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## Generic 1AC

### Adv 1 – MCF

#### Contention 1 is military civil fusion

#### China’s private space industry is booming thanks to state support.

Patel 21 (Neel V., space and tech journalist, 1-21-2021, "China’s surging private space industry is out to challenge the US," MIT Technology Review, https://www.technologyreview.com/2021/01/21/1016513/china-private-commercial-space-industry-dominance/) AG

China’s space program might have been slowed by the pandemic in 2020, but it certainly didn’t stop. The year’s highlights included sending a rover to Mars, bringing moon rocks back to Earth, and testing out the next-generation crewed vehicle that should take taikonauts into orbit—and possibly to the moon—one day. But there were a few achievements the rest of the world might not have noticed. One was the November 7 launch of Ceres-1, a new type of rocket that, at just 62 feet in height, is capable of taking 770 pounds of payload into low Earth orbit. The launch sent the Tianqi 11 communications satellite into space. At first glance, the Ceres-1 launch might seem unremarkable. Ceres-1, however, wasn’t built and launched by China’s national program. It was a commercial rocket—only the second from a Chinese company ever to go into space. And the launch happened less than three years after the company was founded. The achievement is a milestone for China’s fledgling—but rapidly growing—private space industry, an increasingly critical part of the country’s quest to dethrone the US as the world’s preeminent space power. The rivalry between the US and China, whose space program has surged over the last two decades, is what most people mean when they refer to the 21st-century's space race. China is set to build a new space station later this year and will likely attempt to send its taikonauts to the moon before the decade ends. But these big-picture projects represent just one aspect of the country’s space ambitions. Increasingly, the focus is now on the commercial space industry as well. The nation's growing private space business is less focused on bringing prestige and glory to the nation and more concerned with reducing the cost of spaceflight, increasing its international influence—and making money. “The state is really great at large, ambitious projects like going to the moon or developing a large reconnaissance satellite,” says Lincoln Hines, a Cornell University researcher who focuses on Chinese foreign policy. “But it’s not responsive to meeting market needs”—one big way to encourage rapid technological growth and innovation. “I think the government thinks its commercial space sector can be complementary to the state,” he says. What are the market needs that Hines is referring to? Satellites, and rockets that can launch them into orbit. The space industry is undergoing a renaissance thanks to two big trends spurred by the commercial industry: we can make satellites for less money by making them smaller and using off-the-shelf hardware; and we can also make rockets for less money, by using less costly materials or reusing boosters after they’ve already flown (which SpaceX pioneered with its Falcon 9). These trends mean it is now cheaper to send stuff into space, and the services and data that satellites can offer have come down in price accordingly. China has seen an opportunity. A 2017 report by Bank of America Merrill Lynch estimates that the space industry could be worth up to $2.7 trillion by 2030. Setting foot on the moon and establishing a lunar colony might be a statement of national power, but securing a share of such a highly lucrative business is perhaps even more important to the country’s future. “In the future, there will be tens of thousands of satellites waiting to launch, which is a major opportunity for Galactic Energy” says Wu Yue, a company spokesperson. The problem is, China has to make up decades’ worth of ground lost to the West. How did China get here—and why? Until recently, China’s space activity has been overwhelmingly dominated by two state-owned enterprises: the China Aerospace Science & Industry Corporation Limited (CASIC) and the China Aerospace Science and Technology Corporation (CASC). A few private space firms have been allowed to operate in the country for a while: for example, there’s the China Great Wall Industry Corporation Limited (in reality a subsidiary of CASC), which has provided commercial launches since it was established in 1980. But for the most part, China’s commercial space industry has been nonexistent. Satellites were expensive to build and launch, and they were too heavy and large for anything but the biggest rockets to actually deliver to orbit. The costs involved were too much for anything but national budgets to handle. That all changed this past decade as the costs of making satellites and launching rockets plunged. In 2014, a year after Xi Jinping took over as the new leader of China, the Chinese government decided to treat civil space development as a key area of innovation, as it had already begun doing with AI and solar power. It issued a policy directive called Document 60 that year to enable large private investment in companies interested in participating in the space industry. “Xi’s goal was that if China has to become a critical player in technology, including in civil space and aerospace, it was critical to develop a space ecosystem that includes the private sector,” says Namrata Goswami, a geopolitics expert based in Montgomery, Alabama, who’s been studying China’s space program for many years. “He was taking a cue from the American private sector to encourage innovation from a talent pool that extended beyond state-funded organizations.” As a result, there are now 78 commercial space companies operating in China, according to a 2019 report by the Institute for Defense Analyses. More than half have been founded since 2014, and the vast majority focus on satellite manufacturing and launch services. For example, Galactic Energy, founded in February 2018, is building its Ceres rocket to offer rapid launch service for single payloads, while its Pallas rocket is being built to deploy entire constellations. Rival company i-Space, formed in 2016, became the first commercial Chinese company to make it to space with its Hyperbola-1 in July 2019. It wants to pursue reusable first-stage boosters that can land vertically, like those from SpaceX. So does LinkSpace (founded in 2014), although it also hopes to use rockets to deliver packages from one terrestrial location to another. Spacety, founded in 2016, wants to turn around customer orders to build and launch its small satellites in just six months. In December it launched a miniaturized version of a satellite that uses 2D radar images to build 3D reconstructions of terrestrial landscapes. Weeks later, it released the first images taken by the satellite, Hisea-1, featuring three-meter resolution. Spacety wants to launch a constellation of these satellites to offer high-quality imaging at low cost. To a large extent, China is following the same blueprint drawn up by the US: using government contracts and subsidies to give these companies a foot up. US firms like SpaceX benefited greatly from NASA contracts that paid out millions to build and test rockets and space vehicles for delivering cargo to the International Space Station. With that experience under its belt, SpaceX was able to attract more customers with greater confidence. Venture capital is another tried-and-true route. The IDA report estimates that VC funding for Chinese space companies was up to $516 million in 2018—far shy of the $2.2 billion American companies raised, but nothing to scoff at for an industry that really only began seven years ago. At least 42 companies had no known government funding. And much of the government support these companies do receive doesn’t have a federal origin, but a provincial one. “[These companies] are drawing high-tech development to these local communities,” says Hines. “And in return, they’re given more autonomy by the local government.” While most have headquarters in Beijing, many keep facilities in Shenzhen, Chongqing, and other areas that might draw talent from local universities. There’s also one advantage specific to China: manufacturing. “What is the best country to trust for manufacturing needs?” asks James Zheng, the CEO of Spacety’s Luxembourg headquarters. “It’s China. It’s the manufacturing center of the world.” Zheng believes the country is in a better position than any other to take advantage of the space industry’s new need for mass production of satellites and rockets alike. Making friends The most critical strategic reason to encourage a private space sector is to create opportunities for international collaboration—particularly to attract customers wary of being seen to mix with the Chinese government. (US agencies and government contractors, for example, are barred from working with any groups the regime funds.) Document 60 and others issued by China’s National Development and Reform Commission were aimed not just at promoting technological innovation, but also at drawing in foreign investment and maximizing a customer base beyond Chinese borders. “China realizes there are certain things they cannot get on their own,” says Frans von der Dunk, a space policy expert at the University of Nebraska–Lincoln. Chinese companies like LandSpace and MinoSpace have worked to accrue funding through foreign investment, escaping dependence on state subsidies. And by avoiding state funding, a company can also avoid an array of restrictions on what it can and can’t do (such as constraints on talking with the media). Foreign investment also makes it easier to compete on a global scale: you’re taking on clients around the world, launching from other countries, and bringing talent from outside China. Although China is taking inspiration from the US in building out its private industry, the nature of the Chinese state also means these new companies face obstacles that their rivals in the West don’t have to worry about. While Chinese companies may look private on paper, they must still submit to government guidance and control, and accept some level of interference. It may be difficult for them to make a case to potential overseas customers that they are independent. The distinction between companies that are truly private and those that are more or less state actors is still quite fuzzy, especially if the government is a frequent customer. “That could still lead to a lack of trust from other partners,” says Goswami. It doesn’t help that the government itself is often very cagey about what its national program is even up to. And Hines adds that it’s not always clear exactly how separate these companies are from, say, the People’s Liberation Army, given the historical ties between the space and defense sectors. “Some of these things will pose significant hurdles for the commercial space sector as it tries to expand,” he says. Other challenges None of these new companies are yet profitable, and it will be quite some time before they are. “There isn’t any sign of indication that this industry will flop,” says Hines. “But many experts do think a lot of these companies will go out of business.” Apart from the challenge of attracting customers outside China, many companies are still trying to figure out who exactly their customers ought to be. American companies like SpaceX and Blue Origin had billionaire founders ready to burn cash to take on large risks, push past big failures, and finally get off the ground. And while a Chinese billionaire entered the industry last year, “there is no Chinese Elon Musk to push these riskier ventures forward,” says Hines. It’s also unclear whether Chinese companies, even those supported by wealthy backers, will have that appetite for risk. Zheng says one thing Spacety has offered is exceptional transparency with clients for whom it is developing satellites—something that’s still uncommon for Chinese firms. “Many of them have no kind of spaceflight experience,” he says. “They want to see and learn what goes on, but the large companies won’t allow for that. We’re different.” Lastly, China needs to figure out a legal framework that can guide the commercial industry in more explicit terms, and specify what’s allowed and what is not. It is the only major space power without a specialized space law. (The American version is Title 51 of the United States Code.) While the hope is that free enterprise can generate innovation, national governments are still liable for whatever space activities a country’s private companies conduct. There’s a need to license and approve these missions, ensuring that governments know what they’ve signed up for.

#### Space privatization fuels Chinese military-civil integration.

Nie 20 (Mingyan, faculty of law @ Nanjing University of Aeronautics and Astronautics, 5-1-2020, "Space Privatization in China's National Strategy of Military-Civilian Integration: An Appraisal of Critical Legal Challenges," ADS, https://ui.adsabs.harvard.edu/abs/2020SpPol.5201372N/abstract) AG

2. Space privatization as a significant factor in China's implementation of its MCI strategy

The US Congressional Office of Technology Assessment defines MCI as follows: “cooperation between government and commercial facilities in research and development, manufacturing, and/or mainte- nance operations; combined production of similar military and commercial items, including components and subsystems, side by side on a single firm or facility, and use of commercial off-the-shelf items directly within military systems [[4], p. 2].” This definition is consistent with the Chinese government's definition of the MCI strategy, that is, “to apply military technologies in the civil field, additionally, to pro- mote civil technologies to help with the defense industry [5].”

The idea to develop the defense industry and economy as a coordinated system is not a new idea for the Chinese government. In Mao Zedong's era, the concept of connecting military and civilian development was proposed and promoted. Subsequent leaders such as Deng Xiaoping, Jiang Zemin, and Hu Jintao have also proposed this idea [[2], pp. 69e70]. However, this objective has not been achieved [6] because the policies proposed ensured the codevelopment of the military and private sector but did not establish a specialized department and stable regulations [[7], p. 34]. Soon after announcing the “2016 Opinions,” the Central Commission of MCI Development, chaired by President Xi Jinping, was established as the highest decision-making body for issues related to MCI.2 Moreover, a series of documents that administrate the implementation of the MCI strategy were formulated as part of the Central Commission framework,3 and the creation and coordination of regulations were proposed.4 Thus, based on the establishment of a comprehensive framework for the administration and regulations of the MCI national strategy, additional results are now expected.

China's space industry has the typical full range of capacities of developed space sectors [[8], p. 86]. Approximately 20 years ago, China began to use its space systems, such as satellites and ground stations, in military and civilian areas.5 Chinese space programs are strictly controlled by government departments and conducted by relevant government-owned companies, without distinguishing military or civilian use.6 Thus, private enterprises have had no opportunity to engage in space or space-related activities,7 even when military-related space technologies are transferred to the civilian field. In addition, no civilian space technologies have been converted to military use.

As early as 1997, for the first time, private-sector space revenues exceeded government space expenditures, and the private sector's share of global space activities gradually increased [[14], pp. 215e216]. Space privatization has been acknowledged as a necessity by many space powers. However, as described, China provided no opportunities for private enterprises to become involved in space activities.

In the context of promoting the MCI as a national strategy, policymakers have realized that a crucial step to achieve the MCI targets in space is to facilitate the participation of the nongovernmental sector. According to analysts, the first stage of China's MCI strategy will prioritize the application of military technologies in the civilian field, in which the nongovernmental sector should play a vital role. This proposal would provide opportunities to promote the rapid growth of private space enterprises. Once the strength of the private sector increases, it can help the military industry to realize the real MCI target.8

The final target that should be achieved by the MCI strategy in space is to maintain balanced development between the military and civilian fields. To support nongovernmental entities' involvement in space affairs, the latest version of Chinese space policy, “China's Space Activities9” (the “White Paper”), was published at the end of 2016 and encouraged nongovernmental capital and other social sectors to participate in space-related activities; in addition, the government intends to increase its cooperation with private investors [17].

#### military-civil fusion causes war – numerous flashpoints.

Chansoria 21 (Monika, PhD and senior fellow @ Japan Institute of International Affairs in Tokyo, 12-15-2021, "China’s Military-Civil Fusion Strategy is, In Fact, a War Cry," https://asianpolyglotview.com/2021/12/chinas-military-civil-fusion-strategy-is-in-fact-a-war-cry.html) AG

As each successive Five-Year Plan determines Beijing’s strategic goals, the latest and ongoing 14th Five-Year Plan (2021-2025) seeks to deepen military-civil fusion. The 14th FYP anticipates mobilization of military and civilian resources in defense, for use both internally and externally, with civilian entities across China actively involved in supporting the military and defense apparatus. Earlier, in a communiqué issued in October 2020 by the Central Committee of the CCP, there were numerous references to the need for deepening and expanding synergies between commercial and military technologies that would prove instrumental in advancing the capabilities of China’s PLA. It is a strategy that has come to be formally termed as “military-civil fusion.” It needs to be underscored here that China’s MCF is a continuing policy decision from the previous 13th Five Year Special Plan for Military-Civilian Integration Development that was outlined in September 2017. In all, MCF is a critical element of the national framework and the ensuing strategy for the CCP to advance its regional and global territorial ambitions. MCF aims to pave the way for China to transition to the capacity to wage intelligent and informationized warfare as it develops relevant military capabilities. In pursuit of a revisionist territorial agenda, Xi Jinping clearly seeks to integrate a political system within which every possible asset can be incorporated into the Communist Party’s command. Beijing is likely to implement an amalgamation of many military and civilian strategies as the centrality of China’s Military-Civil Fusion strategy ramps up. It will seek to do so in a way that creates capabilities specifically catering to its national strategic priorities for the 21st century — most importantly, national rejuvenation, territorial expansion, and extension of Beijing’s sphere of influence across Asia. Pushing from Political Strength Politically, Xi Jinping moved into 2021, the CCP’s centennial year, with greater military stealth and push across the Indo-Pacific. He appears all the more determined now, as he kicks-off the autumn 2022 campaign, which will see him go in for an unprecedented third term as the CCP’s General Secretary and Chairman of the CMC. The MCF is being interpreted as a war cry by the CCP to be combat-ready in 2022 and beyond — a call that the Party has made since soon after it assumed power in Mainland China in 1949. Developing the PLA into a world-class military by 2049 remains the primary aim. Toward that end, the developing ground realities of China’s activities and aggravations in the Himalayan borderlands, South China Sea, and East China Sea are increasingly being determined by a military-civil fusion of military stealth, economics, and politics.

#### US-China war is uniquely likely and uniquely dangerous in the coming decade. Shutting down Chinese military advancement solves Taiwan, ECS, and SCS escalation.

Beckley and Brands 21 (Michael and Hal, professors on IR and renowned experts, 11-1-2021, "What Will Drive China to War?," Atlantic, https://www.theatlantic.com/ideas/archive/2021/11/us-china-war/620571/) AG

For the past few decades, this pattern of first strikes and surprise attacks has seemingly been on hold. Beijing’s military hasn’t fought a major war since 1979. It hasn’t shot at large numbers of foreigners since 1988, when Chinese frigates gunned down 64 Vietnamese sailors in a clash over the Spratly Islands. China’s leaders often claim that their country is a uniquely peaceful great power, and at first glance, the evidence backs them up. But the China of the past few decades was a historical aberration, able to amass influence and wrest concessions from rivals merely by flaunting its booming economy. With 1.3 billion people, sky-high growth rates, and an authoritarian government that courted big business, China was simply too good to pass up as a consumer market and a low-wage production platform. So country after country curried favor with Beijing. Britain handed back Hong Kong in 1997. Portugal gave up Macau in 1999. America fast-tracked China into major international institutions, such as the World Trade Organization. Half a dozen countries settled territorial disputes with China from 1991 to 2019, and more than 20 others cut diplomatic ties with Taiwan to secure relations with Beijing. China was advancing its interests without firing a shot and, as Deng remarked, “hiding its capabilities and biding its time.” Those days are over. China’s economy, the engine of the CCP’s international clout, is starting to sputter. From 2007 to 2019, growth rates fell by more than half, productivity declined by more than 10 percent, and overall debt surged eightfold. The coronavirus pandemic has dragged down growth even further and plunged Beijing’s finances deeper into the red. On top of all this, China’s population is aging at a devastating pace: From 2020 to 2035 alone, it will lose 70 million working-age adults and gain 130 million senior citizens. Countries have recently become less enthralled by China’s market and more worried about its coercive capabilities and aggressive actions. Fearful that Xi might attempt forced reunification, Taiwan is tightening its ties to the U.S. and revamping its defenses. For roughly a decade, Japan has been engaged in its largest military buildup since the Cold War; the ruling Liberal Democratic Party is now talking about doubling defense spending. India is massing forces near China’s borders and vital sea lanes. Vietnam and Indonesia are expanding their air, naval, and coast-guard forces. Australia is opening up its northern coast to U.S. forces and acquiring long-range missiles and nuclear-powered attack submarines. France, Germany, and the United Kingdom are sending warships into the Indo-Pacific region. Dozens of countries are looking to cut China out of their supply chains; anti-China coalitions, such as the Quad and AUKUS, are proliferating. Globally, opinion polls show that fear and mistrust of China has reached a post–Cold War high. All of which raises a troubling question: If Beijing sees that its possibilities for easy expansion are narrowing, might it begin resorting to more violent methods?China is already moving in that direction. It has been using its maritime militia (essentially a covert navy), coast guard, and other “gray zone” assets to coerce weaker rivals in the Western Pacific. Xi’s government provoked a bloody scrap with India along the disputed Sino-Indian frontier in 2020, reportedly out of fear that New Delhi was aligning more closely with Washington. Beijing certainly has the means to go much further. The CCP has spent $3 trillion over the past three decades building a military that is designed to defeat Chinese neighbors while blunting American power. It also has the motive: In addition to slowing growth and creeping encirclement, China faces closing windows of opportunity in its most important territorial disputes.China’s geopolitical aims are not a secret. Xi, like his predecessors, desires to make China the preponderant power in Asia and, eventually, the world. He wants to consolidate China’s control over important lands and waterways the country lost during the “century of humiliation” (1839–1949), when China was ripped apart by imperialist powers. These areas include Hong Kong, Taiwan, chunks of Indian-claimed territory, and some 80 percent of the East and South China Seas. The Western Pacific flash points are particularly vital. Taiwan is the site of a rival, democratic Chinese government in the heart of Asia with strong connections to Washington. Most of China’s trade passes through the East and South China Seas. And China’s primary antagonists in the area—Japan, Taiwan, the Philippines—are part of a strategic chain of U.S. allies and partners whose territory blocks Beijing’s access to the Pacific’s deep waters. The CCP has staked its legitimacy on reabsorbing these areas and has cultivated an intense, revanchist form of nationalism among the Chinese people. Schoolchildren study the century of humiliation. National holidays commemorate foreign theft of Chinese lands. For many citizens, making China whole again is as much an emotional as a strategic imperative. Compromise is out of the question. “We cannot lose even one inch of the territory left behind by our ancestors,” Xi told James Mattis, then the U.S. secretary of defense, in 2018. Taiwan is the place where China’s time pressures are most severe. Peaceful reunification has become extremely unlikely: In August 2021, a record 68 percent of the Taiwanese public identified solely as Taiwanese and not as Chinese, and more than 95 percent wanted to maintain the island’s de facto sovereignty or declare independence. China retains viable military options because its missiles could incapacitate Taiwan’s air force and U.S. bases on Okinawa in a surprise attack, paving the way for a successful invasion. But Taiwan and the U.S. now recognize the threat. President Biden recently stated that America would fight to defend Taiwan from an unprovoked Chinese attack. Washington is planning to harden, disperse, and expand its forces in the Asia-Pacific by the early 2030s. Taiwan is pursuing, on a similar timeline, a defense strategy that would use cheap, plentiful capabilities such as anti-ship missiles and mobile air defenses to make the island an incredibly hard nut to crack. This means that China will have its best chance from now to the end of the decade. Indeed, the military balance will temporarily shift further in Beijing’s favor in the late 2020s, when many aging U.S. ships, submarines, and planes will have to be retired. This is when America will be in danger, as the former Pentagon official David Ochmanek has remarked, of getting “its ass handed to it” in a high-intensity conflict. If China does attack, Washington could face a choice between escalation or seeing Taiwan conquered. More such dilemmas are emerging in the East China Sea. China has spent years building an armada, and the balance of naval tonnage currently favors Beijing. It regularly sends well-armed coast-guard vessels into the waters surrounding the disputed Senkaku Islands to weaken Japan’s control there. But Tokyo has plans to regain the strategic advantage by turning amphibious ships into aircraft carriers for stealth fighters armed with long-range anti-ship missiles. It is also using geography to its advantage by stringing missile launchers and submarines along the Ryukyu Islands, which stretch the length of the East China Sea. Meanwhile, the U.S.-Japan alliance, once a barrier to Japanese remilitarization, is becoming a force multiplier. Tokyo has reinterpreted its constitution to fight more actively alongside the U.S. Japanese forces regularly operate with American naval vessels and aircraft; American F-35 fighters fly off of Japanese ships; U.S. and Japanese officials now confer routinely on how they would respond to Chinese aggression—and publicly advertise that cooperation. For years, Chinese strategists have speculated about a short, sharp war that would humiliate Japan, rupture its alliance with Washington, and serve as an object lesson for other countries in the region. Beijing could, for instance, land or parachute special forces on the Senkakus, proclaim a large maritime exclusion zone in the area, and back up that declaration by deploying ships, submarines, warplanes, and drones—all supported by hundreds of conventionally armed ballistic missiles aimed at Japanese forces and even targets in Japan. Tokyo then would either have to accept China’s fait accompli or launch a difficult and bloody military operation to recapture the islands. America, too, would have to choose between retreat and honoring the pledges it made—in 2014 and in 2021—to help Japan defend the Senkakus. Retreat might destroy the credibility of the U.S.-Japan alliance. Resistance, war games held by prominent think tanks suggest, could easily lead to rapid escalation resulting in a major regional war. What about the South China Sea? Here, China has grown accustomed to shoving around weak neighbors. Yet opposition is growing. Vietnam is stocking up on mobile missiles, submarines, fighter jets, and naval vessels that can make operations within 200 miles of its coast very difficult for Chinese forces. Indonesia is ramping up defense spending—a 20 percent hike in 2020 and another 16 percent in 2021—to buy dozens of fighters, surface ships, and submarines armed with lethal anti-ship missiles. Even the Philippines, which courted Beijing for most of President Rodrigo Duterte’s term, has been increasing air and naval patrols, conducting military exercises with the U.S., and planning to purchase cruise missiles from India. At the same time, a formidable coalition of external powers—the U.S., Japan, India, Australia, Britain, France, and Germany—are conducting freedom-of-navigation exercises to contest China’s claims. From Beijing’s perspective, circumstances are looking ripe for a teachable moment. The best target might be the Philippines. In 2016, Manila challenged China’s claims to the South China Sea before the Permanent Court of Arbitration and won. Beijing might relish the opportunity to reassert its claims—and warn other Southeast Asian countries about the cost of angering China—by ejecting Filipino forces from their isolated, indefensible South China Sea outposts. Here again, Washington would have few good options: It could stand down, effectively allowing China to impose its will on the South China Sea and the countries around it, or it could risk a much bigger war to defend its ally. Get ready for the “terrible 2020s”: a period in which China has strong incentives to grab “lost” land and break up coalitions seeking to check its advance. Beijing possesses grandiose territorial aims as well as a strategic culture that emphasizes hitting first and hitting hard when it perceives gathering dangers. It has a host of wasting assets in the form of military advantages that may not endure beyond this decade. Such dynamics have driven China to war in the past and could do so again today. If conflict does break out, U.S. officials should not be sanguine about how it would end. Tamping or reversing Chinese aggression in the Western Pacific could require a massive use of force. An authoritarian CCP, always mindful of its precarious domestic legitimacy, would not want to concede defeat even if it failed to achieve its initial objectives. And historically, modern wars between great powers have more typically gone long than stayed short. All of this implies that a U.S.-China war could be incredibly dangerous, offering few plausible off-ramps and severe pressures for escalation. The U.S. and its friends can take steps to deter the PRC, such as drastically speeding the acquisition of weaponry and prepositioning military assets in the Taiwan Strait and East and South China Seas, among other efforts, to showcase its hard power and ensure that China can’t easily knock out U.S. combat power in a surprise attack. At the same time, calmly firming up multilateral plans, involving Japan, Australia, and potentially India and Britain, for responding to Chinese aggression could make Beijing realize how costly such aggression might be. If Beijing understands that it cannot easily or cheaply win a conflict, it may be more cautious about starting one. Most of these steps are not technologically difficult: They exploit capabilities that are available today. Yet they require an intellectual shift—a realization that the United States and its allies need to rapidly shut China’s windows of military opportunity, which means preparing for a war that could well start in 2025 rather than in 2035. And that, in turn, requires a degree of political will and urgency that has so far been lacking.

#### Extinction – nuclear winter, crude oil amplifies, smoke covers the world

Snyder and Ruyle 17 (Brian F.Snyder and Leslie E. Ruyle, 12-15-2017, [Brian F. Snyder. Department of Environmental Science, Louisiana State University, United States. Leslie E. Ruyle. Center on Conflict and Development, Texas A&M University, United States]"The abolition of war as a goal of environmental policy," No Publication, <https://www.sciencedirect.com/science/article/pii/S0048969717316431?via%3Dihub)//CHS> PK

While the precise impacts of a hypothetical nuclear war are difficult to predict, the detonation of the world's nuclear weapons would plausibly kill all or nearly all humans on Earth and initiate a mass extinction event. There are a total of about 9400 nuclear warheads in active service around the world, with approximately 8300 of these weapons in U.S. and Russian arsenals (Kristensen and Norris, 2017a). Because of government secrecy, it is difficult to reliably estimate the total explosive power contained in these warheads, but in most cases, each warhead ranges between 100 and 1200 kt of TNT equivalent (for comparison, the bombs dropped on Hiroshima and Nagasaki had yields of approximately 15–20 kt). The combined arsenals of the U.S. and Russia likely have a yield of at least 2–3 billion tons of TNT equivalent (Kristensen and Norris, 2017b,c). 2.1. Nuclear winter In the 1980s climate scientists used simple and early climate models to estimate the effects of large-scale nuclear wars on climate. The estimates they derived were catastrophic. For example, Turco et al. (1983) reported temperature reductions of 43 °C for 4 months in the Northern Hemisphere following nuclear war using the explosive power of 10 billion tons of TNT.1 As the cold war ended, interest in modelling the climate effects of nuclear war declined and some policy-makers considered the threat of nuclear winter to be either disproved or exaggerated (Martin, 1988). Toon et al. (2007) and Robock et al. (2007) reignited interest in the climate effects of nuclear war. Toon et al. (2008) modeled the effects of a medium scale nuclear war with a total explosive yield of 440 million tons of explosive yield (far less than current U.S. and Russian arsenals) and estimated global soot2 emissions of 180 Tg. Using a more conservative estimate of 150 Tg of soot, Toon et al. estimated that this emission would be sufficient to reduce global temperatures by about 8 °C and energy flux by 150 W/m2 ; for comparison, the cumulative greenhouse gas emissions to the atmosphere since the industrial revolution have increased energy flux by 3 W/m2 (Butler and Montzka, 2017). Robock et al. (2007) modeled a similar 150 Tg smoke emission and found similar results including temperature reduction of about 8 °C lasting for several years. Low temperatures reduced evapotranspiration and weakened the global hydrological cycle and Hadley cells. As a result, precipitation decreased globally by 45% with especially dramatic decreases in the agricultural areas of the United States. In the Northern Hemisphere, growing seasons would be shortened by about 100 days for about 3 years. This would preclude most food production over most of the world for several years. Mills et al. (2014) conducted a detailed analysis of the effects of a small (1.5 million ton) regional exchange lofting just 5 Tg of soot into the atmosphere. This war would be equivalent to an exchange of 100 Hiroshima-sized bombs between, for example, India, Pakistan, or China. Mills et al. found global temperature decreases of 1.6 °C. To our knowledge, no one has studied the effects of a multi-billion ton nuclear exchange using modern atmospheric models. If, as Toon et al. and Robock et al. suggest, a 440 million ton war results in temperature reductions of 8 °C for a decade and a 100 day reduction in the growing season, it is reasonable to assume that a one to five billion ton war would not be survivable for the majority of people on earth. However, as populations and population centers grow, the effects of nuclear wars on the biosphere will also grow. The consequences of nuclear winter increase as the amount of fuel (buildings, cars, biomass, liquid and solid fuels) added to a targeted area increase. As population centers grow and densify over time, the amount of soot added to the stratosphere as the result of any given nuclear exchange may increase (depending in part on building materials). As a result, the nuclear winter resulting from a 400 million ton yield global war in 2020 may be far more severe than if the same war occurred in 2000. Further, there are reasons to believe that the soot emissions from a hypothetical nuclear exchange are conservative because they focus on urban areas and often do not incorporate non-urban energy infrastructure. For example, if ignited and burned completely, the U.S. Strategic Petroleum Reserve (SPR) alone contains about 14.5 Tg of soot emissions.3 Including all crude held in U.S. commercial facilities, the potential soot emissions increase to 24 Tg. Thus, incorporating crude oil storage in the U.S. alone would increase soot generation estimates by about 16%. Similarly, nuclear war planners would be likely to target coal, oil and gas fields in the U.S., Russia, and their allies. This unaccounted for fuel could increase the total soot contribution to the atmosphere, potentially deepening the resulting nuclear winter. 2.2. Acute effects of particulate matter Studies of nuclear winter typically focus on the effects of smoke lofted into the stratosphere during nuclear firestorms. However, a larger proportion of smoke following nuclear war will be trapped in the troposphere where it would have significantly acute impacts on human and non-human species. Crutzen et al. (1984) calculated that following a major nuclear war (about 5 billion tons of explosives, roughly the combined U.S. and Russian deployed nuclear arms as of 2017) smoke would cover about 30–40% of the earth's surface with airborne smoke concentrations on the order of 5 mg/m3 . While initially this smoke would be composed of very small particles (b0.1 μm), the particles would rapidly coalesce into the 0.1 to 3 μm range, roughly consistent with the wellstudied PM2.5. For comparison, the EPA's National Ambient Air Quality standard for PM2.5 is 0.012 mg/m3 and as of 2017, the highest PM2.5 concentrations in Asia are typically around 0.3 to 1 mg/m3 .

### Adv 2 – Mining

#### Contention 2 is mining

#### Chinese private space mining is far ahead of competitors – they’re establishing a monopoly on crucial minerals.

Cohen 21 (Ariel, PhD @ Fletcher and expert on political science/energy policy, 10-26-2021, "China’s Space Mining Industry Is Prepping For Launch – But What About The US?," Forbes, https://www.forbes.com/sites/arielcohen/2021/10/26/chinas-space-mining-industry-is-prepping-for-launch--but-what-about-the-us/)

A slew of activities amongst China’s private and state-owned aerospace companies this year are a testament to China’s growing ambitions for economic and military domination of space. On October 19, the Academy of Aerospace Solid Propulsion Technology (AASPT) – which belongs to the China Aerospace Science and Technology Corporation (CASC) – test fired “the most powerful solid rocket motor with the largest thrust in the world so far.” The 500 tons of thrust is designed to propel the next iteration of China’s heavy-lift rockets, which would meet various demands for space missions like crewed Moon landings, deep space exploration, and off-world resource extraction. In April of this year, China’s Shenzen Origin Space Technology Co. Ltd. launched the NEO-1, the first commercial spacecraft dedicated to the mining of space resources – from asteroids to the lunar surface. Falling costs of space launches and spacecraft technology alongside existing infrastructure provides a unique opportunity to explore extraterrestrial resource extraction. Current technologies are equipped to analyze and categorize asteroids within our solar system with a limited degree of certainty. One of the accompanying payloads to the NEO-1 was the Yuanwang-1, or “little hubble” satellite, which searches the stars for possible asteroid mining targets. The NEO-1 launch marks another milestone in private satellite development, adding a new player to space based companies which include Japan’s Astroscale. Private asteroid identification via the Sentinel Space Telescope was supported by NASA until 2015. As private investment in space grows, the end goal is to be capable of harvesting resources to bring to Earth. “Through the development and launch of the spacecraft, Origin Space is able to carry out low-Earth orbit space junk cleanup and prototype technology verification for space resource acquisition, and at the same time demonstrate future asteroid defense related technologies.” In the end, it will come down to progressively lowering the cost of launched unit of weight and booster rocket reliability – before fundamentally new engines may drive the launch costs even further down. The April launch demonstrates that China is already succeeding while the West is spinning its wheels. The much touted Planetary Resources and Deep Space Industries (DSI) DSI +0.7% were supposed to be the vanguard of extra-terrestrial resource acquisition with major backers including Google’s GOOG +0.1% Larry Page. But both have since been acquired, the former by block chain company ConsenSys and the latter by Bradford Space, neither of which are prioritizing asteroid mining. This is too bad, given that that supply chain crunches here on Earth – coupled with the global green energy transition – are spiking demand for strategic minerals that are increasingly hard to come by on our environmentally stressed planet. And here China currently holds a monopoly on rare earth element (REE) extraction and processing to the tune of 90%. REE’s 17 minerals essential for modern computing and manufacturing technologies for everything from solar panels to semi-conductors. Resource-hungry China also has major involvement in global critical mineral supply chains, which include cobalt, tungsten, and lithium. As I’ve written before, the Chinese hold of upstream and downstream markets is staggering. Possessing 30% of the global mined ore, 80% of the global processing facilities, and an ever increasing list of high dollar investments around the world, China boasts over $36 billion invested in mining projects in Africa alone. Beijing’s space program clearly indicates that the Chinese would also like to tighten their grip on space-based resources as well. According to research, it is estimated that a small asteroid roughly 200 meters in length that is rich in platinum could be worth up to $300 million. Merrill Lynch predicts the space industry — including extraterrestrial mining industry – to value $2.7 trillion in the next three decades. REEs are fairly common in the solar system, but to what degree remains unknown. The most sought after are M-type asteroids which are mostly metal and hundreds of cubic meters. While these are not the most common, the 27,115 Near Earth asteroids are bound to contain a few. This – and military applications – are no doubt a driving factor of China’s ever increasing space ambitions. A new goldrush in space based resource extraction has sparked a new age of miners looking to find their fortunes. In reality, the industry cannot get off the ground without further innovation in deep space observation, on-board power, extraction processes, and logistical support in low earth and high earth orbit. As Uberization of space looms closer, the prices of space launches are falling rapidly. Privately funded satellites like the NEO-1 or Sentinel are the first of many novel economic ventures deploying technologies essential to the viability of solar system mining projects. Private launches by SpaceX and Blue Origin will provide low cost satellite deployment for further testing craft and classification telescopes. Right now, the cost to capture and process asteroids is far greater than traditional mining techniques. This is changing, but like in traditional mining and rare earths refining, China is far ahead of the U.S. in terms of industrial policy and new investments. China is cognizant of the riches in space, while the U.S. fails to support both their public and private space missions. The United States cannot afford to cede this industry – like it has so many others – to its peer competitors. If we do, the joke is on U.S., and it will not be funny.

#### China’s market power is slipping in the squo, but a revitalized monopoly causes rare earth shortages.

Magnuson 21 (Stew, editor in chief @ National Defense, 9-8-2021, "China Maintains Dominance in Rare Earth Production" National Defense, <https://www.nationaldefensemagazine.org/articles/2021/9/8/china-maintains-dominance-in-rare-earth-production>) AG

In 1987, then-Chinese President Deng Xiaoping famously said, “The Middle East has oil. China has rare earths.” “I don’t think people at the time understood it. But China understood that rare earths were going to be the backbone of manufacturing,” said Pini Althaus, CEO of USA Rare Earth, a startup with aspirations to mine and refine the 17 elements categorized as strategic minerals. While what the former Chinese president said was true — China has vast deposits of rare earth elements to mine — so do many other nations, including the United States, Canada, Australia and Japan. After Deng’s declaration, China legitimately partnered with foreign companies that were doing the complex work of separating rare earths from the surrounding rock and refining them, then moved the production to mainland China, Althaus said. Meanwhile, the U.S. government widely thought that rare earth mining and refinement was a difficult and dirty business, so it let China do it all on the cheap so it can supply U.S. manufacturers with inexpensive rare earths, he said. There are two pitfalls, Althaus said. One is if China economically weaponizes rare earths and stops sending the refined products to the United States so they can’t be used in weapon systems or commercial applications. Or the nation may create shortages by prioritizing its own industries such as the burgeoning electric vehicle market, which uses some of the key elements to make high-performance magnets used in engines. “We’re seeing shortages already and those shortages are projected to increase in the coming years,” he said. In 2010, China pulled the “rare earth card” in response to a territorial dispute with Japan, which led to an undeclared Chinese embargo, according to the Biden administration’s 100-day review, “Building Resilient Supply Chains, Revitalizing American Manufacturing and Fostering Broad-Based Growth.” That served as a wakeup call to U.S. policymakers, the Pentagon and its contractors, which rely on several of the elements to make weapon subsystems. The United States, European Union and Japan protested China’s actions at the World Trade Organization and prevailed, yet little coordinated action to counter China in the rare earths market has taken place in the past decade. China has over the past 30 years established two rare earth R&D hubs in Changchun, Jilin Province, and Baotou in Inner Mongolia. It has legions of students studying material sciences. Researchers devoted to finding and patenting new applications for rare earths work at Peking University’s rare earth materials chemistry and applications laboratory. Concurrently, the U.S. agency that carried out similar industrial policies to bolster U.S. competitiveness, the Bureau of Mines, was defunded in 1996 and only exists on paper. As the 100-day review spelled out, there has been a dramatic decline in American human capital in the field as “only a handful of mining and mineral-related degree-granting university programs are left in the United States. … By way of comparison, China has 39 universities granting mineral processing and metallurgy degrees, thousands of undergraduate and graduate students.” Meanwhile, a handful of U.S. startups have opened or are planning on opening rare earth mines, and some are planning on doing their own refinement. [(See part 1 here)](https://www.nationaldefensemagazine.org/articles/2021/9/7/us-startups-seek-to-claw-back-chinas-share-of-technology-minerals-market) To James Kennedy, president of Caldera Holding LLC, owner of an iron ore mine in Missouri that can produce rare earth elements, these startups are going against a mighty Chinese monopoly that does not play by the market rules that Americans are obsessed with. “This is not an economic fight. This is a geopolitical strategy,” he said. The 100-day review agreed, stating “China does not operate on market principles of cost or pricing structure.” China’s strategy extends to other strategic minerals such as cobalt, of which it has established a monopoly, and lithium, needed to make lithium-ion batteries also found in electric vehicles, the review stated. Kennedy said the largest profits are made when the refined elements are made into useful metals, alloys, or magnets. China will be happy to offshore the mining — and even the refinement of rare earths — as long as it can maintain a monopoly on the finished products, he added. Althaus and other executives interviewed said they are well aware of Beijing’s underhanded means of manipulating the market and declared that they are well positioned to withstand dumping and heavy subsidies. “China can’t manipulate prices the way they did a decade ago because then they were a net exporter. Now they are net importers, so they don’t have excess amounts of materials,” Althaus said. James Litinsky, chairman and CEO of MP Materials, a publicly traded company that operates a rare earth mine in California, said, “The drive to electrify and decarbonize is giving rise to a durable, demand-driven cycle that has only begun to materialize. In this new era, our operating results and balance sheet demonstrate the potential for U.S. companies to compete.”

#### Rare earth shortages kill the transition to renewables – causes warming.

CNN 21 (citing report by International Energy Agency, 5-5-2021, "Shortage of rare earth metals could hinder climate efforts, report warns," WRAL TechWire, <https://www.wraltechwire.com/2021/05/05/shortage-of-rare-earth-metals-could-hinder-climate-efforts-report-warns/>) AG

Shortage of rare earth metals could hinder climate efforts, report warns

As countries switch to green energy, demand for copper, lithium, nickel, cobalt and rare earth elements is soaring. But they are all vulnerable to price volatility and shortages, the agency warned in a report published on Wednesday, because their supply chains are opaque, the quality of available deposits is declining and mining companies face stricter environmental and social standards. Limited access to known mineral deposits is another risk factor. Three countries together control more than 75% of the global output of lithium, cobalt and rare earth elements. The Democratic Republic of Congo was responsible for 70% of cobalt production in 2019, and China produced 60% of rare earth elements while refining 50% to 70% of lithium and cobalt, and nearly 90% of rare earth elements. Australia is the other power player. In the past, mining companies have responded to higher demand by increasing their investment in new projects. But it takes on average 16 years from the discovery of a deposit for a mine to start production, according to the IEA. Current supply and investment plans are geared to “gradual, insufficient action on climate change,” it warned. “These risks to the reliability, affordability and sustainability of mineral supply are manageable, but they are real,” the Paris-based agency said in the most comprehensive report on the issue to date. “How policy makers and companies respond will determine whether critical minerals are a vital enabler for clean energy transitions, or a bottleneck in the process.” The minerals are essential to technologies that are expected to play a leading role in combating climate change. The average electric car requires six times more minerals than a conventional car, according to the IEA. Lithium, nickel, cobalt, manganese and graphite are crucial to batteries. Electricity networks need huge amounts of copper and aluminum, while rare earth elements are used in the magnets needed to make wind turbines work. Meeting the goals of the Paris climate agreement will require a “significant” increase in clean energy, according to the IEA, which estimates that the annual installation of wind turbines would need to grow threefold by 2040 and electric car sales would need to expand 25 times over the same period. Reaching net zero emissions by 2050 would require even more investment. “The data shows a looming mismatch between the world’s strengthened climate ambitions and the availability of critical minerals that are essential to realizing those ambitions,” Fatih Birol, executive director of the IEA, said in a statement. “The challenges are not insurmountable, but governments must give clear signals about how they plan to turn their climate pledges into action.” The agency said that policymakers should provide more clarity on the energy transition, promote the development of new technology and recycling, enhance supply chain resilience and encourage higher environmental, social and governance (ESG) standards. The IEA, which advises the world’s richest countries and was founded after the oil supply shocks in the 1970s, said that mineral supplies will be the energy security challenge of the 21st century. “Concerns about price volatility and security of supply do not disappear in an electrified, renewables-rich energy system,” it said.

#### Climate change causes extinction.

Specktor 19 [Brandon; writes about the science of everyday life for Live Science, and previously for Reader's Digest magazine, where he served as an editor for five years; "Human Civilization Will Crumble by 2050 If We Don't Stop Climate Change Now, New Paper Claims," livescience, 6/4/19; <https://www.livescience.com/65633-climate-change-dooms-humans-by-2050.html>] Justin

The current climate crisis, they say, is larger and more complex than any humans have ever dealt with before. General climate models — like the one that the [United Nations' Panel on Climate Change](https://www.ipcc.ch/sr15/) (IPCC) used in 2018 to predict that a global temperature increase of 3.6 degrees Fahrenheit (2 degrees Celsius) could put hundreds of millions of people at risk — fail to account for the **sheer complexity of Earth's many interlinked geological processes**; as such, they fail to adequately predict the scale of the potential consequences. The truth, the authors wrote, is probably far worse than any models can fathom. How the world ends What might an accurate worst-case picture of the planet's climate-addled future actually look like, then? The authors provide one particularly grim scenario that begins with world governments "politely ignoring" the advice of scientists and the will of the public to decarbonize the economy (finding alternative energy sources), resulting in a global temperature increase 5.4 F (3 C) by the year 2050. At this point, the world's ice sheets vanish; brutal droughts kill many of the trees in the [Amazon rainforest](https://www.livescience.com/57266-amazon-river.html) (removing one of the world's largest carbon offsets); and the planet plunges into a feedback loop of ever-hotter, ever-deadlier conditions. "Thirty-five percent of the global land area, and **55 percent of the global population, are subject to more than 20 days a year of** [**lethal heat conditions**](https://www.livescience.com/55129-how-heat-waves-kill-so-quickly.html), beyond the threshold of human survivability," the authors hypothesized. Meanwhile, droughts, floods and wildfires regularly ravage the land. Nearly **one-third of the world's land surface turns to desert**. Entire **ecosystems collapse**, beginning with the **planet's coral reefs**, the **rainforest and the Arctic ice sheets.** The world's tropics are hit hardest by these new climate extremes, destroying the region's agriculture and turning more than 1 billion people into refugees. This mass movement of refugees — coupled with [shrinking coastlines](https://www.livescience.com/51990-sea-level-rise-unknowns.html) and severe drops in food and water availability — begin to **stress the fabric of the world's largest nations**, including the United States. Armed conflicts over resources, perhaps culminating in **nuclear war, are likely**. The result, according to the new paper, is "outright chaos" and perhaps "the end of human global civilization as we know it."

### Solvency

#### Contention 3 is the plan

#### We affirm: The appropriation of outer space by private entities in the People’s Republic of China is unjust.

#### Appropriation is the taking of or exercise of control over property

Bohm 13 [JEFF BOHM, Chief Judge. In re Cowin, 492 B.R. 858 (Bankr. S.D. Tex. 2013).] TDI

1. Application of the Facts in the Instant Disputes to Embezzlement under Section 523(a)(4)

(i) "The Debtor appropriated funds." "Appropriation" is defined as "the exercise of control over property; a taking of possession." BLACK'S LAW DICTIONARY 98 (7th ed. 1999). In connection with its analysis under the TTLA in section C.2.b., supra, this Court has determined that the Debtor appropriated the excess proceeds from the foreclosure sales of the Countrywide Property, the Chase Property, and the WMC Property that rightfully belonged to the Plaintiffs. Not only did the Debtor control the disposition of the excess proceeds via the WCL and Dampkring Deeds of Trust, but he ensured that the proceeds were deposited to Perc and TRH, entities controlled by his co-conspirator Allan Groves. Thus, the first element is satisfied.

(ii) "The appropriation was for the Debtor's use or benefit." This element does not require a showing that the Debtor himself personally benefitted by the amounts that the Plaintiffs were damaged. For example, in affirming a bankruptcy court's decision that a debt was nondischargeable due to embezzlement under section 523(a)(4), the Sixth Circuit stated:

### Framework

#### The standard is maximizing expected well-being, or hedonistic act utilitarianism.

#### 1] Actor spec—governments must use util because they don’t have intentions and are constantly dealing with tradeoffs—outweighs since different agents have different obligations—takes out calc indicts since they are empirically denied.

#### 2] Death is bad and outweighs – a] agents can’t act if they fear for their bodily security which constrains every ethical theory, b] it destroys the subject itself – kills any ability to achieve value in ethics since life is a prerequisite which means it’s a side constraint since we can’t reach the end goal of ethics without life

#### 3] Neuroscience- pleasure and pain *are* intrinsic value and disvalue – everything else regresses.

Blum et al. 18 [Kenneth Blum, 1Department of Psychiatry, Boonshoft School of Medicine, Dayton VA Medical Center, Wright State University, Dayton, OH, USA 2Department of Psychiatry, McKnight Brain Institute, University of Florida College of Medicine, Gainesville, FL, USA 3Department of Psychiatry and Behavioral Sciences, Keck Medicine University of Southern California, Los Angeles, CA, USA 4Division of Applied Clinical Research & Education, Dominion Diagnostics, LLC, North Kingstown, RI, USA 5Department of Precision Medicine, Geneus Health LLC, San Antonio, TX, USA 6Department of Addiction Research & Therapy, Nupathways Inc., Innsbrook, MO, USA 7Department of Clinical Neurology, Path Foundation, New York, NY, USA 8Division of Neuroscience-Based Addiction Therapy, The Shores Treatment & Recovery Center, Port Saint Lucie, FL, USA 9Institute of Psychology, Eötvös Loránd University, Budapest, Hungary 10Division of Addiction Research, Dominion Diagnostics, LLC. North Kingston, RI, USA 11Victory Nutrition International, Lederach, PA., USA 12National Human Genome Center at Howard University, Washington, DC., USA, Marjorie Gondré-Lewis, 12National Human Genome Center at Howard University, Washington, DC., USA 13Departments of Anatomy and Psychiatry, Howard University College of Medicine, Washington, DC US, Bruce Steinberg, 4Division of Applied Clinical Research & Education, Dominion Diagnostics, LLC, North Kingstown, RI, USA, Igor Elman, 15Department Psychiatry, Cooper University School of Medicine, Camden, NJ, USA, David Baron, 3Department of Psychiatry and Behavioral Sciences, Keck Medicine University of Southern California, Los Angeles, CA, USA, Edward J Modestino, 14Department of Psychology, Curry College, Milton, MA, USA, Rajendra D Badgaiyan, 15Department Psychiatry, Cooper University School of Medicine, Camden, NJ, USA, Mark S Gold 16Department of Psychiatry, Washington University, St. Louis, MO, USA, “Our evolved unique pleasure circuit makes humans different from apes: Reconsideration of data derived from animal studies”, U.S. Department of Veterans Affairs, 28 February 2018, accessed: 19 August 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6446569/>] R.S.

**Pleasure** is not only one of the three primary reward functions but it also **defines reward.** As homeostasis explains the functions of only a limited number of rewards, the principal reason why particular stimuli, objects, events, situations, and activities are rewarding may be due to pleasure. This applies first of all to sex and to the primary homeostatic rewards of food and liquid and extends to money, taste, beauty, social encounters and nonmaterial, internally set, and intrinsic rewards. Pleasure, as the primary effect of rewards, drives the prime reward functions of learning, approach behavior, and decision making and provides the **basis for hedonic theories** of reward function. We are attracted by most rewards and exert intense efforts to obtain them, just because they are enjoyable [10].

Pleasure is a passive reaction that derives from the experience or prediction of reward and may lead to a long-lasting state of happiness. The word happiness is difficult to define. In fact, just obtaining physical pleasure may not be enough. One key to happiness involves a network of good friends. However, it is not obvious how the higher forms of satisfaction and pleasure are related to an ice cream cone, or to your team winning a sporting event. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure [14].

Pleasure as a hallmark of reward is sufficient for defining a reward, but it may not be necessary. A reward may generate positive learning and approach behavior simply because it contains substances that are essential for body function. When we are hungry, we may eat bad and unpleasant meals. A monkey who receives hundreds of small drops of water every morning in the laboratory is unlikely to feel a rush of pleasure every time it gets the 0.1 ml. Nevertheless, with these precautions in mind, we may define any stimulus, object, event, activity, or situation that has the potential to produce pleasure as a reward. In the context of reward deficiency or for disorders of addiction, homeostasis pursues pharmacological treatments: drugs to treat drug addiction, obesity, and other compulsive behaviors. The theory of allostasis suggests broader approaches - such as re-expanding the range of possible pleasures and providing opportunities to expend effort in their pursuit. [15]. It is noteworthy, the first animal studies eliciting approach behavior by electrical brain stimulation interpreted their findings as a discovery of the brain’s pleasure centers [16] which were later partly associated with midbrain dopamine neurons [17–19] despite the notorious difficulties of identifying emotions in animals.

Evolutionary theories of pleasure: The love connection BO:D

Charles Darwin and other biological scientists that have examined the biological evolution and its basic principles found various mechanisms that steer behavior and biological development. Besides their theory on natural selection, it was particularly the sexual selection process that gained significance in the latter context over the last century, especially when it comes to the question of what makes us “what we are,” i.e., human. However, the capacity to sexually select and evolve is not at all a human accomplishment alone or a sign of our uniqueness; yet, we humans, as it seems, are ingenious in fooling ourselves and others–when we are in love or desperately search for it.

It is well established that modern biological theory conjectures that **organisms are** the **result of evolutionary competition.** In fact, Richard Dawkins stresses gene survival and propagation as the basic mechanism of life [20]. Only genes that lead to the fittest phenotype will make it. It is noteworthy that the phenotype is selected based on behavior that maximizes gene propagation. To do so, the phenotype must survive and generate offspring, and be better at it than its competitors. Thus, the ultimate, distal function of rewards is to increase evolutionary fitness by ensuring the survival of the organism and reproduction. It is agreed that learning, approach, economic decisions, and positive emotions are the proximal functions through which phenotypes obtain other necessary nutrients for survival, mating, and care for offspring.

Behavioral reward functions have evolved to help individuals to survive and propagate their genes. Apparently, people need to live well and long enough to reproduce. Most would agree that homo-sapiens do so by ingesting the substances that make their bodies function properly. For this reason, foods and drinks are rewards. Additional rewards, including those used for economic exchanges, ensure sufficient palatable food and drink supply. Mating and gene propagation is supported by powerful sexual attraction. Additional properties, like body form, augment the chance to mate and nourish and defend offspring and are therefore also rewards. Care for offspring until they can reproduce themselves helps gene propagation and is rewarding; otherwise, many believe mating is useless. According to David E Comings, as any small edge will ultimately result in evolutionary advantage [21], additional reward mechanisms like novelty seeking and exploration widen the spectrum of available rewards and thus enhance the chance for survival, reproduction, and ultimate gene propagation. These functions may help us to obtain the benefits of distant rewards that are determined by our own interests and not immediately available in the environment. Thus the distal reward function in gene propagation and evolutionary fitness defines the proximal reward functions that we see in everyday behavior. That is why foods, drinks, mates, and offspring are rewarding.

There have been theories linking pleasure as a required component of health benefits salutogenesis, (salugenesis). In essence, under these terms, pleasure is described as a state or feeling of happiness and satisfaction resulting from an experience that one enjoys. Regarding pleasure, it is a double-edged sword, on the one hand, it promotes positive feelings (like mindfulness) and even better cognition, possibly through the release of dopamine [22]. But on the other hand, pleasure simultaneously encourages addiction and other negative behaviors, i.e., motivational toxicity. It is a complex neurobiological phenomenon, relying on reward circuitry or limbic activity. It is important to realize that through the “Brain Reward Cascade” (BRC) endorphin and endogenous morphinergic mechanisms may play a role [23]. While natural rewards are essential for survival and appetitive motivation leading to beneficial biological behaviors like eating, sex, and reproduction, crucial social interactions seem to further facilitate the positive effects exerted by pleasurable experiences. Indeed, experimentation with addictive drugs is capable of directly acting on reward pathways and causing deterioration of these systems promoting hypodopaminergia [24]. Most would agree that pleasurable activities can stimulate personal growth and may help to induce healthy behavioral changes, including stress management [25]. The work of Esch and Stefano [26] concerning the link between compassion and love implicate the brain reward system, and pleasure induction suggests that social contact in general, i.e., love, attachment, and compassion, can be highly effective in stress reduction, survival, and overall health.

Understanding the role of neurotransmission and pleasurable states both positive and negative have been adequately studied over many decades [26–37], but comparative anatomical and neurobiological function between animals and homo sapiens appear to be required and seem to be in an infancy stage.

Finding happiness is different between apes and humans

As stated earlier in this expert opinion one key to happiness involves a network of good friends [38]. However, it is not entirely clear exactly how the higher forms of satisfaction and pleasure are related to a sugar rush, winning a sports event or even sky diving, all of which augment dopamine release at the reward brain site. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure.

Remarkably, there are pathways for ordinary liking and pleasure, which are limited in scope as described above in this commentary. However, there are **many brain regions**, often termed hot and cold spots, that significantly **modulate** (increase or decrease) our **pleasure or** even produce **the opposite** of pleasure— that is disgust and fear [39]. One specific region of the nucleus accumbens is organized like a computer keyboard, with particular stimulus triggers in rows— producing an increase and decrease of pleasure and disgust. Moreover, the cortex has unique roles in the cognitive evaluation of our feelings of pleasure [40]. Importantly, the interplay of these multiple triggers and the higher brain centers in the prefrontal cortex are very intricate and are just being uncovered.

Desire and reward centers

It is surprising that many different sources of pleasure activate the same circuits between the mesocorticolimbic regions (Figure 1). Reward and desire are two aspects pleasure induction and have a very widespread, large circuit. Some part of this circuit distinguishes between desire and dread. The so-called pleasure circuitry called “REWARD” involves a well-known dopamine pathway in the mesolimbic system that can influence both pleasure and motivation.

In simplest terms, the well-established mesolimbic system is a dopamine circuit for reward. It starts in the ventral tegmental area (VTA) of the midbrain and travels to the nucleus accumbens (Figure 2). It is the cornerstone target to all addictions. The VTA is encompassed with neurons using glutamate, GABA, and dopamine. The nucleus accumbens (NAc) is located within the ventral striatum and is divided into two sub-regions—the motor and limbic regions associated with its core and shell, respectively. The NAc has spiny neurons that receive dopamine from the VTA and glutamate (a dopamine driver) from the hippocampus, amygdala and medial prefrontal cortex. Subsequently, the NAc projects GABA signals to an area termed the ventral pallidum (VP). The region is a relay station in the limbic loop of the basal ganglia, critical for motivation, behavior, emotions and the “Feel Good” response. This defined system of the brain is involved in all addictions –substance, and non –substance related. In 1995, our laboratory coined the term “Reward Deficiency Syndrome” (RDS) to describe genetic and epigenetic induced hypodopaminergia in the “Brain Reward Cascade” that contribute to addiction and compulsive behaviors [3,6,41].

Furthermore, ordinary “liking” of something, or pure pleasure, is represented by small regions mainly in the limbic system (old reptilian part of the brain). These may be part of larger neural circuits. In Latin, hedus is the term for “sweet”; and in Greek, hodone is the term for “pleasure.” Thus, the word Hedonic is now referring to various subcomponents of pleasure: some associated with purely sensory and others with more complex emotions involving morals, aesthetics, and social interactions. The capacity to have pleasure is part of being healthy and may even extend life, especially if linked to optimism as a dopaminergic response [42].

Psychiatric illness often includes symptoms of an abnormal inability to experience pleasure, referred to as anhedonia. A negative feeling state is called dysphoria, which can consist of many emotions such as pain, depression, anxiety, fear, and disgust. Previously many scientists used animal research to uncover the complex mechanisms of pleasure, liking, motivation and even emotions like panic and fear, as discussed above [43]. However, as a significant amount of related research about the specific brain regions of pleasure/reward circuitry has been derived from invasive studies of animals, these cannot be directly compared with subjective states experienced by humans.

In an attempt to resolve the controversy regarding the causal contributions of mesolimbic dopamine systems to reward, we have previously evaluated the three-main competing explanatory categories: “liking,” “learning,” and “wanting” [3]. That is, dopamine may mediate (a) liking: the hedonic impact of reward, (b) learning: learned predictions about rewarding effects, or (c) wanting: the pursuit of rewards by attributing incentive salience to reward-related stimuli [44]. We have evaluated these hypotheses, especially as they relate to the RDS, and we find that the incentive salience or “wanting” hypothesis of dopaminergic functioning is supported by a majority of the scientific evidence. Various neuroimaging studies have shown that anticipated behaviors such as sex and gaming, delicious foods and drugs of abuse all affect brain regions associated with reward networks, and may not be unidirectional. Drugs of abuse enhance dopamine signaling which sensitizes mesolimbic brain mechanisms that apparently evolved explicitly to attribute incentive salience to various rewards [45].

Addictive substances are voluntarily self-administered, and they enhance (directly or indirectly) dopaminergic synaptic function in the NAc. This activation of the brain reward networks (producing the ecstatic “high” that users seek). Although these circuits were initially thought to encode a set point of hedonic tone, it is now being considered to be far more complicated in function, also encoding attention, reward expectancy, disconfirmation of reward expectancy, and incentive motivation [46]. The argument about addiction as a disease may be confused with a predisposition to substance and nonsubstance rewards relative to the extreme effect of drugs of abuse on brain neurochemistry. The former sets up an individual to be at high risk through both genetic polymorphisms in reward genes as well as harmful epigenetic insult. Some Psychologists, even with all the data, still infer that addiction is not a disease [47]. Elevated stress levels, together with polymorphisms (genetic variations) of various dopaminergic genes and the genes related to other neurotransmitters (and their genetic variants), and may have an additive effect on vulnerability to various addictions [48]. In this regard, Vanyukov, et al. [48] suggested based on review that whereas the gateway hypothesis does not specify mechanistic connections between “stages,” and does not extend to the risks for addictions the concept of common liability to addictions may be more parsimonious. The latter theory is grounded in genetic theory and supported by data identifying common sources of variation in the risk for specific addictions (e.g., RDS). This commonality has identifiable neurobiological substrate and plausible evolutionary explanations.

Over many years the controversy of dopamine involvement in especially “pleasure” has led to confusion concerning separating motivation from actual pleasure (wanting versus liking) [49]. We take the position that animal studies cannot provide real clinical information as described by self-reports in humans. As mentioned earlier and in the abstract, on November 23rd, 2017, evidence for our concerns was discovered [50]

In essence, although nonhuman primate brains are similar to our own, the disparity between other primates and those of human cognitive abilities tells us that surface similarity is not the whole story. Sousa et al. [50] small case found various differentially expressed genes, to associate with pleasure related systems. Furthermore, the dopaminergic interneurons located in the human neocortex were absent from the neocortex of nonhuman African apes. Such differences in neuronal transcriptional programs may underlie a variety of neurodevelopmental disorders.

In simpler terms, the system controls the production of dopamine, a chemical messenger that plays a significant role in pleasure and rewards. The senior author, Dr. Nenad Sestan from Yale, stated: “Humans have evolved a dopamine system that is different than the one in chimpanzees.” This may explain why the behavior of humans is so unique from that of non-human primates, even though our brains are so surprisingly similar, Sestan said: “It might also shed light on why people are vulnerable to mental disorders such as autism (possibly even addiction).” Remarkably, this research finding emerged from an extensive, multicenter collaboration to compare the brains across several species. These researchers examined 247 specimens of neural tissue from six humans, five chimpanzees, and five macaque monkeys. Moreover, these investigators analyzed which genes were turned on or off in 16 regions of the brain. While the differences among species were subtle, **there was** a **remarkable contrast in** the **neocortices**, specifically in an area of the brain that is much more developed in humans than in chimpanzees. In fact, these researchers found that a gene called tyrosine hydroxylase (TH) for the enzyme, responsible for the production of dopamine, was expressed in the neocortex of humans, but not chimpanzees. As discussed earlier, dopamine is best known for its essential role within the brain’s reward system; the very system that responds to everything from sex, to gambling, to food, and to addictive drugs. However, dopamine also assists in regulating emotional responses, memory, and movement. Notably, abnormal dopamine levels have been linked to disorders including Parkinson’s, schizophrenia and spectrum disorders such as autism and addiction or RDS.

#### 4] No intent-foresight distinction for states.

Enoch 07 Enoch, D [The Faculty of Law, The Hebrew Unviersity, Mount Scopus Campus, Jersusalem]. (2007). INTENDING, FORESEEING, AND THE STATE. Legal Theory, 13(02). doi:10.1017/s1352325207070048 https://www.cambridge.org/core/journals/legal-theory/article/intending-foreseeing-and-the-state/76B18896B94D5490ED0512D8E8DC54B2

The general difficulty of the intending-foreseeing distinction here stemmed, you will recall, from the feeling that attempting to pick and choose among the foreseen consequences of one’s actions those one is more and those one is less responsible for looks more like the preparation of a defense than like a genuine attempt to determine what is to be done. Hiding behind the intending-foreseeing distinction seems like an attempt to evade responsibility, and so thinking about the distinction in terms of responsibility serves 39. Anderson & Pildes, supra note 38. I will use this text as my example of an expressive theory here. 40. See id. at 1554, 1564. 41. For a general critique, see Mathew D. Adler, Expressive Theories of Law: A Skeptical Overview, 148 U. PA. L. REV. 1363 (1999–2000). 42. As Adler repeatedly notes, the understanding of expression Anderson & Pildes work with is amazingly broad, so that “To express an attitude through action is to act on the reasons the attitude gives us”; Anderson & Pildes, supra note 38, at 1510. If this is so, it seems that expression drops out of the picture and everything done with it can be done directly in terms of reasons. 43. This may be true of what Anderson and Pildes have in mind when they say that “expressive norms regulate actions by regulating the acceptable justifications for doing them”; id. at 1511. http://journals.cambridge.org Downloaded: 03 Aug 2014 IP address: 134.153.184.170 Intending, Foreseeing, and the State 91 to reduce even further the plausibility of attributing to it intrinsic moral significance. This consideration—however weighty in general—seems to me very weighty when applied to state action and to the decisions of state officials. For perhaps it may be argued that individuals are not required to undertake a global perspective, one that equally takes into account all foreseen consequences of their actions. Perhaps, in other words, individuals are entitled to (roughly) settle for having a good will, and beyond that let chips fall where they may. But this is precisely what stateswomen and statesmen—and certainly states—are not entitled to settle for.44 In making policy decisions, it is precisely the global (or at least statewide, or nationwide, or something of this sort) perspective that must be undertaken. Perhaps, for instance, an individual doctor is entitled to give her patient a scarce drug without thinking about tomorrow’s patients (I say “perhaps” because I am genuinely not sure about this), but surely when a state committee tries to formulate rules for the allocation of scarce medical drugs and treatments, it cannot hide behind the intending-foreseeing distinction, arguing that if it allows45 the doctor to give the drug to today’s patient, the death of tomorrow’s patient is merely foreseen and not intended. When making a policy-decision, this is clearly unacceptable. Or think about it this way (I follow Daryl Levinson here):46 perhaps restrictions on the responsibility of individuals are justified because individuals are autonomous, because much of the value in their lives comes from personal pursuits and relationships that are possible only if their responsibility for what goes on in the (more impersonal) world is restricted. But none of this is true of states and governments. They have no special relationships and pursuits, no personal interests, no autonomous lives to lead in anything like the sense in which these ideas are plausible when applied to individuals persons. So there is no reason to restrict the responsibility of states in anything like the way the responsibility of individuals is arguably restricted.47 States and state officials have much more comprehensive responsibilities than individuals do. Hiding behind the intending-foreseeing distinction thus more clearly constitutes an evasion of responsibility in the case of the former. So the evading-responsibility worry has much more force against the intending-foreseeing distinction when applied to state action than elsewhere.

#### 5] Only consequentialism explains degrees of wrongness—if I break a promise to meet up for lunch, that is not as bad as breaking a promise to take a dying person to the hospital. Only the consequences of breaking the promise explain why the second one is much worse than the first which is the most intuitive.