be confident that someone will be killed over the next decade unless there is a drastic change. Nor does it matter that the risk is partly under our control. So is the outbreak of pandemics, but we cannot avoid them in perpetuity. The absence of nuclear war since 1945 is partly a matter of skill, but also partly a matter of luck. Good luck eventually runs out.

Analysts have been strikingly reluctant to face these facts (Pelopidas, 2017). Noting efforts to avoid war on both sides of the Iron Curtain, Schroeder (1985, p. 87, emphasis in original) insists that it is not 'only *luck* [that has] kept the world from nuclear holocaust'. This reflects the binary way we think about luck (Pelopidas, 2022). When a plane delivers us safely to our destination, we do not regard ourselves as lucky to have survived the flight (Coffman, 2014). Instead, we attribute it the outcome to the pilot's skill, the reliable design of the aeroplane, the safety procedures characteristic of modern aviation, and so on. Nevertheless, now and then planes crash. When they do, their passengers are unlucky; conversely, when we avoid a crash, though it is in great part through skill, it is in some measure through luck (McKinnon, 2013). Even if good management makes disaster improbable in any given instance, airlines cannot expect their luck to hold forever. The same goes for nuclear deterrence. 'In the short term, we are talking probabilities', observes MccGwire (2006, p. 648), 'but in the longer term (as with earthquakes) we approach certainty'.

The eventual outcome, if we stay the course, is sure to be catastrophic. The next time nuclear weapons are used it may be in small numbers, against military forces rather than cities (Waltz, 2013a). But it is no more plausible that states will keep nuclear conflicts limited for the rest of history than that they can avoid them entirely (Rendall, 2007). True, if the probability of nuclear war is low enough, the problem may be solved before its outbreak – or something else may destroy us first.<sup>4</sup> 'If we are speaking of eight thousand years, for example', Nye (1986, p. 67) observes, 'humankind may have concerns other than nuclear war. And colonies in space will probably exist'. The record of the Cold War, however, does not suggest that we have nearly that much time (Baum et al., 2018). For nuclear peace to survive that long, radical changes

in the character of international relations would be needed.

Political realists will respond that the real obstacle is that the problem is intractable. That is not literally true. Nuclear disarmament would be feasible under an international government with the power to enforce it. It is not that disarmament is impossible, but that states do not give it priority over other values such as sovereignty. At the end of the Cold War, the United States rejected an even much less drastic reform of the international order (Sarotte, 2021). This presents a greater puzzle for realism than is often acknowledged. If states pursue security – as most realists believe – why do they tolerate a status quo that bodes catastrophe in the long run (Booth & Wheeler, 1992; Craig, 2003)?

### 3 | RISK PERCEPTION

A common explanation for the failure to act against global heating is that this risk is hard to discern. One reason is that we judge threats that we readily bring to mind to be more serious – the so-called 'availability' heuristic. Conversely, people underestimate the risk of rare catastrophes because they have not experienced them (Sunstein, 2007; Wiener, 2016). Compare the chances of being killed by an asteroid and an aeroplane crash. The probability of another plane crashing during one's lifetime is far greater than that of an asteroid impact. One is, however, unlikely to be on that plane. An asteroid strike, on the other hand, could kill much of the world's population, even everyone on the planet. The average American's risk of dying in one of the two disasters is roughly equal. But since plane crashes are more frequent and come to mind more easily, they are seen as a greater threat (Chapman & Morrison, 1994; Posner, 2004; Slovic, 2007). Nor does the mere knowledge that a disaster has occurred in the past carry the same emotional weight (Meyer & Kunreuther, 2017). People underestimate the risk of pandemics until they themselves experience one (Botzen et al., 2021; Phan & Wood, 2020).

The same is likely to be true of nuclear war. Hiroshima, like the Spanish flu, lies outside most people's living memory. In 2019, roughly a quarter of young Russians could not cite a single instance of the bomb's use (VTsIOM Novosti, 2019). Familiarity with risk also breeds complacency. This is particularly true of low-frequency, high-impact risks, because when a long time goes by without incident, this is apt to be taken as evidence that existing practice is safe. Before the *Challenger* space shuttle disaster, after many successful flights, NASA officials grew increasingly nonchalant about small flaws in its design (Brooks, 2010; Slovic et al., 1978/2000; Weber, 2006). MccGwire (2006) notes the failure to prepare for the 2004 Indian Ocean tsunami – despite the knowledge that one could be

expected every two or three centuries – and its similarity to complacency about nuclear war.

People judge dangers to be greater when their impact is dramatic and shocking, and they are associated with vivid images (Sunstein, 2007). One might expect that nuclear weapons would seem especially threatening due to the horrifying effects of their use (Slovic, 2007). Many people may, however, lack concrete images of what nuclear war would be like (Fiske, 1987). The danger, as with global heating, is that by the time vivid evidence arrives, the chance to forestall the disaster will be lost (Botzen et al., 2021; Gilbert, 1988). Social dynamics render these patterns self-reinforcing. Without striking evidence, if the topic is not discussed or if others are ignoring the threat, warnings can seem alarmist, hectoring or tasteless (Meyer & Kunreuther, 2017; Norgaard, 2011). Some researchers, moreover, maintain that our minds have a ‘finite pool of worry’, with difficulty focusing on multiple dangers at the same time (Weber, 2006). Today, it is likely that nuclear war is competing for attention with global heating (Futter et al., 2020). These factors may help explain the absence of large-scale anti-nuclear activist, despite the revival of the arms race, the Trump administration’s alarming rhetoric, and Russia’s assault on Ukraine.

A final factor predisposing us to underestimate low-frequency, high-impact threats is that we focus on their low probabilities, neglecting the very large number of casualties if they do materialise. In one study, subjects considered a war that killed eight times as many as another to be only twice as large (Fetherstonhaugh et al., 1997/2000; Slovic, 2007; Ord, 2020). Even experts are prone to this error, as shown by the US Defense Department’s inference that an alleged decline in wartime deaths since 1945 demonstrates the desirability of American nuclear weapons (United States Department of Defense, Office of the Secretary of Defense, 2018; cf. Ice et al., 2022). As with asteroids (Chapman & Morrison, 1994), the most likely number of deaths from nuclear war over a few decades may be zero. More relevant are *expected* deaths, which depend not only on probabilities but also on damages (Kydd, 2019).

This underweighting is likely to be especially pronounced in that much of the cost of a large-scale thermonuclear war would be damage to the future (Lackey, 1984, pp. 189–91). If we avoid extinction from other causes, the vast majority of sentient beings will live after nuclear war occurs (Bostrom, 2013). Like extreme global heating, thermonuclear war could greatly impoverish the biosphere, burdening humanity for the rest of history (Ehrlich et al., 1983). Both laypeople and experts, however, probably focus on its immediate costs. That so many regard weapons of mass destruction in the hands of ‘rogue states’ – which would not threaten civilisation or the habitability of the planet (Toon et al., 2007) – as a greater threat than the US

and Russian arsenals strongly suggests that they are discounting the costs a large-scale war could impose on distant future generations. Short-termism is also visible in claims that nuclear deterrence is justified to protect other values, such as freedom from tyranny (Nye, 1986). Such arguments ignore the time scales involved. Had the Soviet Union overrun the United States, communist rule might have lasted a few decades. The effects of a thermonuclear holocaust could have been permanent. It was as if ancient Athens and Sparta had risked destroying much of the planet for the sake of deterrence before the Peloponnesian War (Lackey, 1984; Paskins, 1982; Posner, 2004).

## 4 | INTERGENERATIONAL BUCK-PASSING

Not only do cognitive biases encourage us to lowball the cost of nuclear war – worse yet, we may have selfish incentives to do so. Some goods like fossil fuels, Gardiner (2011) points out, are ‘front-loaded’: we enjoy their benefits now, whereas the costs of their use will fall primarily on future generations. This encourages what Gardiner calls ‘intergenerational buck-passing’: leaving problems for future generations. The same is true of nuclear deterrence. Unlike global heating’s worst effects, nuclear war may arrive at any time. But particularly if its annual probability is as low as many experts believe, nuclear deterrence is an *expectedly* front-loaded good. The benefits – increased status and what is widely believed to be a lower risk of conventional war (cf. Bell & Miller, 2015) – are enjoyed immediately. The costs may not arrive until long after our deaths, with the bulk externalised to future generations (Lackey, 1984). The expected benefits of nuclear deterrence for each successive generation in the nuclear states may exceed its expected costs clear up to the point catastrophic war occurs (Rendall, 2021).

That is not to say that every generation consciously gambles that nuclear war will arrive after its death. In the 1980s, surveys showed large minorities of Americans believing nuclear war likely in the next ten years. Western European surveys appeared to show substantial though lower numbers believing the same (Schatz & Fiske, 1992; Slemrod, 1986; Smith, 1988). US and British polling indicated that most respondents expected nuclear war to involve their own deaths (Crewe, 1984; Jones & Reece, 1990; Schatz & Fiske, 1992). ‘If one combines people’s estimated probability of nuclear war and their estimated probability of dying if a nuclear war occurred’, Fiske (1987, p. 209) commented on American data, ‘people are essentially saying that they have about one chance in three of dying from a nuclear attack.’ A 1984 US survey found 86 percent unsure whether life on earth would survive (Fuld & Nevin, 1988, p. 59).

Nor do these views seem to have changed. As already noted, Americans polled in 2018 rated their own chances of being affected by a nuclear attack as almost even. Russians also expect such a war to be catastrophic. Over a decade ago, 14 per cent expressed confidence that ‘civilization will be destroyed not by external factors, but that it will destroy itself in a nuclear world war’ (Pautova, 2016). Surveys in 2015, 2016 and 2018 showed 79 per cent, 80 per cent and 75 per cent affirming that nuclear war between Russia and NATO would lead to human extinction (Fond ‘Obshchestvennoe mnenie’, 2016, 2018; see also VTsIOM Novosti, 2019).

Other research indicates, however, that nuclear war is often seen as a long-term threat. Even if people assign a sizable probability to its occurrence during their lifetimes, they probably do not expect it tomorrow or next week. A study of British attitudes in the 1980s found that many regarded it as probable in the long run, but considered nuclear deterrence ‘apparently the best option currently on offer for maintaining the peace as long as possible’ (Jones & Reece, 1990, pp. 17). When researchers asked American respondents why they had not chosen ‘threat of nuclear war’ as the most important danger facing the United States, ‘[t]he most frequent explanation was that nuclear war is something to worry about for the distant future, but that unemployment/inflation/budget cuts is an important problem here and now’ (Schuman et al., 1986, p. 526).

That relieves the pressure for radical change. While most people might prefer the transformation of international relations – even world government – to experiencing a thermonuclear war, that may not be the choice we face. Rather, if the annual risk of nuclear war is as low as is commonly believed, the most likely prospect is thermonuclear war will occur someday after our own deaths. After decades of peace, the public may recognise on some level that nuclear war is probably not just around the corner (Bostrom, 2019). As Waltz (1959, p. 228), emphasis added noted early in the atomic age, international anarchy ‘often produces monstrous behavior but *so far* has not made life itself impossible’. This situation is ripe for procrastination.

## 5 | KICKING THE CAN DOWN THE ROAD

Public opinion involves a paradox that puzzled researchers in the 1980s: many people perceive a sizable likelihood that they themselves will perish in a nuclear war, yet do not make it a leading political issue. Two scholars at the University of New Hampshire found that 44 per cent of their students judged the chance of nuclear war before the year 2000 to be at least 50 per cent, and that 88 per cent did ‘not expect (or want) to survive’. Nevertheless, they noted with bemusement,

though ‘over 50% of our students report involvement in social and political concerns such as third-world intervention, human rights, and environmental preservation, only 12% report any involvement in issues related directly to the nuclear arms race’ (Fuld & Nevin, 1988, p. 59). We see a similar phenomenon today with global heating. In a study of the Norwegian town of ‘Bygdaby’, Norgaard (2011) found that residents recognised that climate change threatened their way of life, and nearly all expressed serious concern, yet most took next to no action, despite being engaged in a variety of other causes.

Norgaard concluded that a sense of impotence underlay much of Bygdaby’s passivity. A recent cross-national survey likewise finds that lack of public support for greenhouse gas abatement has less to do with unwillingness to make sacrifices than with scepticism that mitigation will succeed (Fairbrother et al., 2020). Research suggests that whether the public perceives a problem as serious may in turn depend on its believing that a relatively easy solution is available (Krosnick et al., 2006). Something similar may be at work with nuclear weapons. Surveys show Americans and Russians regarding multilateral nuclear disarmament as desirable, while doubting that it is feasible (Fond ‘Obshchestvennoe mnenie’, 2014, 2020; Herron & Jenkins-Smith, 2006, 2014; Ripberger et al., 2011). A key reason is the belief that other countries are the stumbling block (cf. Johnson & Levin, 2009). A summer 1987 survey found Britons believing that Britain neither was responsible for the risk of nuclear war nor could do anything to dispel it (Jones & Reece, 1990). Today, Americans who perceive a greater threat of nuclear attack more strongly favour retaining nuclear weapons (Ripberger et al., 2011). Since at least the late 1990s, Russians have seen the main danger of nuclear war as coming from the United States (Deriglazova & Rozhanovskaya, 2020; Fond ‘Obshchestvennoe mnenie’, 2020; Institut obshchestvennogo mneniia, 2017; Petrova et al., 1999).

Under such circumstances, it is tempting to focus on dangers that are easier to solve. This is particularly likely when procrastination is unlikely to lead at once to disaster. The result can be that ‘important tasks that pose implementation challenges are *perpetually* relegated to the bottom of the list, despite the exorbitant but delayed costs of perpetual postponement’ (Andreou, 2007, p. 248, emphasis in original). We can always wait till tomorrow to deal with global heating, Senator Sheldon Whitehouse remarks, ‘while now we have to worry about covid, Ukraine, inflation, crime. The problem is that there are only so many tomorrows that you can defer this to before it’s too late’ (quoted in McGreal, 2022). Such dynamics seem to have been central to the failure to prepare for the pandemic of 2020: in such cases, ‘officials do what is easy and pays immediate dividends rather than doing what is hard,

where the dividends seem remote' (Eric Dezenhall, quoted in Osterholm & Olshaker, 2020, p. 18).

The chance, moreover, that nuclear war will occur during a given official's tenure is low. Policies that reduce its risk may receive little recognition due to the difficulty of proving their effects. Leaders will look to other states for cues: if the latter seem to consider the existing situation tolerable, the natural inclination will be to follow the herd. Human beings' predisposition to regard compromise as reasonable promotes what Jonathan Schell called an 'extremism of the centre', with half-measures that change little (Bazerman & Watkins, 2004; Meyer & Kunreuther, 2017; Posner, 2004; van Munster & Sylvest, 2021). Half measures also allow actors with a vested interest in the status quo – and the politicians who represent them – to pretend to do something without solving the underlying problem. Both global heating and nuclear weapons have been subject to ongoing negotiations whose parties set ambitious goals that they then fail to achieve. These make for good speeches, and policy-makers will probably have long left office by the time the threat materialises (Craig & Ruzicka, 2013; Egeland, 2021a, 2021b; Gardiner, 2011; Pelopidas, 2021). As with global heating, because so much of the expected cost of nuclear weapons is externalised, there is a risk of discourse being corrupted through motivated reasoning (Gardiner, 2011; Rendall, 2021).

In the absence of vivid events such as international crises or natural disasters, neither leaders nor the public accord the problem the needed priority (Ungar, 1992), even when the case is strong that an eventual disaster is in the cards. The same may happen with nuclear weapons.

## 6 | WHAT IS TO BE DONE?

It might be objected that this paper has shown too much. If any event of non-zero annual probability is bound to materialise, given enough time, it could seem that nuclear war is inevitable whatever we do. If that is really the case, states should at least think more creatively about how to limit the damage. This might involve 'winter-safe' means of deterrence, such as targeting cities with air bursts from neutron bombs, or small nuclear arsenals that would deter by threatening infrastructures with an electromagnetic pulse (Baum, 2015b, 2015c). It could also mean greater attention to the stockpiling of resources, and the creation of refuges that ensured that at least some portion of civilisation would survive (Baum, 2015a).

But it would be wrong to assume that nuclear weapons will be with us for the rest of history. Developments yet unforeseen could render them innocuous or irrelevant, or in the very long run, as Nye (1986) noted, space colonies may provide a buffer against civilisational

collapse. Deudney (2020) has recently made a strong case that space colonisation under present conditions would increase existential risk, due largely to its potential for expanding violent conflict. But if we can drive the probability of war low enough to get through the next few centuries intact (Ord, 2020), that calculus could change. This is a tall order, but not the same as demanding that pigs grow wings. Interstate war, and even the prospect of war, already seem to have vanished within Western Europe and North America – perhaps South America's Southern Cone as well. No law of nature precludes the spread of stable peace throughout the world (Booth & Wheeler, 1992; Boulding, 1984; Hurrell, 1998; Tertrais, 2009).

Unfortunately, neither states nor publics give this goal priority. A first step would be for experts to get clear about the stakes (Bazerman, 2006; Wiener, 2016). Many analysts continue to regard nuclear deterrence as sustainable. Waltz (2013b) and Freedman (2013), for example, both take the absence of nuclear conflict since 1945 as evidence that it is reliable. Yet if nuclear war is a low-frequency, high impact risk, we would not expect it to occur over seventy-five years (Knopf, 2002). In a recent analysis, Kydd (2019, p. 647) entertains the possibility that the benefits of nuclear deterrence exceed its costs, observing that "[i]f a nuclear war would be catastrophic but never happens, we are safe'. What, we may ask, is the chance of avoiding catastrophic war *in the long run* if we retain nuclear weapons? Experts should acknowledge that nuclear war is nearly certain over time if nothing is done. It may be that we can increase its public salience by framing it in these terms (Meyer & Kunreuther, 2017).

Nevertheless, warnings of long-term disaster will take us only so far. If the probability of nuclear war is as low as is widely believed, nuclear weapons may be a good *ex ante* bet for their possessors. Proponents of nuclear disarmament need to recognise that a real intergenerational conflict of interest may help to explain the impasse. This paper has emphasised how many of the factors that prevent progress on global heating also impede it on disarmament. Scholars and activists in both fields can learn much from one another, as well as from research on other catastrophic risks (Sears, 2020; van Munster & Sylvest, 2021; Rendall, 2021). Notably, three decades of negotiations on global heating have shown that privileged states will make only limited sacrifices of present-day interests for the sake of other countries or future generations, however strong the moral arguments for doing so (Weisbach, 2016). Technological innovation that renders clean energy cheaper than fossil fuels is more likely to make the difference (Karlsson, 2016). If the problem of nuclear weapons is ever solved, it is also likely to be through technological or political innovation.

This means seeking policies that can buy enough time for nuclear weapons to become obsolete or

for human beings to spread safely to other planets. Existing schemes for international reform often fail to do this. The prominent Russian scholar Sergei Karaganov (2015, 2019), for example, pooh-poohs claims that the spread of democracy will bring peace, while advocating a great power concert on 19th-century lines. Yet the original Concert of Europe collapsed after only 40 years in the Crimean War. In contrast, the absence of war between well-established democracies is widely accepted as a nearly law-like regularity, though there is less agreement about its explanation (Hegre, 2014; Weart, 1998). Even if the democratic peace thesis should be disproven, it is the *kind* of discovery we need. International relations research should prioritise the study of stable peace (e.g., Kacowicz et al., 2000), which, if achieved, might enable us to survive the next few centuries.

Since 1945 we have been in a state of planetary emergency – faced with a threat that bodes catastrophe in the long run. In the first few decades after Hiroshima, this was widely grasped. While that did not lead to the abolition of nuclear weapons, it did inspire a variety of efforts to rethink international relations which, when embraced by the Soviet leadership, played a critical role in ending the Cold War (Polynov, 2012; Risse-Kappen, 1994). Yet what was once seen as extraordinary has come to seem normal, and the sense of urgency has ebbed (Pelopidas, 2021; Schell, 2000). While governments express ritual hopes that nuclear weapons will someday disappear from the earth, little serious thought is given to how to bring this about. Even smaller steps such as the de-alerting of nuclear arsenals have not been taken (von Hippel, 2021).

These are dangerous trends. No less than with pandemics, activists and intellectuals must keep the long term in mind, and try to see that politicians and publics do so as well.

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## DATA AVAILABILITY STATEMENT

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## ENDNOTES

<sup>1</sup> While these findings surely also reflect fears of terrorism, earlier research found significant anxiety about the nuclear threat from China (see Herron & Jenkins-Smith, 2006). Thanks to Benoît Pelopidas for pressing me on this point.

<sup>2</sup> Polling may itself, however, have evoked higher levels of anxiety. Thus recent research found 39 per cent of Europeans agreeing at least in part that they had never seriously worried about nuclear war, but 80 per cent partially or wholly affirming that they were frightened at the prospect (Pelopidas, 2022, and personal communication from the author).

<sup>3</sup> I am grateful to Benoît Pelopidas for bringing this source and argument to my attention.

<sup>4</sup> Thanks to Benoît Pelopidas and an anonymous referee for pointing this out.

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